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Achieving a Readable Style: Learn Techniques for Clear, Concise, Active Writing

To help your students in *Writing Science Right* you may want to review a few basics of good writing with them. A **sentence** is a group of words that expresses a complete thought. **Style** refers to the overall way to express ideas in a sentence and even the words chosen in a paragraph and in a paper such as a report.

The Paragraph

A reminder: We define a **paragraph** as a group of sentences that begins with a central or topic statement of the paragraph content. The supporting sentences build on the idea stated in the topic sentence and should occur in a logical order. In short:

- Begin each paragraph with a topic sentence that summarizes content to come.
- Include only information relevant to the topic sentence.
- Place sentences in a logical order.
- Avoid long paragraphs. (No one likes to read long paragraphs!)

Examples for Study

Effective report segments result from effective paragraphs. Examine the following introduction to a science report (Example 2.1). Topic sentences appear underlined. How does a topic sentence contribute to a readable paragraph?

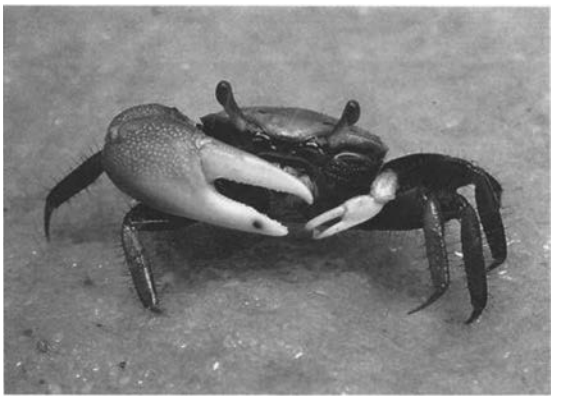
Example 2.1: Introduction to a Science Report

We live on a rotating planet. Every day, as the Earth turns on its axis, we experience the natural cycle of day and night. By day, most humans are busy. During the dark hours of night, we rest. Why do we follow this pattern? Why do we wake up in the morning, often without an alarm clock?

All living things have internal systems that function like clocks. These timekeepers are called biological clocks. In humans these "biological clocks" keep us in sync with our environment. They not only wake us up, they tell us when to sleep. We follow a daily rhythm. But some marine animals follow a different rhythm. Their activities correspond to the rise and fall of ocean tides. The fiddler crab exemplifies one of the sea animals that follows the rhythm of the ocean. A fiddler crab dashes about the beach, finding food and fighting other crabs. The time is low tide, and the crab has a limited amount of time to do its business. Once water begins to rise, the crab returns to its burrow.

The fiddler crab's activities do not coincide with day and night but link to the tides. At low tide, the crab is active. When high tide comes again six hours later, the crab rests. The pattern repeats itself both day and night. In an ocean environment, tides are like a clock. They provide a steady beat that some animals use to regulate their behavior and follow a tidal rhythm.

Male Fiddler Crab



This report about the life rhythm of the male fiddler crab has been prepared to discuss the biological clock of the crabs. The photo, introduction, and two paragraphs set the stage for the report itself. Beginning each paragraph with a topic sentence allows your readers to follow the ideas you are presenting.

All reports begin with an introduction to prepare the reader for the information that follows. Example 2.2 uses a list to draw the reader's eyes to the central idea presented in the paragraph. The topic sentence introduces the paragraph and the list.

Example 2.2: Effective Introduction to a Scientific Report

The Power of Wind Power

Rising energy prices and concern over greenhouse gas have focused congressional attention on energy alternatives, including wind power. Although wind power currently provides only a small fraction of U.S. energy needs, it is growing more rapidly than any other electricity source. Wind energy already plays a major role in several European nations. Countries like China and India are rapidly expanding their capacity to manufacture wind turbines and to integrate wind power into their electricity grids. This report describes high volume, utility-scale wind power issues in the United States. The report is divided into the following sections:

- Background on wind energy;
- Wind resources and technology;
- Industry composition and trends;
- Wind power economics; and
- Policy issues.

Using a list emphasizes five items that take front and center in the report.

In this situation, listing highlights the importance of the problem that will be the focus of the report. A traditional paragraph that embedded the list as part of the paragraph would make the concerns harder to notice—see Example 2.3.

