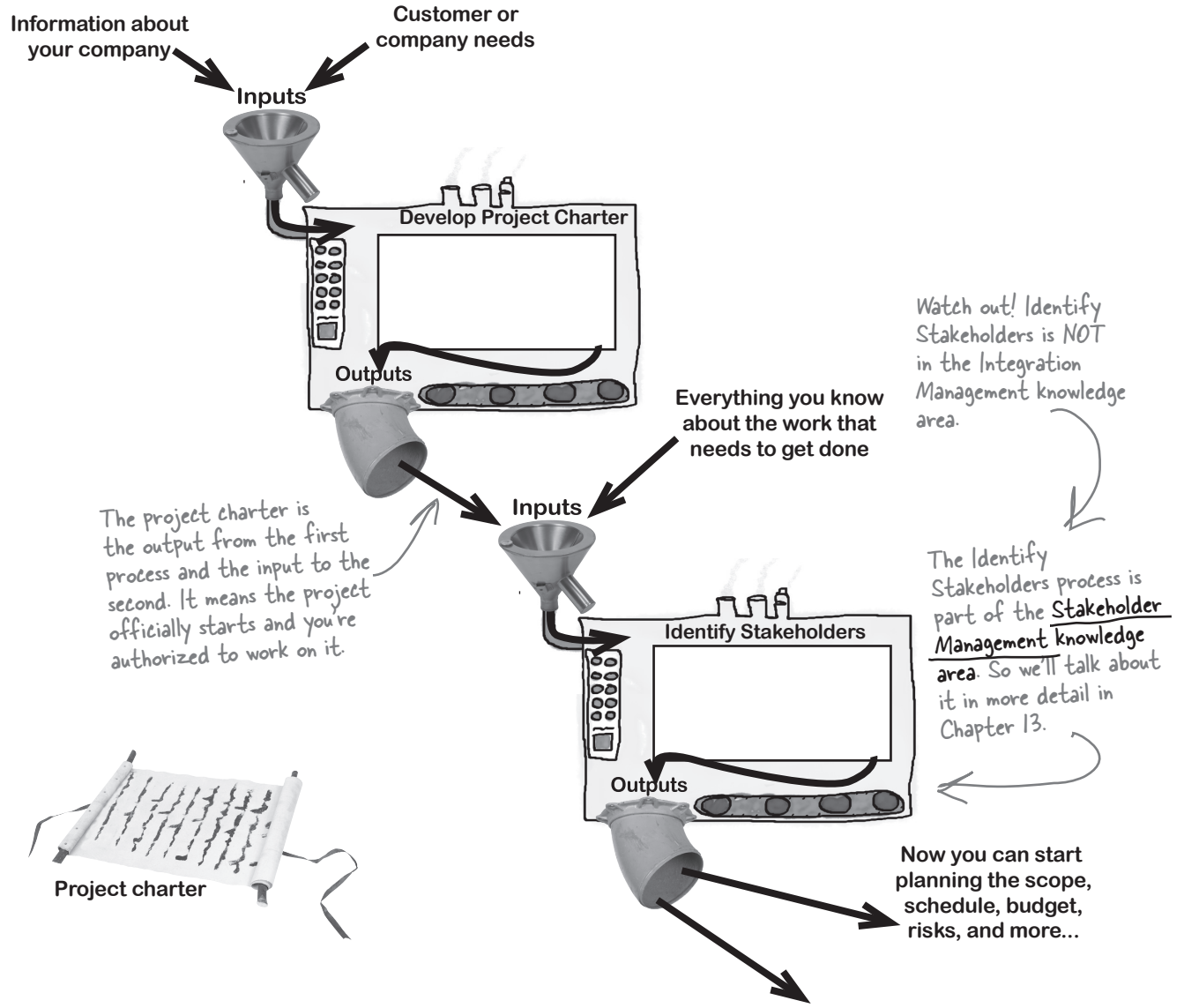
Start your project with the Initiating processes

There ***are only two processes in the Initiating process group***, and they're all you need to get your project started. First, the **Develop Project Charter** process tells everyone in the company why the project is needed, and gives you the authority you need to make it happen. Then you use the **Identify Stakeholders** process to figure out who is affected by the project and how to communicate with them.

These are the only two processes in the Initiating process group. We'll talk about one of them here, and the other in Chapter 13.

Initiating process group



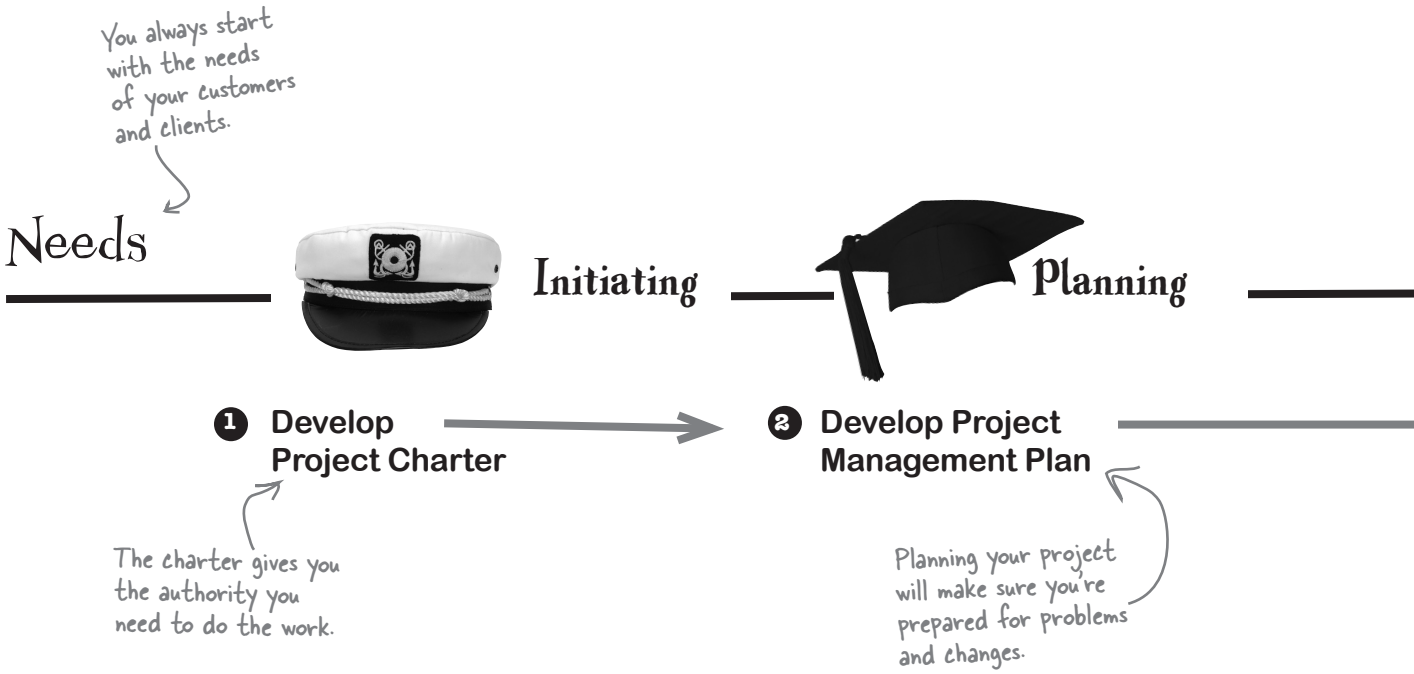
The project charter is the output from the first process and the input to the second. It means the project officially starts and you're authorized to work on it.

Watch out! Identify Stakeholders is NOT in the Integration Management knowledge area.

The Identify Stakeholders process is part of the Stakeholder Management knowledge area. So we'll talk about it in more detail in Chapter 13.

Integration Management and the process groups

Here is how the process groups all fit into this whole Integration Management thing. The process groups show you the order in which these processes happen, and how they interact.

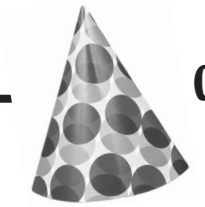


The Integration Management knowledge area brings all of the process groups together. A project manager has to integrate the work of everyone on the team through all of these major activities to keep the project on track:

1. **Being authorized by the project charter to control the budget and assign resources**
2. **Planning all of the work that's going to happen throughout the project**
3. **Directing the work once it gets started**
4. **Using the information your company already knows about this project and keeping track of all of the new things you learn**
5. **Monitoring the way the work progresses and looking for potential problems**
6. **Looking out for changes, understanding their impacts, and making sure they don't derail the project**
7. **Closing out the project and making sure that there are no loose ends when it's over**

The goal of every project: you and your customers are satisfied with the result of the project.

Executing



Closing

Success!

❸ **Direct and Manage Project Work**

❹ **Manage Project Knowledge**

Manage the work so it gets done efficiently and track what's actually happening on the project.

Help the team and the organization use their knowledge and create new knowledge to meet the project's goals.

❼ **Close Project or Phase**

Closing out the project makes sure you get paid—and more importantly, that you have a chance to write down all the lessons you learned along the way.

❺ **Monitor and Control Project Work**

This is where you compare what actually happened to what you planned, and figure out how to respond to differences.

Monitoring and Controlling

You need to make sure that you make ONLY those changes that are necessary and will help your project.

❻ **Perform Integrated Change Control**

The Develop Project Charter process

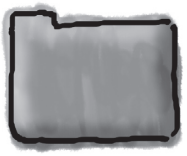
Initiating process group

If you work in a matrix organization, then your team doesn't report to you. They report to functional managers, and might have other work to do. But when they're on your project, you're effectively their boss. So how do you make that happen? Well, you need some sort of **authorization**, and that's what the project charter is for. It says exactly what you're authorized to do on the project (like assign work to the team members and use the company's resources), and why you've been assigned to it. But the charter isn't just important for matrix companies. In any kind of company, it's really important to know who's in charge, and what resources you have available to you when you manage a project.