Example 2.3: Traditional Paragraph With List

Rising energy prices and concern over greenhouse gas have focused congressional attention on energy alternatives, including wind power.

Although wind power currently provides only a small fraction of U.S. energy needs, it is growing more rapidly than any other electricity source. Wind energy already plays a major role in several European nations. Countries like China and India are rapidly expanding their capacity to manufacture wind turbines and to integrate wind power into their electricity grids. This report describes utility-scale wind power issues in the United States. The report is divided into the following sections: background on wind

energy, wind resources and technology, industry composition and trends, wind power economics, and policy issues.

Concise paragraphs that begin with good topic sentences, followed by well-structured sentences of moderate length, create clear, readable papers. In addition, the title and any headings affect the readability of the paragraph by preparing readers for the information to come.

Basic Principles of Effective Style

Effective writers adjust their style to the needs of their readers. Good writers take into consideration (1) their readers' knowledge of the subject and (2) their readers' ability to follow the sentences, considering the context in which they will read the text.

Determine Your Readers' Knowledge of the Subject

The reader's familiarity with the subject will determine how many specialized terms the writer can use. If the reader has a thorough knowledge of the subject, writers can use acronyms, such as DNA, and specialized terms that readers in a specific discipline regularly read and use. If the reader has limited knowledge of the subject, limit the use of specialized vocabulary or define the terms that will be used. Another possibility is to substitute common phrases or words that clearly express the meaning.

Example 2.4 comes from a high school 4-H study packet that describes a ruminant stomach. Notice how the writer defines terms in parentheses.

Example 2.4: From a High School Study Packet

> The true (glandular) stomach in the ruminant is preceded by three divisions, or diverticula (lined with stratified squamous epithelium), where food is soaked and subjected to digestion by microorganisms before passing to the digestive tract.
>
> The rumen, reticulum, and omasum of ruminants are collectively known as the fore-stomach. The cardia is located craniodorsally in the dome-shaped atrium ventriculi, which is common to both the rumen and the reticulum. The sulcus ruminoreticularis (esophageal groove), which extended from the cardia to the omasum, is formed by two heavy muscular folds or lips, which can close to direct material from the esophagus into the omasum directly, or open and permit the material to enter the rumen and reticulum.

However, in explaining to 4-H students how the ruminant stomach works, an agricultural extension agent uses a different approach. Note that he uses examples and analogies that will have meaning for middle school students. He includes the technical terms for each part of the ruminant stomach, but he immediately links each term to descriptive terms that would be familiar to his student readers.

Example 2.5: From an Agricultural Extension Agent

The ruminant animals—such as sheep, goats, cattle, deer, antelope, elk, and camels—have a unique stomach system. The word ruminant comes from the Latin word "ruminate," which means to chew over again and implies that ruminants are "cud-chewing" animals. Because of this need to chew their food over and over, their system differs from that of the human or monogastric. Where the human stomach is one large tank, the ruminant's consists of four fermentation and storage tanks connected in series by an intricate network of flexible plumbing. The first three tanks make up the fore-stomach. The fourth tank is comparable to the human stomach and can be called the true stomach.

The rumen is the *first tank*, or stomach, and is quite large. It is responsible for about 75% of the digestive process. When it is full, the rumen holds up to 55 gallons of food, bacteria, and fluids. The main job of the rumen is to store food and keep it until the animal must chew it again. The rumen can be compared to the common blender. When food enters, the rumen begins mixing it with bacteria, which causes the food to start breaking down—or digesting.

The reticulum is *the second stomach* and is relatively small compared to the rumen. The reticulum occupies 5% of the total stomach. Like the rumen, its purpose is storage. The reticulum looks like a cheese grater. The common name for the reticulum is the honeycomb because it is lined with a mucous membrane that contains honeycomb-like compartments. When food enters this stomach, it passes through the honeycomb, which then breaks the food down and shreds it into small pieces. Once the rumen and reticulum break down the food stored in the reticulum, the food moves to the omasum.

The omasum is *the third stomach* and completes the fore-stomach. It is small—occupying about 8% of the total stomach—but it is important to the process of digestion. The omasum's purpose is to make sure the food is broken down enough before it enters the true stomach. This stomach rips, shreds, and crushes the food into a liquid form so that it will not clog the pipe that connects the omasum to the abomasums.

The abomasums, which takes up about 7% of the digestive system, is *the fourth stomach* and is comparable to our own stomach. The abomasums

digests what the rumen, reticulum, and omasum break down. At the end of the abomasums is the pipe that allows the food to enter the small intestine. This pipe is call the pylorus and is similar to a strainer. Only properly digested food can enter the pipe.

Note: Conciseness does not equal brevity. Writing concisely means including all that is needed without extra words and phrases that contribute little to the main idea. Brevity means scaling down (rather than completeness of thought).

Adjust the Style to the Readers, the Purpose, and the Context or Setting

Most scientific writing should strive for as much conciseness as possible because of the large quantity of information that readers confront. E-mail messages should have concise paragraphs and concise sentences. Even in complex, highly technical reports, readers value conciseness: the longer the report, the less likely that anyone will read all of it.

Keys to Building Effective Sentences

Watch Sentence Length

Papers composed of consistently long sentences can become difficult to read. Sentence length should vary, but consider revising sentences over 15 words. Even legal documents can benefit from shorter sentences and have improved as a result of the plain English laws that now govern insurance policies and many other legal documents in various states. Many government entities want their public documents written in concise, easily understood sentences.

Excessively complex:

Familiar to all are the rhythmic changes in innumerable processes of animals and plants in nature. Examples of phenomena geared to the 24-hour solar day produced by rotation of the earth relative to the sun are sleep movements of plant leaves and petals, spontaneous activity in numerous animals, emergence of flies from their pupal cases, color changes of the skin in crabs, and wakefulness in man.

Sample patterns of daily fluctuations, each interpretable as adaptive for the species are discussed here. Rhythmic phenomena linked to the 24-hour and 50-minute lunar-day period of rotation of the earth

> relative to the moon are most conspicuous among intertidal organisms whose lives are dominated by the ebb and flow of the ocean tides. Everyone knows that there are individuals who are able to awaken morning after morning at the same time within a few minutes. Are they awakened by sensory cues received unconsciously, or is there some "biological clock" that keeps accurate account of the passage of time? Students of the behavior or animals in relation to their environment have long been interested in the biological question.

More easily understood:

> Everyone knows individuals able to awaken morning after morning at the same time within a few minutes. Are they awakened by sensory cues received unconsciously, or is there some "biological clock" that keeps accurate account of the passage of time? Students of that behavior and of animals in relation to their environment have long been interested in the biological question.
>
> Most animals show a rhythmic behavior pattern of one sort or another. For instance, many animals that live along the ocean shores have behavior cycles which repeat with the ebb and flow of the tides, each cycle averaging about 12.5 hours in length.

If you expect readers whom you will have to interest in your topic, to read what you have written, you may need to add some drama to your writing.

More easily understood and compelling:

> One of the greatest riddles of the universe is the uncanny ability of living things to carry out their normal activities with clocklike precision at a particular time of the day, month, and year. Why do oysters plucked from a Connecticut bay and shipped to a Midwest laboratory continue to time their lives to ocean tides 800 miles away? How do potatoes in hermetically sealed containers predict atmospheric pressure trends two days in advance? What effects do the lunar and solar rhythms have on the life habits of man? Living things clearly possess powerful adaptive capacities—but the explanation of whatever strange and powerful forces are involved in this behavior continues to challenge science.

In short, understand your topic, determine what sentence length and word choice will best appeal to the reader, and then choose the tone of your message. **Be aware of the characteristics of bad and good writing**.

Characteristics of Bad and Good Writing

Bad Writing	Good Writing
few action verbs per sentence	many verbs per sentence
excessive ***is/are*** verb forms	specific action verbs
abstract nouns	actual, tangible nouns
many prepositional phrases	few prepositional phrases
passive voice	active voice
key words are separated (by other words)	actor–action and subject–verb connections are clear (usually because they are close together)
long, rambling sentences	specific, precise sentences
one sentence contains many distinct ideas that are not clearly connected to each other	main idea of each sentence is easy to find and follow
sentences must be read several times	sentence meaning is clear after one reading