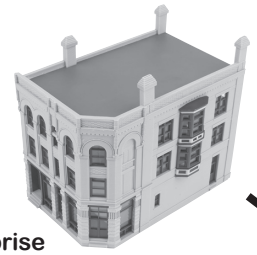
The teachers' contract said that they needed to go to Asia and Europe for $7,500 per person. You'd better make sure that shows up on the charter.

Agreements

This is a description of the business need, the scope, and how the project fits into the strategic plan.



Business documents



Enterprise environmental factors

Since this project will be done at Acme Travel, Acme's work culture will affect it. At Acme, everyone gets a two-hour lunch every day, so the schedule will need to take that into account.

Organizational process assets

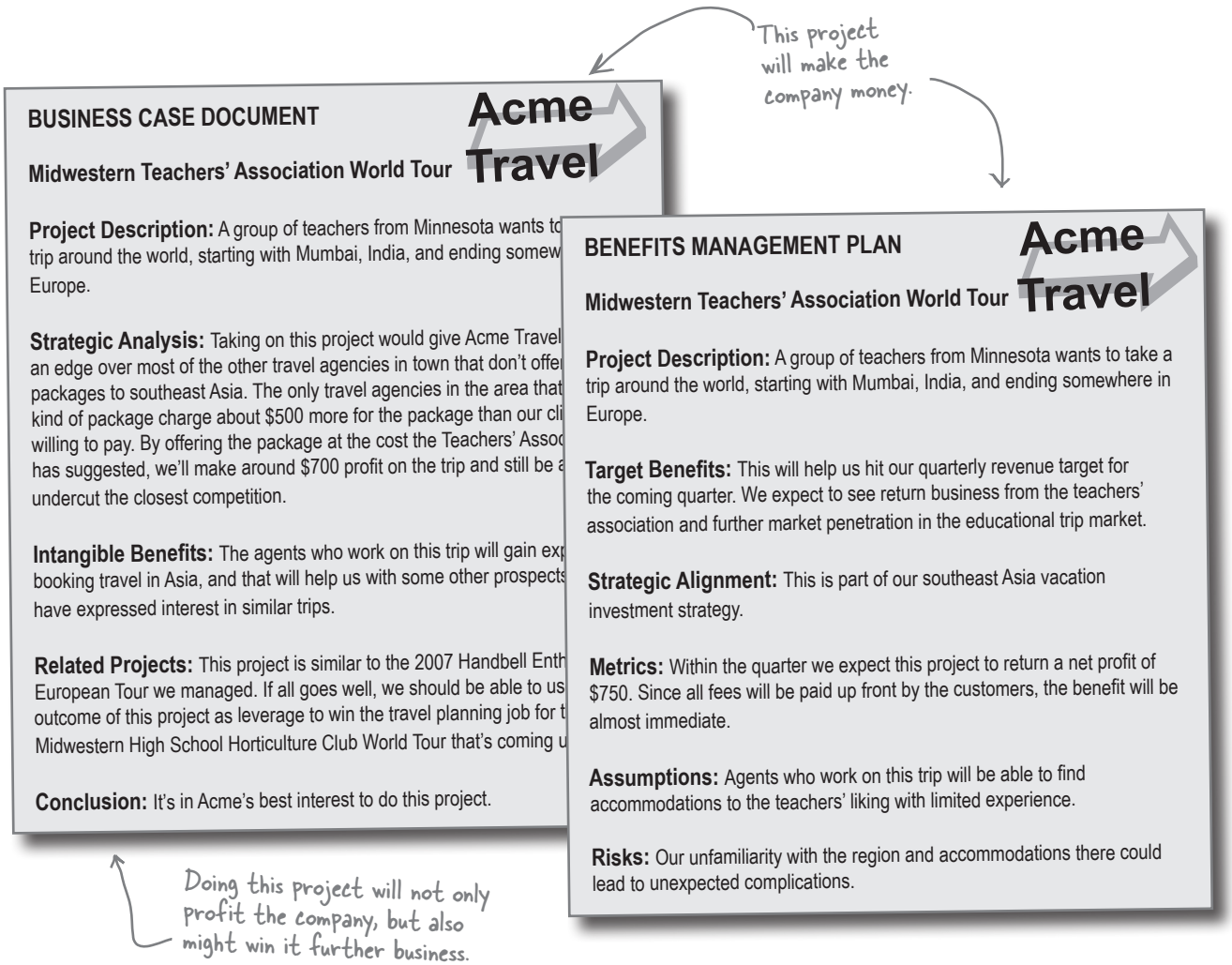
While he was writing the charter, the CEO looked at lessons learned from past trips to be sure that Acme got the best airline and hotel accommodations for the teachers' trip.

Inputs

Make the case for your project

The Midwestern Teachers' Association contract wasn't the only one that Acme could have taken. The company's got more work than it can handle right now, and occasionally it needs to turn away a client. That's where a **business case** and **benefits management plan** come in handy. If a project is too risky, won't make enough money, isn't strategic, or isn't likely to succeed, then the senior managers at Acme could choose to pass on it.

But to figure all that out, you need to do some thinking about what makes taking on this project a good idea for Acme Travel. Preparing business documents means thinking about the value of the project to the business. Is there a big market for world travel packages that Acme can break into if it does this project? Should Acme do it just because the customer requested it? Will it help the company in other ways?



Use expert judgment and data gathering techniques to write your project charter

When you think about it, a lot of different people's opinions can help your company come to a good decision about whether or not to start a project. Sometimes project sponsors will call on experts to help them decide which projects to do. At Acme Travel, the CEO called a meeting with the VP of Asia Travel to make sure that the teachers' trip was worth doing. The VP of Asia Travel had set up trips like this one before and knew where things could go wrong in planning them. Together, they looked at all of the project documentation to make sure that this project looked like it would make Acme enough money to be worth doing.

You use expert judgment any time you bring in an expert from outside your project to offer advice or lend expertise.

Your company might need to talk to subject matter experts from a bunch of different departments to decide if a project will be beneficial to it. It might rely on outside consultants or industry groups to tell it how other companies have solved the same problem. All of those different opinions are called **expert judgment**.

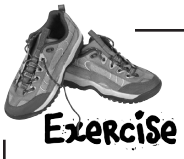
If the experts agree that the project's business case and contract add up to a product that's going to do good things for your company, they'll usually give the green light to write the charter.

Data gathering techniques help everyone understand the goal of your project

When you sit down to write your project charter, you'll need to get your stakeholders on the same page about what your project team will do. You might set up meetings with your stakeholders to brainstorm project goals or work with them to resolve conflicts around how your project will run. All of the approaches you take to get everybody on the same page are called **data gathering techniques**. Unlike expert judgment, which relies on people using their past experiences to make decisions, data gathering techniques involve meetings and sessions that use hard data to reach an agreement on major project decisions.

Interpersonal and team skills and meetings make sure everyone is on the same page

When a project is just beginning you need to think about many different perspectives. The best way to get a clear picture of how your project fits into the organization's strategic goals is to get everyone together and talk about it. You'll need to use **interpersonal and team skills** like conflict management facilitation and meeting management to help make those conversations successful. You'll also need to rely on your meeting management skills to make sure that the decisions that are made in the **meetings** are clear to everyone.



Here are a bunch of ways Acme evaluated the inputs for the Develop Project Charter process. Try to figure out which ones involve expert judgment and which are data gathering techniques.

1. Acme Travel creates a committee to review all of the business case documents that have been submitted for possible projects and compare them to figure out which projects should be funded in the next quarter.

A. Expert judgment B. Data gathering technique

2. Acme hires an outside consultant to help it figure out whether or not its current strategic goals are the right ones for the company.

A. Expert judgment B. Data gathering technique

3. Acme asks the VP of Asia Travel to review the business case for the Midwest Teachers' Association trip and decide whether or not the projected costs and schedule look right.

A. Expert judgment B. Data gathering technique

4. Acme has a focus group with all of the potential customers who might be interested in the trip to help it evaluate all of its project proposals and decide which ones are most likely to benefit the company.

A. Expert judgment B. Data gathering technique

5. The travel agent who is assigned to the project holds a brainstorming session with all of the other travel agents to propose a new goal for the project.

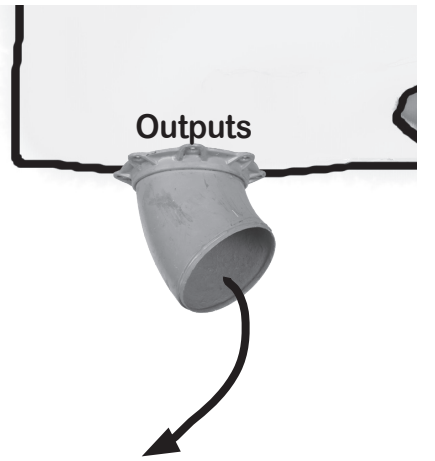
A. Expert judgment B. Data gathering technique

Answers on page 124

A closer look at the project charter

The charter is the **most important** output of the Develop Project Charter process. We know that it makes sense to do the project—that's what we did with the business case. And we know that it assigns authority so that you can do your job. But what else does a charter have in it?

The only other output is the **assumption log.** During the course of building the project charter, you should keep track of the assumptions you're making as you define the project. Those assumptions will help the project team understand what was considered when the project was approved.



The charter assigns you the authority to use resources, like people on your team, computers, office equipment, conference rooms—the things you need to get the job done.

Project Charter

Acme Travel

Project Description: World vacation in 4 weeks
A group of teachers from Minnesota wants to take a trip around the world, starting with Mumbai, India, and ending somewhere in Europe. They have contracted Acme Travel Agency to make their dream a reality.

Larry should have paid attention to this information.

Project Requirements:
- Trip should be planned to coincide with good weather.
- Need to see famous monuments at each point of destination.
- Restaurant recommendations and nightlife information on request.
- Need assistance for missed flights, lost luggage, and other issues in transit.

As the project charter officially assigns the PM, it can be written before the PM is even involved.