Keep Subjects and Verbs Close Together

A recipe for sentence clarity: *keep the subject of the sentence and the verb close together and emphasize verbs*. The more verbs in a sentence, the sharper and more direct the sentence. Be aware of the number of verbs in relationship to the number of words in a sentence. The verb-to-word ratio controls the directness of the meaning. Examine the following sentences: The more verbs the clearer the sentence.

s v s v

John *enjoyed* physics because he *learned* the basics easily. (verb/word ratio 2/9)

versus

s v

John's enjoyment of physics *was dependent* on his ease of learning the basics of science. (verb/word ratio 1/14)

In this simple example, you can see the point: the more verbs, the sharper the sentence. (In addition, the sole verb in the second sentence is passive—*was dependent*—instead of active—*enjoyed*, *learned*.)

Let's take this method a step further: Lengthy sentences become less distracting to the reader if the writer structures them to improve clarity and readability. To achieve clarity, build sentences with clauses and as many verbs

and verbals (to + a verb) as possible. For example, this sentence is developed from three clauses:

> When they plan science proposals, researchers consider a variety of options because they need research funds. (16 words)

1) *When they plan science proposals*
2) *researchers consider a variety of options*
3) *because they need research funds.*

Note that the sentence follows the three guidelines: interlocking clauses (three in this sentence); specific action verbs (plan, recommend, and need); subject next to the verb in each clause:

1) *they plan*
2) *researchers consider*
3) *they need*

The sentence has a verb/word ratio of 3/17.

Now, let's see what would happen if the writer did not follow the guidelines and avoided verbs:

> In their planning for science proposals, a variety of approaches *are considered* by researchers because of their serious need for project funding. (21 words)

The verb/word ratio is 1/21. The sentence lacks directness and conciseness. Compare the two versions. Can you see the difference?

> The more verbs and verbals a writer uses, the easier time the reader has in understanding the sentence(s). The actor, or subject should be followed with an active verb that identifies what the actor does.

For most writing, use specific, concrete subjects and verbs.

Instead of:

There *is* now no effective existing mechanism for introducing into the beginning initiation and development stages requirements on how to

guide employees on how *to minimize* errors in product development efforts.

(verb/word ratio 3/31; one "is" verb and two verbals)

Use:

The company *has* no way *to guide* employees on how *to minimize* product development errors during the early development stages.

(verb/word ratio 3/20; note that the sentence begins with the actor in the subject position and includes two verbals)

Note: When a sentence lacks a clear subject/agent doing the action (verb), writers can often drift into the phrases "there is, there are, there was, there were," which have no meaning and deter conciseness and directness.

Direct/indirect words also affect tone:

a. *We encourage you to prepare for large volumes of rain that can be expected in California so take every measure to protect your property.*
b. We expect heavy rainfall in California, so be prepared.

Note that (b) is easier to read than (a). The tone of (a) also sounds pompous.

Write Squeaky-Clean Prose

The following excerpt from *DNA: The Secret of Life*, one of the most important science books of the 20th century, addresses readers interested in science who have a basic understanding of genetics. Note the structure of each sentence, the use of topic sentences, and the development of each paragraph:

The great size of DNA molecules posed a big problem in the early days of molecular biology. To come to grips with a particular gene—a particular stretch of DNA—we would have to devise some way of isolating it from all the rest of the DNA that sprawled around it in either direction. But it was not only a matter of isolating the gene; we also needed some way of "amplifying" it: obtaining a large enough sample of it to work with. In essence we needed a molecular editing system: a pair of molecular scissors that could cut the DNA text into manageable sections; a kind of molecular glue pot that would allow us to manipulate those pieces; and finally a molecular duplicating machine to amplify the pieces that we had cut out and isolated. We wanted to

> do the equivalent of what a word processor can now achieve: to cut, paste, and copy DNA.
>
> Developing the basic tools to perform these procedures seemed a tall order even after we cracked the genetic code. A number of discoveries made in the late sixties and early seventies, however, serendipitously came together in 1973 to give us so-called "recombinant DNA" technology—the capacity to edit DNA. This was no ordinary advance in lab techniques. Scientists were suddenly able to tailor DNA molecules, creating ones that had never before been seen in nature. We could "play God" with the molecular underpinning of all of life. This was an unsettling idea to many people. Jeremy Rifkin, an alarmist for whom every new genetic technology has about it the whiff of Dr. Frankenstein's monster, had it right when he remarked that recombinant DNA "rivaled the importance of the discovery of fire itself."
>
> Source: Watson, James. *DNA: The Secret of Life*, pp. 87–88. Knopf, 2003. Used by permission.