Assigned Project Manager and Authority Level:
You have the authority to use dedicated money and resources to accomplish this goal.

This is just a summary of the important points of the business case that were used to decide to pursue the project.

Summary Milestone Schedule

June 13–20—Mumbai	June 20–23—Hong Kong
June 24–29—Shanghai	June 30–July 4—Rome
July 5–8—Barcelona	July 9–14—Paris

Business Case:
This project will be a sound investment for Acme. Provided it is planned and executed properly, we should receive around $700 per person in profit.

SIGNED,

This project has one sponsor, but it's OK if a project has more than one.

CEO, Acme Travel

Assumption log

An assumption is a basis for a decision. Documenting that you expected there to be 10 teachers helps to explain the size of the van you rented.

Take a look at the charter for the teachers' trip, and write down what you think each of the following sections of a typical project charter is used for.

Project Description:

Project Requirements:

Assigned Project Manager and Authority Level:

Summary Milestone Schedule:

Business Case:

Sharpen your pencil Solution

Take a look at the charter for the teachers' trip, and write down what you think each of the following sections of a typical project charter is used for.

Project Description:

The purpose of the project

This is a high-level description of the goals of your project. It's usually a few sentences that describe the project's main purpose.

Project Requirements:

Describes the product your project has to make

Anything you know that the customer, stakeholder, or sponsor expects to get out of the project should go here.

Assigned Project Manager and Authority Level:

Who the project manager is and what he has to do

This is where you're assigned to the project. If it's known who is going to be the project manager, the name of that person is noted. Otherwise, you may just have a department listed that you know the PM will come from. This is also where any specific decision-making authority you might need can be described.

Summary Milestone Schedule:

A list of dates that your project needs to meet

Business Case:

Why your company has decided to do this project

This section lists the reasons why it makes sense for your business to do this project. You might note the return on investment, building infrastructure, goodwill with clients, or anything else that will help people understand why this project is important.

Exercise

Here are a bunch of ways Acme evaluated the inputs for the Develop Project Charter process. Try to figure out which ones involve expert judgment and which are facilitation techniques.

Expert judgment always refers to people using their experience to make decisions on your project.

1. A. Expert judgment — B. Data gathering technique
2. A. Expert judgment — B. Data gathering technique
3. A. Expert judgment — B. Data gathering technique
4. A. Expert judgment — B. Data gathering technique
5. A. Expert judgment — B. Data gathering technique

Data gathering techniques are the meetings and sessions that are used to get everybody to agree on major project decisions.

Two things you'll see over and over and over...

There are two inputs that you'll see repeatedly for a bunch of different processes throughout the rest of the book. **Enterprise environmental factors** are anything that you need to know about how your company does business. And **organizational process assets** have information about your projects: how people in your company are supposed to perform them, and how past projects have gone.

Enterprise environmental factors

Enterprise environmental factors tell you about how your company does business.

There's a lot of information about your company that will be really useful to you when you're planning your project. You need to know how each of the different departments operates, the market conditions you're working in, the company's overall strategy, any policies you need to work with, your company's culture, and all about the people who work at the company.

One of the enterprise environmental factors you'll use in the Integration Management processes is **the project management information system**, which determines how your company assigns work to people and ensures that tasks are done properly and in the right order.

Organizational process assets

Organizational process assets tell you about how your company normally runs its projects.

Every company has standards for how to run its projects. There are guidelines and instructions for managing projects, procedures you need to follow, categories for various things you need to keep track of, and templates for all of the various documents that you need to create. These things are usually stored in some sort of library.

One of the most important organizational process assets is called **lessons learned**, which is how you keep track of valuable historical information about your project. At the end of every project, you sit down with the project team and write down everything you learned about the project. This includes both positives and negatives. That way, when you or another project manager in your company plans the next project, you can take advantage of the lessons you learned on this one.

Can you think of how these would be useful for starting and planning your project?

there are no Dumb Questions

Q: I've never had a project charter. Is it really necessary?

A: Yes, definitely. Have you ever been on a project where you didn't feel like you had enough authority to do your job? The project charter gives you the authority to manage your project. Every project should have a charter, and writing the charter is the first thing that should happen on any project.

Q: Wait a minute! How can I be the one writing the charter, when it's what gives me all of my authority and I might not even be assigned to the project yet?

A: Right, you're not usually going to write a charter. The charter is usually handed to you. The project manager or the project sponsor can write the charter; only the sponsor approves it. And it's always easy to tell who the project sponsor is: it's the person who pays for the project, and comes up with the project's overall goals.

Q: I'm still not sure I get the idea behind a business case document. How's that different from the project charter?

A: The business case is a description of what your company is trying to get out of the project—like how much money you're planning on making from the project, how it will benefit parts of your organization, and future business you might gain from the project.

The project charter is a high-level description of your project. It tells you—and anyone else who needs to know about your project—what you'll be delivering, including a really high-level description of what it is that you'll build.

A really important difference between them is that the project charter is what authorizes the project manager to do the work, while the business case helps justify the project. You can think of the business case as the background research that had to be done in order to make sure the project was worth doing, and the project charter as the thing that formally announces the decision to do it.

Q: I'm still not clear on who the sponsor is. How's that different than the customer?

A: The sponsor is the person (or people) paying for the project. The customer is the person who uses the product of the project. Sometimes the customer is the same person as a sponsor. This is often true in consulting companies. For the teachers' project, the sponsor is the Acme Travel CEO, and the customers are the teachers. But it's possible that in another travel agency, the teachers themselves would be the sponsors. This happens a lot in contracted work.

For the exam, you'll need to be careful about this. Sometimes you'll see the word *customer* in a question that's asking you about the sponsor. You might even see the word *client*—a word that appears in the *PMBOK® Guide* only four times! (It's usually used when you're talking about procurement.) When you see this, you should assume that the question is asking you about a consulting situation, where the sponsor, customer, and client are all the same person.

The CEO and VP of Asia Travel are paying for this project in the sense that they're providing funding for the project team at the travel agency and cutting checks to the airlines, hotels, tour groups, and so on. The customers are definitely paying Acme Travel, but they're not paying out the budget for the specific work that has to be done to complete the project.

Q: Hold on. My project sponsors are really important people in my company. I can't imagine them actually typing up a project charter.

A: Good point. That's why the project sponsor will often delegate the actual creation of the charter to the project manager. For the exam, though, keep in mind that the sponsor is ultimately responsible.

The sponsor of a project is responsible for creating the project charter.

The sponsor of a project pays for the project. The PM manages the project.

BULLET POINTS: AIMING FOR THE EXAM

- The **project charter** officially sanctions the project. Without a charter, the project cannot begin.
- The **sponsor** is the person (or people) responsible for paying for the project and is part of all important project decisions.
- **Develop Project Charter** is the very first process performed in a project.
- The project charter gives the project manager authority to **do the project work**, and to **assign work** or take control of project resources for the duration of the project. It also gives the project manager authority to **spend money** and **use other company resources**.
- **Data gathering techniques** (like brainstorming) are ways to get all of your stakeholders on the same page about your project goals and your approach to meeting them.
- The **business case** tells everyone why the company should do the project. It's an input to building the **project charter** that tells everyone that the project actually started, explains what it's going to deliver, and authorizes the project manager to do the work.
- The project charter does not include details about what will be produced or how. Instead, it contains the **summary milestone schedule**.
- Two additional inputs to Develop Project Charter are the **agreements** and the **benefits management plan**. The agreements are what you agreed to do, although not all projects have agreements. The benefits management plan tells everyone exactly when and how the benefits of the project will be delivered.
- **Enterprise environmental factors** tell you how your company does business. They can be either internal or external factors. An important one is the **project management information system**, which determines how work is assigned, and makes sure that tasks are done in the right order.
- **Organizational process assets** tell you how your company normally runs projects. One of the most important assets is **lessons learned**, which is where you write down all of the valuable historical information that you learn throughout the project to be used later.

In matrix organizations, your team doesn't report to you, so the charter gives you the authority to put them to work.

The project charter shouldn't be too detailed. You shouldn't have to update the charter every time you change something about your project for it to stay accurate.

Agreements are sometimes referred to as contracts on the exam.

At Acme, the CEO and VP of Asia Travel were the sponsors. But at another travel agency, Frank and Joanne could just as easily sponsor the project, since they're the customers.

Watch it!

When you're taking the PMP exam, be careful when you see a question that asks you about the customer or client.

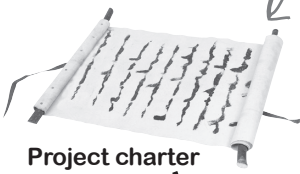
There's a good chance that the question is asking you about a consulting or procurement situation where the customer or client is also the sponsor.

Plan your project!

Planning the project is when you really take control. You write a plan that says exactly how you're going to handle everything that goes on in the project. The **Develop Project Management Plan** process is where you organize all of the information about your project into one place, so everyone knows exactly what needs to happen when they do the project work—no matter what their jobs are.

This lists all of the high-level requirements for your project

All of the planning processes in Chapters 5–13 will have you make plans. Those plans all go into the Project Management plan.

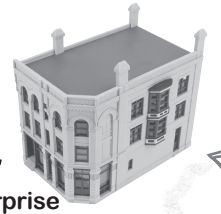


Project charter

Organizational process assets

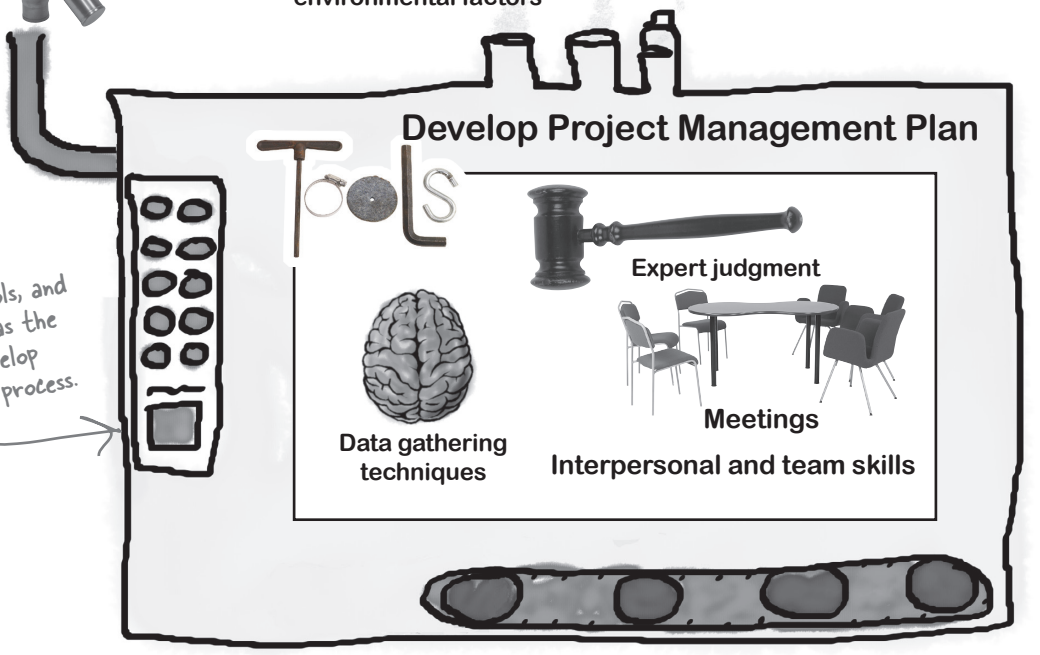
Outputs of planning processes

Inputs



Enterprise environmental factors

This is where you'll find your company's personnel management guidelines and stakeholder risk tolerance.



There are four tools, and they're the same as the tools for the Develop Project Charter process.

The Project Management plan lets you plan ahead

The **Planning** process group is where you figure out how you're going to do the project—because you need to come up with a plan before you bring the team in to do the work. This is where you think about everything that will happen on your project, and try to plot a course to complete it with as few errors as possible.

And it's where you figure out how you'll handle changes—because every project has plenty of problems, but not all of those problems mean that you need to change course. If you plan well, your project will make only the right changes.

Outputs

The Project Management plan is the only output of the Develop Project Management Plan process.

The Project Management plan is a collection of other plans

The Project Management plan is a single document, but it's broken into a bunch of pieces called **subsidiary plans**. There's one subsidiary plan for each of the other knowledge areas: Scope Management, Schedule Management, Cost Management, Quality Management, Resource Management, Communications Management, Risk Management, Procurement Management, and Stakeholder Management.

The Project Management plan is actually a whole bunch of documents called "subsidiary plans," each dedicated to a knowledge area and the specific approach to planning related to that area.

The Project Management plan is all about planning for problems, and having the information you need to correct those problems when they occur.

Project Management plan

Communications Management is another knowledge area. In that plan, we've got important numbers for the trip.

If you take over a project that's already under way, but there isn't a Project Management plan or it's out of date, the first thing you need to do is get a current, accurate plan written up.

There's a subplan for Risk Management. We used it when we took out traveler's insurance for the teachers' trip. That means if bags or cash are stolen, we'll have a plan for dealing with it.

The Project Management plan also has baselines. A baseline is a snapshot of the scope, schedule, or budget that you can use for planning. You'll learn all about baselines in the next three chapters!

No. The Project Management plan is not the same thing as a project schedule.

You'll use a tool like Microsoft Project when you're doing Schedule Management to build the project schedule. (It's useful for other knowledge areas as well.) But you'll use your Project Management plan as a guide to help you develop that schedule. It will tell you what tools to use when you develop it, and how changes will be handled.

Don't worry about memorizing all of the subsidiary plans yet.

You're going to learn about all of the knowledge areas throughout the book, so don't worry about memorizing all of these subsidiary plans right now. Just know that the Project Management plan has plans within it that map to each of the knowledge areas.

A quick look at all those subsidiary plans

You'll be learning about each of the knowledge areas throughout this book, and you'll learn all about the subsidiary plan that goes with each area. But let's take a quick look at what each subsidiary plan focuses on.

Project Management Plan—Subsidiary Plans and Baselines

The **Scope Management plan** describes how scope changes are handled—like what to do when someone needs to add or remove a feature for a service or product your project produces.

The **Requirements Management plan** describes how you'll gather, document, and manage the stakeholders' needs, and how you'll meet those needs with the project deliverables.

This plan is used in Scope Management, which you'll learn about in the next chapter.

The **Schedule Management plan** shows you how to deal with changes to the schedule, like updated deadlines or milestones.

The **Cost Management plan** tells you how you'll create the budget, and what to do when your project runs into money problems.

The **Quality Management plan** deals with problems that could arise when a product doesn't live up to the customer or client's standards.

You use the **Resource Management plan** to deal with changes in your staff, and to identify and handle any additional staffing needs and constraints you might have in your specific project.

The **Communications Management plan** lists all of the ways that you communicate with your project's team, stakeholders, sponsors, and important contacts related to the project.

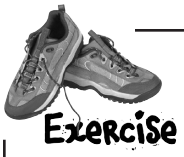
The **Risk Management plan** is about detailing all the bad things that might happen and coming up with a plan to address each risk when and if it occurs.

The **Procurement Management plan** focuses on dealing with vendors outside of your company.

The **Stakeholder Management plan** focuses on managing the expectations of all of the people who are affected by the project.

There are three **baselines** in the Project Management plan. The **scope baseline** is a snapshot of the scope, which helps you keep track of changes to the work that you'll be doing and the planned deliverables you'll be building. The **schedule baseline** does the same for the project schedule, and the **cost baseline** does the same for the budget.

The Project Management plan is the core of Integration Management. It's your main tool for running a project.



Below is a whole crop of factors the project team members discovered as they executed the project. Write down which subsidiary plan you'd look in to get some help. If you're not sure, just reread the descriptions of each subsidiary plan on the previous page, and take your best guess.

1. The teachers want to go Bali, but Acme Travel doesn't book flights there so you need to subcontract one leg of the travel to another travel agency.

_____

2. After reading online reviews, the teachers want to stay at better hotels. They tell you to increase their budget by 15% to do that.

_____

3. Just as you're about to mail off the teachers' tickets, you notice they've been printed incorrectly.

_____

4. The teachers might run into more bad weather, and you've got to figure out what contingencies you can put into place if that happens.

_____

5. The teachers are concerned that they won't be able to get in touch with you when they're away.

_____

6. One of the teachers realizes that he needs to come back earlier, and you want to make sure the budget reflects his lessened costs.

_____

7. You find out that you need to get the tickets out earlier than expected, because the teachers' contract requires that all trips be preapproved by the superintendent of their school district.

_____

Answers on page 163.

there are no Dumb Questions

Q: How far should I go when trying to anticipate every possible issue and list it in the Project Management plan?

A: It's really important to think about what could change on your project, so that you can have plans for what to do when things don't go as expected. An unexpected change can sometimes derail a project, and doing some planning up front can keep issues like that to a minimum. Planning can help you avoid problems in the first place, which is a lot better for everyone than reacting to them when they happen. So think of everything you can; the extra time you spend planning could be what makes your project a success.

Q: Does the project manager create the Project Management plan all by himself?

A: No, it should be a group effort between the PM and the stakeholders. Everyone on the project team and all of the stakeholders need to agree that the plan is acceptable.

Q: What about things that I don't think about? I'm not sure what they'll be until the project gets going. Sometimes there are uncertainties, so we base our plans on assumptions...right?

A: You're never going to think of everything. To help keep your plan flexible, you should add an Open Issues section to the plan. You can write down any open issues or concerns in this section, and deal with them as they come down the line. However, you have to have all your project requirements complete before starting the project—you should *never* have any requirements in your Open Issues section.

Q: I still don't get what enterprise environmental factors are.

A: Your company's enterprise environmental factors are all of the information you have about its policies, processes, departments, and people. You need to know how your company does business in order to manage a project. For example, you need to know about the different departments in your company if you're managing a project that will be used by people in them. And remember, enterprise environmental factors can also be external factors, like regulations. The important point is that you can't control them, and need to take them into account.

BULLET POINTS: AIMING FOR THE EXAM

- Remember that the Project Management plan is **formal**—which means that it's **written down** and **distributed** to your team. This is also true for the project charter.
- You may get a question on the exam that asks what to do when you encounter a change. You ***always*** begin dealing with change by **consulting the Project Management plan**.
- The **project management information system** is a part of your company's enterprise environmental factors, and it's generally part of any change control system. It defines how **work is assigned to people**.
- The Project Management plan includes **baselines**: snapshots of the scope, schedule, and budget that you can use to keep track of them as they change.

Question Clinic: The just-the-facts-ma'am question

A great way to prepare for the exam is to learn about the different kinds of questions, and then try writing your own. Each of these Question Clinics will look at a different type of question, and give you practice writing one yourself.

Take a little time out of the chapter for this Question Clinic. It's here to let your brain have a break and think about something different.

A LOT OF QUESTIONS ON THE EXAM ARE PRETTY STRAIGHTFORWARD, BUT IT'S THE ANSWERS TO THOSE QUESTIONS THAT CAN REALLY HANG YOU UP. HERE, TAKE A LOOK:

27. Which of the following can be found in the project charter?

A. Business case document

Some answers will clearly be wrong. The business case document is one of the inputs to the Develop Project Charter process.

B. Expert judgment

Some answers are a little misleading! This is part of the Develop Project Charter process—but it's from the tools and techniques, not a part of the project charter itself.

C. Authorization for the project manager

Here's the right answer! The project manager's authorization is included in the project charter.

D. Project management information system

You haven't seen this one yet—it's part of enterprise environmental factors, an input to the Develop Project Charter process, but not in the charter itself.

WHEN YOU SEE A JUST-THE-FACTS-MA'AM QUESTION, READ THE QUESTION REALLY CAREFULLY! IF YOU DON'T, IT'S EASY FOR A WRONG ANSWER TO LOOK RIGHT.