This excerpt uses a variety of sentences of moderate length, close subject-verb patterns, familiar words, and a description of recombinant DNA in words easily understood by the nonscientific reader: the passage concisely and picturesquely expresses the meaning of recombinant DNA.

Avoid Pompous Language—Write to Express, Not Impress

The concept of simplicity relates to the concept of naturalness. Writers often believe they must sound learned, aloof, and sophisticated to impress readers. The idea that direct writing lacks sophistication frequently derives from writing done in high school where teachers encourage students to expand their vocabularies. Academic writing in college reinforces the importance of using jargon-laden language to convince the professor that the student knows the subject and the terminology or vocabulary of the discipline. Instructors may reward students for writing ponderous verbiage in research papers. However, particularly in the science fields, verbose writing may be ignored or misread by readers who are only interested in gleaning information relevant to their work.

Remember that writing exists for human beings to communicate. Few of us enjoy reading writing that seems harder to read than it needs to be. What constitutes "difficult" writing depends on the reader, the topic, and the purpose of the paper. Direct, concise writing that uses a conversational style will usually be appreciated by most readers. Using shorter rather than longer sentences also helps readers follow your thoughts. Consider:

> Please give immediate attention to ensure that the pages of all science reports prepared for distribution are numbered sequentially and in a

> place of optimum visibility. This is needed to facilitate our ability to refer to items during meetings.

Versus:

> Please correctly number the pages of all documents. Place numbers in the upper right-hand corner. Sequential numbering helps us locate material during meetings.

Or:

> Please number all pages in order.

Avoid Excessive Use of "Is/Are" Verb Forms

Choosing specific, concrete verbs for clarity means avoiding forms of the "be" verb whenever possible. As the following sentences illustrate, excessive use of "be" verbs often obscures action verbs. Many times, a "be" verb presents the best choice (as this sentence exemplifies). However, writers can lessen the tendency to rely on "be" verbs by doing the following:

1) Avoid beginning sentences with *there is* or *there are*, *there was* or *there were*.
2) Avoid beginning sentences with phrases such as *it is clear that*, *it is evident that*, and *it should be noted that*.
3) Choose a specific verb rather than *is*, *are*, *was*, and *were* verb forms.

"Be" verbs often create a longer, less direct sentence:

> Delegation is a means of lessening the manager's work load.

Versus:

> Managers who delegate *reduce* their work load.

"Be" words introduce extra words:

> My decision *is based on the assumption* that his statement *is erroneous*.

Versus:

> My decision *assumed* his statement *is erroneous*.

As these examples and the ones that follow show, the clearest sentences focus on the agent and the action (the verb):

There are two methods presently available for testing research samples.

Shorter and clearer:

Two available methods can test research samples.

Wordy:

There are several national and global organizations dedicated to promoting environmental sustainability for health care facilities.

Shorter and clearer:

Several national and global organizations promote environmental sustainability for health care facilities.

Use Active Voice for Clarity

The structure of a sentence—the arrangement of words—affects the clarity of the sentence. In active voice, the actor that does the action occurs next to the verb. The actor and the action both appear in the sentence, and the actor appears as the subject of the sentence.

Actor *verb*

The department teaches Chemistry II every spring term.

Actor *verb*

The science coordinator refused to allow freshmen to take Biology II.

The result? Clear, concise, direct sentences.

Before:

(A) Attempts were made by the science faculty to assess the new course revisions.

After:

actor verb

(B) The science faculty attempted to assess the new course revisions.

Sentence (A) uses passive voice. Sentence (B) uses active voice: the actor (staff) occurs as the subject and appears next to the verb (*attempted*).

Research to determine the most readable sentence structures indicates that active voice sentences are more readable than passive sentences. Readers often need the actor placed near the action (the verb) to determine the sentence meaning. The subject and verb contain the essence of the sentence. The following examples illustrate this concept. Imagine a sign:

The Door to the Science Labs Is to Be Locked at 6:00 P.M.