HEAD LIBS

Fill in the blanks to come up with your own just-the-facts-ma'am question.

You are managing a _____ project. You are using
(an industry)

_____ and _____
(an input) (an input)

to create a _____. What process are you performing?
(an output)

A. _____
(the name of the wrong process)

B. _____
(the name of the right process)

C. _____
(a made-up process that sounds like a real process)

D. _____
(the name of a tool and technique from the right process)

LADIES AND GENTLEMEN, WE NOW RETURN YOU TO CHAPTER FOUR

The Direct and Manage Project Work process

Once you have a Project Management plan, your project is ready to begin. And as the project unfolds, it's your job to direct and manage each activity on the project, every step of the way. That's what happens in the **Direct and Manage Project Work** process: you simply follow the plan you've put together and handle any problems that come up.

The Project Management plan is the most important input: it tells your team what to build, how to build it, and when you're set to deliver your product.

Inputs

Approved change requests

Project Management plan

Project documents

Enterprise environmental factors

Organizational process assets

Direct and Manage Project Work

Tools

Expert judgment

Meetings

Project management information system

Here's where you'll find scheduling and configuration management information.

These are the other outputs lumped together. We'll talk about them shortly.

Outputs

Change requests

Issue log

Work performance data

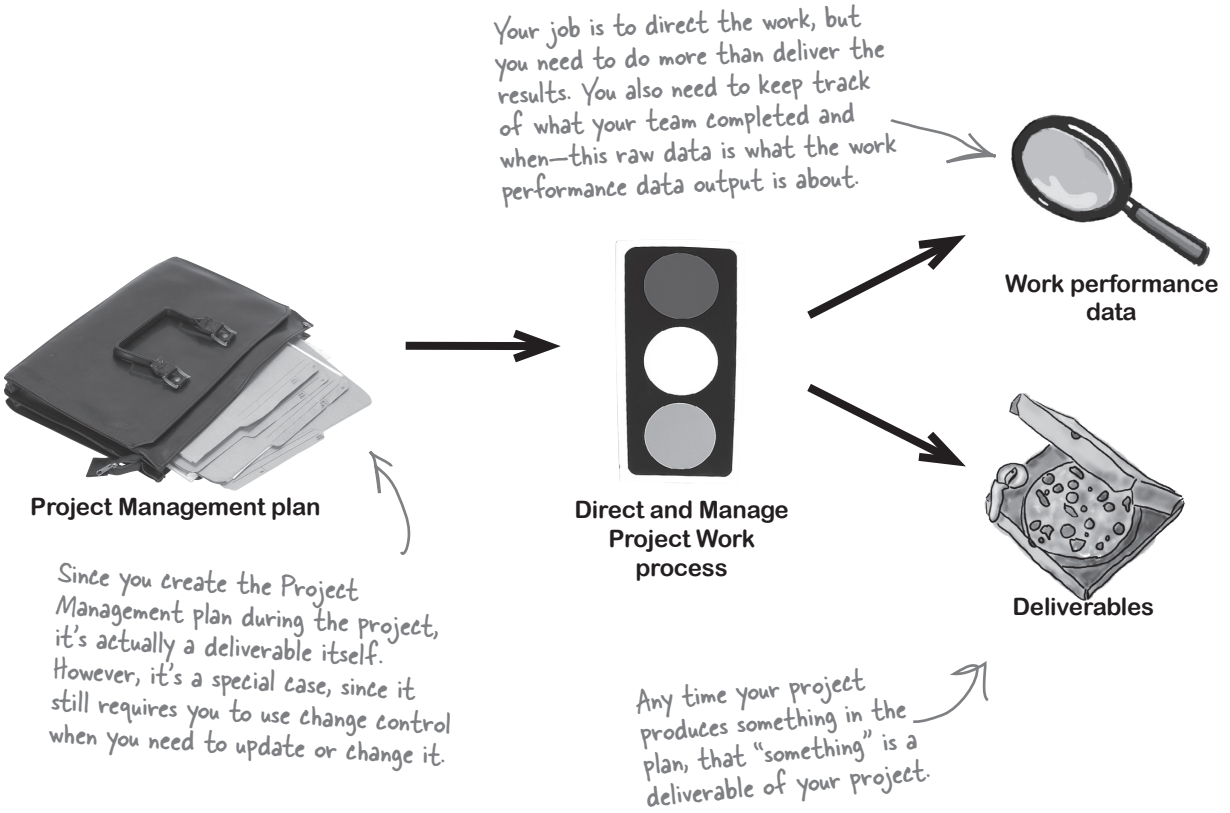
Deliverables

Updates to project documents, plan updates, and organizational process asset updates

The project team creates deliverables

The work you're doing on the teachers' project creates lots of things: airline reservations, hotel reservations, invoices, defect reports, and customer comments (to name a few). These things are all your **deliverables**, and they are one of the outputs of the **Direct and Manage Project Work** process.

Another output is **work performance data**, and that's what we call the reports Acme's running on the project. These reports track how many negative versus positive customer comments the project gets, and how well the project is doing at meeting its cost estimates. In fact, a project manager should figure out a way to use the work performance data that is generated from each knowledge area during the Direct and Manage Work process to understand how well the processes are being performed.



You create work performance data by measuring how and when the processes from each knowledge area are being performed.

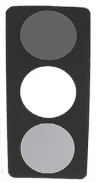
Executing the project includes repairing defects

The Direct and Manage Project Work process has a bunch of inputs and outputs—but most of them have to do with implementing changes, repairs, and corrective action. If there's a defect repair that's been approved, this is where it happens. Once the defect is repaired, the result is an implemented defect repair. The same is true for changes and corrective actions; once they're approved, they become process inputs, and then they can be implemented and become process outputs.

Any time you have to correct a mistake or make a repair in a deliverable, you're fixing a defect.

The three components of the Direct and Manage Project Work process:

Deliverables are anything you produce in the course of doing your project activities.



1. Use the plan to create deliverables.
2. Repair defects in deliverables.
3. As the project plan changes, make sure those changes are reflected in the deliverables.

Your Quality Management plan focuses on catching defects as you go, so you can repair them as soon as possible.

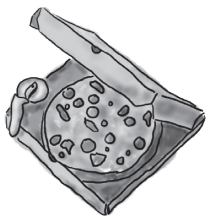
This is different from fixing defects. A defect means that the plan was right, but your deliverable was built wrong.

Deliverables include everything that you and your team produce for the project

The word **deliverable** is pretty self-explanatory. It means anything that your project **delivers**. The deliverables for your project include all of the products or services that you and your team are performing for the client, customer, or sponsor.

But deliverables include more than that. They also include every single document, plan, schedule, budget, blueprint, and anything else that gets made along the way…including all of the project management documents that you put together.

Deliverables can be either internal to your company or to the customer.



Deliverables

The Direct and Manage Project Work process is where you and your team actually do the work to produce the deliverables.

Sharpen your pencil

Here's a list of things produced by some typical projects. Some of them are deliverables, and others are work performance data produced by running reports. There's also a list of changes, some of which affect the Project Management plan, and some of which just affect the project deliverables. It's up to you to figure out which is which.

1. The software project team builds software.

☐ Deliverable ☐ Work performance data

2. A builder hangs a door.

☐ Deliverable ☐ Work performance data

3. A wedding photographer sends the photo proofs to the client.

☐ Deliverable ☐ Work performance data

4. The cable repair technicians take an average of four hours per job.

☐ Deliverable ☐ Work performance data

Sometimes something that looks like a defect in a deliverable is really a change that you need to make to the plan.