This sentence, which does not specify the actor (the person doing the action), could mean either of the following:

The janitor [or some designated person] will lock the door at 6:00 P.M.
The last person leaving the building at 6:00 P.M. must lock the science lab door.

As both revisions illustrate, to understand a sentence, readers need to know the actor and the action carried out by the actor. Sentences should indicate who or what performs the action.

Passive voice sentences often intentionally do not include the actor or agent doing the action to hide responsibility. The result may produce a sentence more verbose and less accurate than an active voice version. Passive voice sentences often use "there is" and "there are" constructions. Even in engineering writing, such as articles for academic journals, many editors want active voice sentences because of the increased clarity of the sentences. As in the examples below, the use of active subjects will usually make an explanation easier to read and easier to understand:

Before:

With the growing request of high quality multimedia service, especially in portable systems, efficient algorithms for audio and/or video data processing have been developed. These algorithms have the characteristics of high complexity data-intensive computation. For these applications, there exist two extreme implementations. One is software implementation running on a general purpose processor and the other is hardware implementation in the form of application-specific integrated circuit (ASIC). In the first case, it is flexible enough to support various applications but may not yield sufficient performance to cope with the complexity of application. In the second case, optimization is better in respect of both power and performance but only for a specific application. A coarse-grained reconfigurable architecture fills the gap between the two approaches, providing higher performance than software implementation and wider applicability than hardware implementation.

Try to write this example more concisely. Breaking long sentences into shorter ones and creating short paragraphs can also produce clarity.

Before:

To ensure quality of manufactured products, a crucial step is to take coordinate measurements of the geometric features to reconstruct product surface and then to check their compliance with tolerance specifications: my research develops a method to integrate the coordinate measurements from measuring devices of different resolutions for a better reconstruction of the product surface.

After:

To ensure quality of manufactured products, researchers must take coordinated measurements of the geometric features. The goal: to reconstruct product surface and then check surface compliance with tolerance specifications.

My research develops a method to integrate the coordinate[d] measurements from measuring devices of different resolutions to better reconstruct the product surface.

Avoid Using Longer Words When Shorter Ones Will Do Just as Well

To write concise sentences, use clear, concise words and phrases.

(Write to express, not to impress.)

Instead of:	Write:	Instead of:	Write:
accumulate	gather	implement	carry out
acquire	get	initiate	begin
acquaint	tell	maximum	most
activate	begin	modification	change
aggregate	total	nevertheless	but, however
assist	help	objective	aim
communicate	write, talk, tell	optimum	best
compensation	pay	personnel	people, staff
consequently	so	procure	get
continue	keep up	purchase	buy
demonstrate	show	terminate	end
discontinue	stop	transmit	send
endeavor	try	utilize	use
facilitate	ease, simplify		

Eliminate Words That Add Nothing to the Meaning of the Sentence

Reread your own sentences to delete any unnecessary words.

to the extent that	in view of
with respect to	in as much as
as a matter of fact	for the purpose
with reference to	in order
in connection with	as already stated

Avoid Words That Sound Knowledgeable Without Being Specific

Many are technical words that have been overused and poorly adapted to nontechnical situations.

parameters	warrants further investigation
broad-based	paradigm
contact	dynamics
impact	infrastructure
input/output	longitudinal study
conceptualize	matrix
meaningful	resource utilization
multifaceted	systematized
methodized	prioritize

Avoid Wordiness

These phrases can be pared down to avoid repetition.

absolutely complete	human volunteer
absolutely essential	green in color
my personal opinion	point in time
necessary essentials	sincere and earnest
basic fundamentals	small in size
complete absence	summarize briefly
consensus of opinion	miniscule
each and every	thought and consideration
exactly identical	true facts
example to illustrate	very unique
few in number	first and foremost
consideration was given	I considered
prior to the	before
at the present writing	now
effect an improvement	improve

(*continued overleaf*)

Continued

cognizant of	know
endeavor	try
viable alternative	possibility
in regard/reference to	about
in the normal course of procedure	normally
in this day and age	today
in my opinion	I believe
it is our opinion	we think
on a daily basis	daily
on the grounds that	because
without further delay	now

Style Exercises

Sentence Style

Ask your students to decide which recommendations in this chapter operate in the revisions of the following sentences. Why do these principles result in clearer, more concise revisions?

1. A stroke is an increasingly common problem associated with the brain. It is caused when a vein or artery in the brain is obstructed. This results in loss of consciousness from the loss of oxygen in the brain.

   Revision: A stroke, an obstruction in a vein or artery in the brain, results in loss of consciousness because the brain does not receive oxygen.

2. There is another method that is more invasive to the patient but proves to be successful enough to treat stroke.

   Revision: Another, more invasive, method proves successful in treating stroke.

3. There are many proposed solutions for ridding the U.S. of oil dependency.

   Revision: Many proposed solutions target reduction of U.S. oil dependency.

4. A significant amount of new research has come out recently about a bodily phenomenon called brown fat. Brown fat is regarded with interest because of its potential use as a new therapy for obese patients. Brown fat is nothing new—it's been known for centuries as "baby fat," the stuff that makes newborn infants so adorably chubby.

   Revision: Recent research on human "brown fat" shows that it may help obese patients. Brown fat, known for centuries as "baby fat," makes newborn infants chubby.

5. People in this field work in hospitals and dedicate their time to the mental well-being of children in hospitals as well as to helping the parents be able to support their children and cope with the trauma.

   Revision: People in this field work in hospitals. These professionals focus on the mental well-being of hospitalized children and help the parents support their children as they cope with trauma.

6. Asperger's Syndrome, sometimes called high functioning Autism Disorder, is a disability in young people that is frequently overlooked by educators and medical personnel.

   Revision: Educators and medical personnel frequently overlook Asperger's Syndrome, a high functioning Autism Disorder occurring in young people.

7. Even though Hurricane Gustav left its mark, there was a minimal amount of damage to the town, and finally there was a sigh of relief regarding energy prices.

   Revision: Even though Hurricane Gustav left its mark, the town suffered minimal damage and gave a sigh of relief regarding energy prices.

8. A shoemaking company has signed a deal to share military technology to make their shoes waterproof, at the same time making the fabric breathable.

   Revision: A shoemaking company has signed a deal to share military technology, making their shoes both waterproof and breathable.

9. There are many issues facing New Orleans related directly to hurricanes and tropical storms. Recently most of the problems caused from these storms have been traced back to the loss of wetlands of New Orleans during the past century. Despite recent pushes by community and political leaders in New Orleans to help restore these, very little has been done, leaving much of the city vulnerable to hurricanes and allowing sea level to continue to rise.

   Revision: New Orleans faces many issues related to hurricanes and tropical storms. Most problems caused by these storms have occurred because of loss of wetlands around New Orleans during the past century. The city has become more vulnerable to hurricanes as the sea level continues to rise. Little has been done, despite efforts by community and political leaders, to restore wetlands.

10. Efforts were made on the part of the director's committee for completion of an evaluation of the recommendations of the report.

    Revision: The director's committee tried to complete their evaluation of the report recommendations.

Have your students revise the following excerpts according to principles presented in this chapter.

1. There are several national and global organizations dedicated to promoting environmental sustainability for health care facilities.
2. Though there have been numerous economic anthropology studies in Mexico, they have largely been in three locations.
3. The intervening steps taken in the site are with the intention to make the site more attractive. This is done by establishing services, heading offices, cultural centers, and commercial firms in the downtown district.
4. For adequate housing in such circumstances, this paper here presents a model. The model is a step-by-step development process which is aimed at empowering the users. This process includes:*
   - Innovative financing
   - Creating employment opportunity
   - Make the users aware of sustainable systems for drinking water, sewage disposal, other utilities, and shelter improvement
   - Demonstrate the knowledge of the mentioned systems through a construction of a public facility for them.
   - Transfer the knowledge by employing the users in the construction and maintenance of the facility.

*__Note:__ Teaching usage works best when it is included in all exercises rather than by itself. Parallel structure can be a huge problem for many students, and they can often more easily identify it as a problem when they are evaluating a bulleted list like this one.

5. At the same time, these fuels must be easy to burn cleanly. This is typically characteristic of liquid and gaseous fuels. Lastly, it is best that the fuel be all liquid or a gas because of the ability to pump both. This means that the existing infrastructure can be used to distribute the fuel.
6. Lots of money around the world is poured into cancer research.
7. There has been success using lymphotropic paramagnetic nanoparticles for imaging prostate cancer.
8. There is plenty of money and room for big companies to get their foot in and discover new technologies to fight cancer.
9. Recently there has been a surge in research and development for a material called grapheme. One area grapheme is being applied to is solar cells.