5. The construction crew worked 46 hours of overtime in March.

☐ Deliverable ☐ Work performance data

6. The construction crew built the six houses required by the plan.

☐ Deliverable ☐ Work performance data

7. A software test team finds bugs in the software.

☐ Defect in deliverable ☐ Change to Project Management plan

8. A bride asks the photographer to stop asking her mother for permission to make changes.

☐ Defect in deliverable ☐ Change to Project Management plan

9. A construction crew used the wrong kind of lumber in a house.

☐ Defect in deliverable ☐ Change to Project Management plan

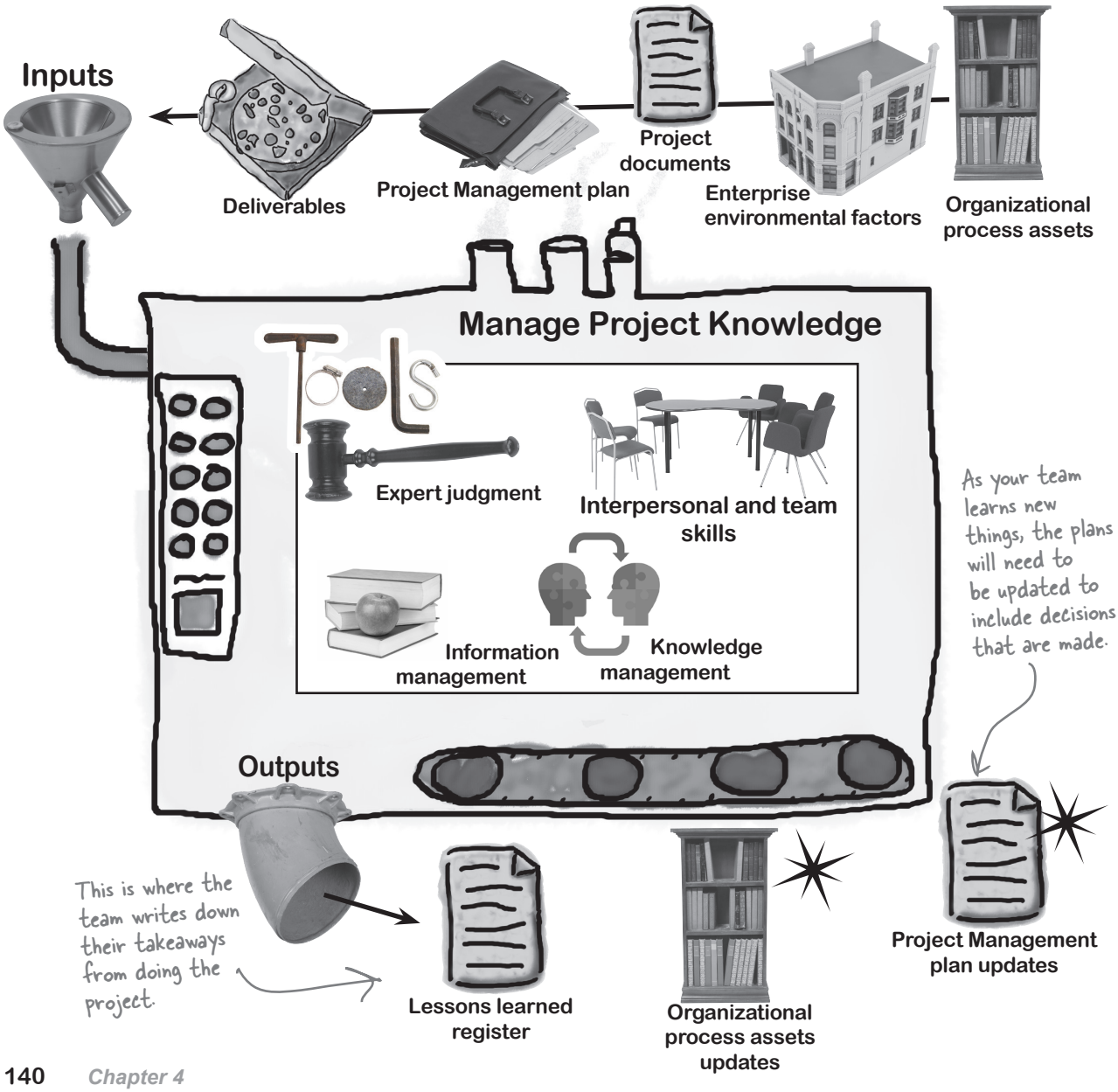
10. A photographer's prints are grainy.

☐ Defect in deliverable ☐ Change to Project Management plan

Answers on page 164.

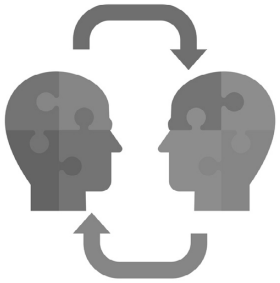
The Manage Project Knowledge process

The whole time your project is happening, your team is solving problems and learning. The **Manage Project Knowledge** process is all about using the information your company has already learned from doing past projects and creating new information when your team learns something your company hasn't encountered before.



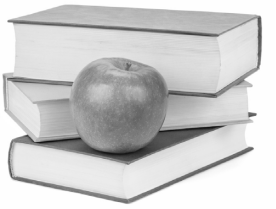
Knowledge is the lifeblood of any project

Who would you rather have running your project: a rookie project manager who's only been managing projects for a few months, or a seasoned veteran who's got 20 years of experience? The thing that separates them, more than anything else, is **knowledge**: the experienced project manager has learned a huge number of lessons throughout her career, and she knows how to apply them to her day-to-day work to make her projects run smoothly. But it's not just the project manager who has important knowledge; it's spread across your whole team, your entire organization, and even people outside of it. Some of that knowledge is **explicit**, or written down in documents, files, data, and so on, but a lot of it is **tacit**, in people's heads or embedded in the company's culture. Getting a handle on this knowledge can be a real challenge for an organization.



That's where **knowledge management** comes in. Your team works together every day, and they're constantly reshaping their understanding of the problems that come up within your project. Knowledge management is about creating opportunities for them to share what they've learned with each other and think of new solutions together. Teams will use methods like communities of practice, message boards, distribution lists, workshops, pair programming and work shadowing, and team meetings to help keep everyone on the same page.

It's not enough for the team to have a shared understanding of the project, though—they need to share that understanding with the rest of the organization. Once the team has identified information from their project that might be useful to the rest of the organization, they need to write it down and share it. **Information management** is all about creating libraries of information that people both within and outside the project can use if they run into similar situations to the ones your team is encountering. The main document produced by teams to describe what they've learned during the project is the **lessons learned register**.



Teams use lessons learned just like the experienced PM uses her knowledge to make her project run better.

We'll dive deeper into lessons learned later in this chapter.

Watch it!

Knowledge management goes beyond "just" information management.

People sometimes use the words "knowledge" and "information" interchangeably, but they're not the same thing. One way to think about it is that you process data to turn it into information, but it's only when you analyze that information that it becomes knowledge. Knowledge management goes beyond ***information management****, or using IT systems to capture, store, and organize information. It also includes building a culture of collaboration and knowledge sharing.*

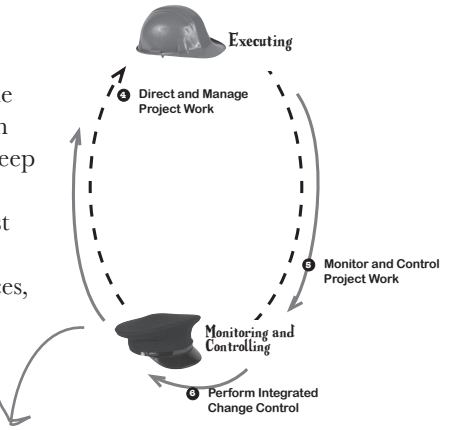
Eventually, things WILL go wrong...

Even if you work through all the processes you've seen so far, things can still go wrong on your project. In fact, the teachers are already letting you know about some issues they're having.

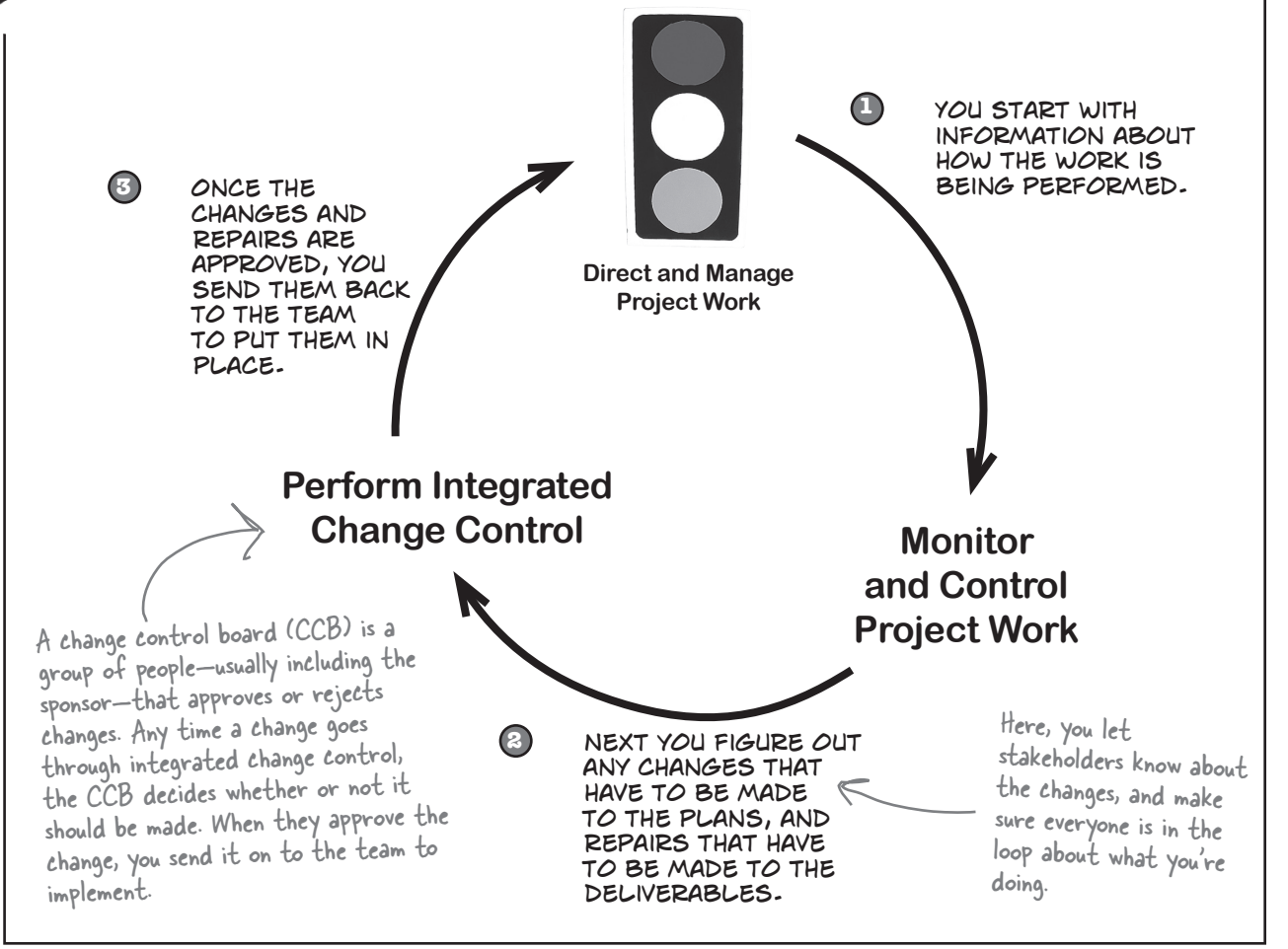
...but if you keep an eye out for problems, you can stay on top of them!

Sometimes you need to change your plans

Take a minute and flip back to page 117. Notice how there's a loop between the Executing and the Monitoring and Controlling processes? That's because when your team is executing the plan and working on the deliverables, you need to keep a constant lookout for any potential problems. That's what the **Monitor and Control Project Work** process is for. When you find a problem, you can't just make a change…because what if it's too expensive, or will take too long? You need to look at how it affects the project constraints—time, cost, scope, resources, risks, and quality—and figure out if it's worth making the change. That's what you do in the **Perform Integrated Change Control** process.