10. Sustainable development is the process of moving human activities into a pattern that can be perpetually sustained. It is an approach that seeks to meet the needs of the present while protecting the resources that will be needed in the future.

Paragraph and Visual Style

Style also involves using visuals to help readers "see" your meaning. Visual displays of concepts are extremely important, so we introduce the concept here and then develop it further in Chapter 4 on oral presentations.

Examine the examples in Figures 2.1 and 2.2. The example in Figure 2.1 targets students in a middle-school science class. The example in Figure 2.2 targets adults in a continuing education course on birding. How do the drawings of birds flocking affect the readability of each example? Ask students to write two paragraphs describing the style of each example based on the style principles and keys in this chapter. Then have them revise the text and the visuals in Figure 2.1.

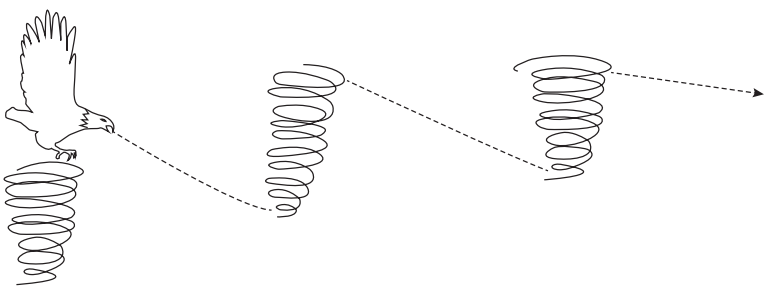
Figure 2.1 A definition of flocking for middle school students

What Is Flocking?

Why do hawks fly together in a group? Haven't you noticed that you often see hawks flying together rather than just one hawk flying all by itself?

Soaring birds, such as hawks and vultures, migrate in flocks, groups of birds that fly close together. Scientists have studied why hawks like flying together in flocks. These scientists have concluded that hawks travel as a group to help each other fly in the right direction. Another possible reason is that a group of hawks traveling together can find thermals more easily than can one hawk flying all by itself.

What are thermals and why are they important to soaring birds? Thermals are bubbles of warm air that rise from the ground into the sky. Hawks get inside these thermals and circle high in the air. When they reach the top of the thermal, they glide down to the bottom of the next one, then up again and down until they arrive home. Their flight looks like this:



So hawks, by using thermals, which are natural warm air currents, can circle and glide rather than flap their wings. As a result, they save energy as well as time. That's why you see hawks flying together. Working together, they can find these thermals, rather than looking for them alone.

Figure 2.2 A definition of flocking for a more mature audience

The Function of Flocking in Long-Distance Soaring Migrants

Studies by ornithologists have shown that soaring birds migrate in flocks. Since most migratory broad-winged hawks are observed in flocks and form groups even in the early morning, flocking must have some specific advantages for these raptors.

Some researchers believe that flocking assists hawks in navigating and in orienting themselves in the proper direction. Other biologists conclude that flocking enables hawks to locate thermals, the rising currents of warm air that allow the birds to soar and thus gain altitude. A hawk that has reached the top of a thermal can then glide down to the base of the next thermal, soar up, and glide down again, thermal-hopping until it reaches its destination.

Some researchers also suggest that thermal travel conserves energy and time for migrating raptors hawks' ability to find these thermals for soaring (wings spread for circular motion) and gliding (wings spread for forward motion). This method of flight is essential to conserve energy. In contrast, flapping flight uses over five times as much energy. Thermals also increase hawks' flight speed, since they use air currents both while soaring within the thermal and while gliding to the next one, rather than relying on their own powered flight.

These researchers also believe that flocking behavior enhances hawks' chances for encountering these life-saving thermals. A group of hawks moving together, as in (a) will more likely find thermals, which are produced randomly by the heating of the earth's surface, than will a bird traveling alone across the vast expanse of sky, as in (b). Interestingly,a computer simulation program has been designed to find optimum dimensions for encountering thermals produced by a geometric shape similar to that of hawk flocks.