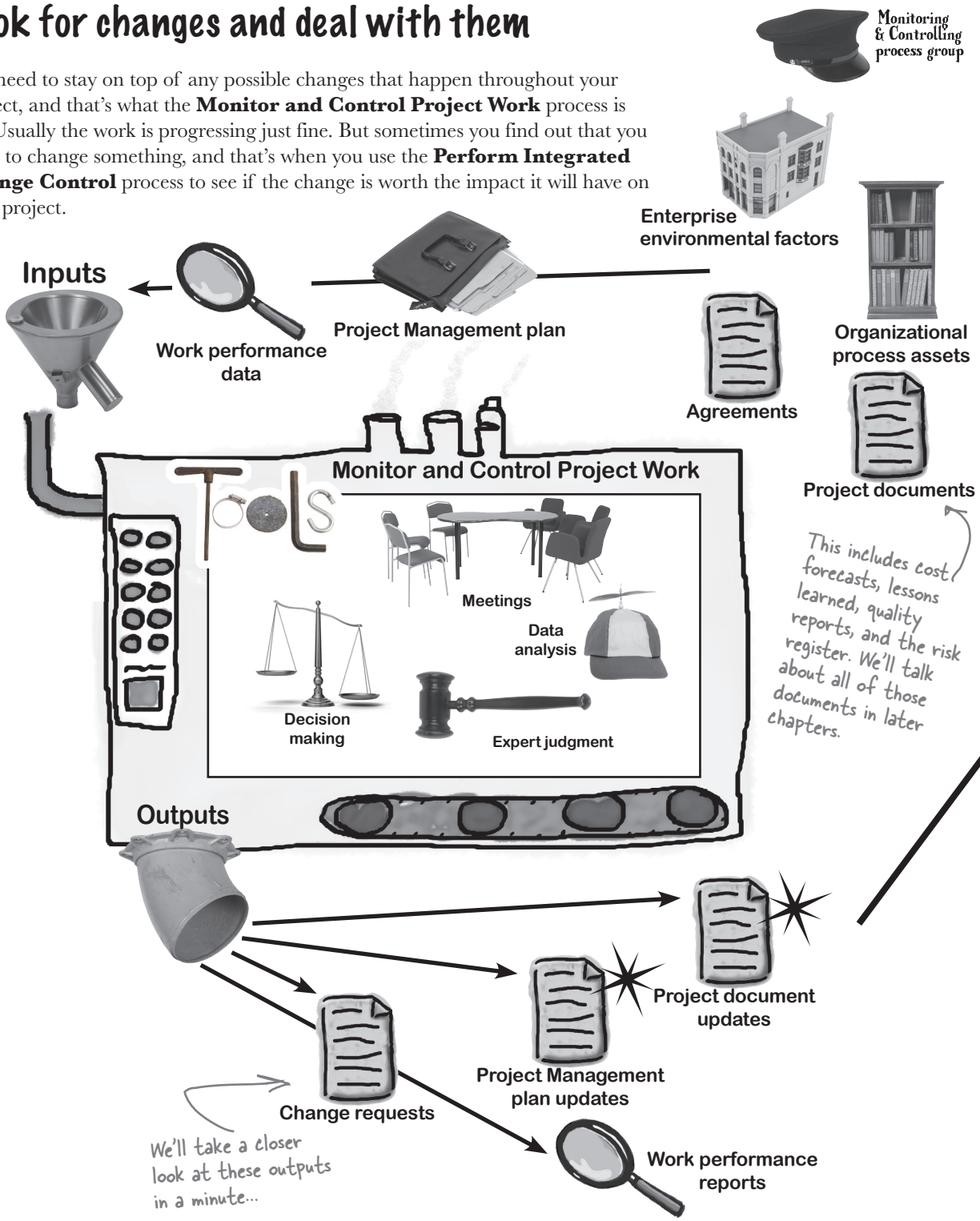


The Monitor and Control Loop Up Close



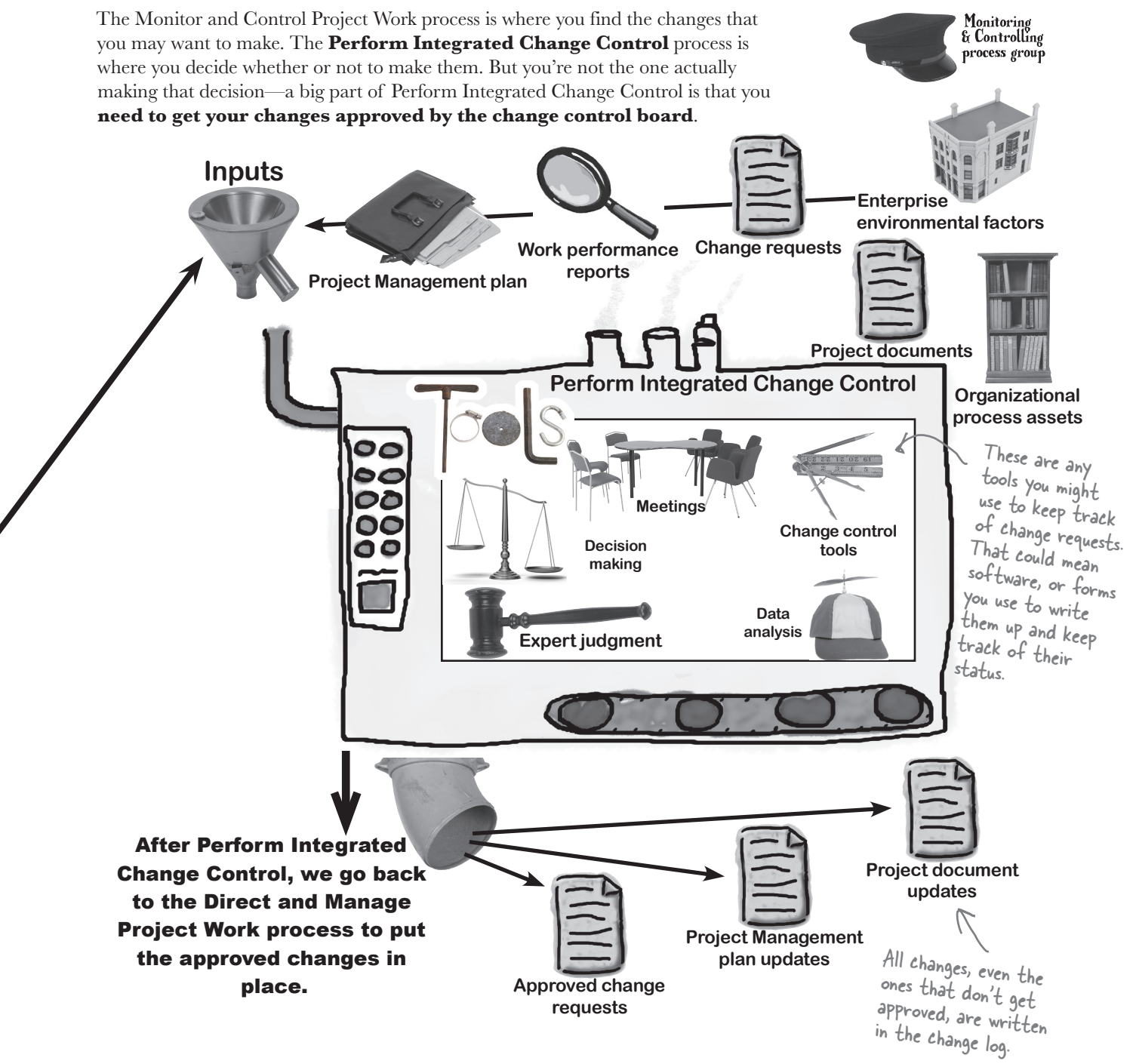
Look for changes and deal with them

You need to stay on top of any possible changes that happen throughout your project, and that's what the **Monitor and Control Project Work** process is for. Usually the work is progressing just fine. But sometimes you find out that you need to change something, and that's when you use the **Perform Integrated Change Control** process to see if the change is worth the impact it will have on your project.



Make only the changes that are right for your project

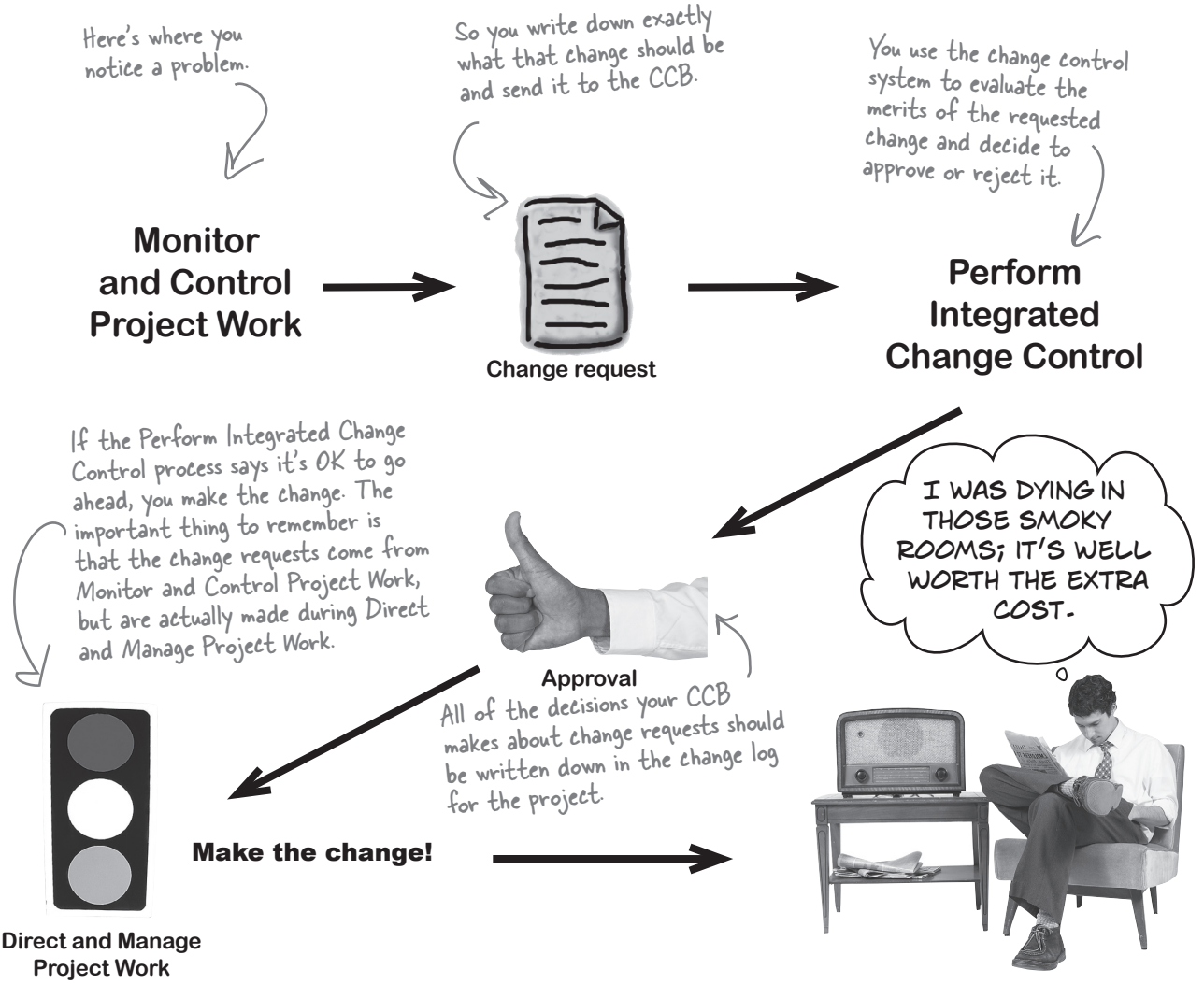
The Monitor and Control Project Work process is where you find the changes that you may want to make. The **Perform Integrated Change Control** process is where you decide whether or not to make them. But you're not the one actually making that decision—a big part of Perform Integrated Change Control is that you **need to get your changes approved by the change control board**.



How the processes interact with one another

While monitoring the teachers' trip, you notice that they all ask for nonsmoking rooms every time they check into a hotel. But some hotels don't have enough nonsmoking rooms available, and the teachers aren't too thrilled about that.

After you talk it over with the teachers, it's clear that it's worth splitting up the group over multiple hotels to make sure they all are in nonsmoking rooms—and some hotels are more expensive than you'd planned. The cost change will put you over budget, so the Cost Management plan needs to be updated. Time to take the request to change control:



Changes, defects, and corrections

You've already seen how a project can change as it goes along. When the teachers asked for their hotel to be upgraded, you took the request through the **Perform Integrated Change Control** process at Acme, and when the change control board approved the change, you directed the agents to make the booking for the group.

But sometimes, things go wrong with what you intended to have happen in the first place. When your quality department told you that you had booked the teachers on the flight to Rome without putting them in the same row, you quickly fixed the reservation. But you intended for the teachers to sit together in the first place, so that's not a change, it's a **defect**.

In the process, you realized that your team wasn't reading your documentation carefully, which is why they screwed up the airline reservations. To fix the way your team is working, you need to take corrective action. That's when you need to change the way you're doing the work on your project. Got all that?

When the team is repairing defects to deliverables, they still need to go through change control.

Decide your changes in change control meetings

Sometimes a change you make will have a direct impact on other teams and projects, and it's a good idea to be sure that everybody who will be impacted knows that it's coming and thinks that it's worth it before you make the change. You can't always know everything that might happen as a result of a change, and that's why it's a good idea to get buy-in from key people in your company before you go through with it. And that's what a change control meeting is all about!

Usually, a change control meeting will be a regularly scheduled thing, where people representing the affected areas of the company will get together to review proposed changes and decide whether or not to make them. A change control board is never made up of just the people on your team. A change control meeting is all about getting people with different perspectives together to talk about the pros and cons of changes before deciding whether to approve or reject them.

It's your job as a project manager to know the impact of requested changes to your project and prioritize them for the change control board. Once you've done that, the change control board can make informed decisions about whether or not to approve them.

Control your changes; use change control

Project Management plan

Your Project Management plan should detail how you deal with changes that happen during your project.

Change control is how you deal with changes to your Project Management plan.

A change control system is the set of procedures that lets you make those changes in an organized way.

Any time you need to make a change to your plan, you need to start with a **change request**. This is a document that either you or the person making the change needs to create. Any change to your project needs to be documented so you can figure out what needs to be done. Once you have a change request, that then kicks off your project's set of change control procedures.

The key here is PROCEDURE—change control is about how your company handles changes. You may use a computer system to monitor and document changes, but that's just one part of your change control system.

This means you need to write down exactly what needs to be changed and put it in something called a change request. That's a form that you fill out to send a change through change control.

This is Acme's change control system. It's specific to the company, but it contains all of the steps you'd see in a typical change control system.

Acme Travel Change Control System

Acme Travel

The first thing you do with any change is to consult the proper management plan.

Cost Management plan

The teachers want to increase their budget, so you look at their Cost Management plan.

Next, you document the change, and submit it to the board that decides if the change will be implemented.

Change request

Change control meeting

A change control board is a group of people who consider changes for approval. Not every change control system has one, but most do.

Not every change gets approved, but this one did—and now the Project Management plan can be updated.

Approval

Project Management plan

Project management information system

At Acme, the plan is updated using the configuration management system, a part of the PMIS that tracks all of the changes.

Preventing or correcting problems

When you monitor your project, you might be checking the actual time it's taking you to do scheduled work versus the amount of time you planned, or you might be gathering information on the number of defects you have found versus the number you expected. In both cases, it's possible that you might find problems. If you do, you have to change the way you do your work and keep your project from being dragged down. When you make a course change on your project, that's taking **corrective action**.

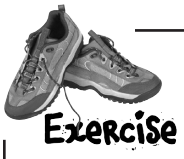
It's also possible that you might see problems that are going to occur even though they haven't happened yet. If you do, you will want to take **preventive action**, or steps that you take to avoid potential problems.

When people predict problems on projects before they happen, it's called a **forecast**. A forecast can be a good reason to make a change too!

In both corrective and preventive action, you always need to submit your proposed change and put it through the Perform Integrated Change Control process—and only if it is approved will you implement it. If your recommended action makes it through, you need to change the plan and any of your **baselines** to include it.

The documented scope, schedule, and cost baselines in the Project Management plan are called the **performance measurement baseline.**

We'll learn more about the performance measurement baseline in upcoming chapters.



Here is a list of actions that are recommended by a project manager. Which are preventive and which are corrective?

1. A software project is running late, so a software project manager looks to find slack time and reassign resources to get things done more quickly.

☐ Preventive action ☐ Corrective action

2. A caterer notices that the crudités are all gone and assigns a chef to make more.

☐ Preventive action ☐ Corrective action

3. A photographer brings an extra camera body to a shoot, in case one breaks down.

☐ Preventive action ☐ Corrective action

4. A consulting company assigns extra resources to a project to compensate for possible attrition.

☐ Preventive action ☐ Corrective action

Answers on page 162.

there are no Dumb Questions

Q: Sometimes my team members come to me and tell me that the project could have problems later. What do I do with that?

A: For some project managers, it seems natural to dismiss these "negative Nellies" who seem concerned with problems that could go wrong in the future. But working with them instead is one of the best ways you can satisfy your stakeholders.

When someone makes an estimate or prediction of a future condition that could lead to trouble, it's called a **forecast**, and that's very valuable information. You should distribute it along with your work performance data, and try to think of ways to avoid the problem—which is what preventive action is all about.

A big part of your job as a project manager is to figure out how to prevent changes. This might seem a little weird—how can you prevent changes before the project is implemented? One way to do this is to plan as well as possible, because a lot of changes happen because of a lack of planning. But it also means talking to stakeholders throughout the project and keeping an eye out for potential problems. When you take the PMP exam, if you see the phrase "**influencing factors that cause change**," this is what it's referring to.

Q: Who approves changes?

A: Usually there's a **change control board (CCB)** that approves changes. That's a group of people, most often including the stakeholders and sponsor, who look at the benefits of a change and figure out if it's worth the cost. If there's a CCB, your change control system will include a procedure that mentions it. But not every company has a CCB, and there is no requirement in the *PMBOK® Guide* that you have one.

Q: What if there's a problem outside my project, and I'm not sure it affects me?

A: You should still consider its potential impact when you're monitoring your project's work. It's important that you're always on the lookout for potential problems. If you're not sure whether something could impact your project, it's your responsibility as a project manager to bring it to the attention of your stakeholders. And if you can make a change on your own that doesn't impact the project constraints (scope, cost, time, quality, risk, or resources), then **it's completely within your rights as a project manager to do it**.

Q: Once a change is approved, what do I do with it?

A: You change your Project Management plan to incorporate the change. This can mean that you create a new baseline with the new Project Management plan. For example, say you forgot to add a stakeholder to the change control board, so your project plan now describes the wrong process for making changes. You'll need to fix that, and you'll need to go through change control to do it.

Every time a change is reviewed by the change control board, you keep a record of it in your change log. So whether the change was approved or rejected, the change request and the decision the CCB makes about it should be documented.

Q: What about changes that don't affect the project constraints?

A: If you evaluate the impact of a change and find that it won't have an impact on the project constraints, then you can make the change without going through change control. Sometimes you need to change resources or move tasks around, and you can make those changes without affecting the bottom line or the end product. In these cases, change control wastes time and resources, rather than helping your project.

Q: Now, what's a performance baseline again, and what do I do with it?

A: A performance baseline is a snapshot of your project's scope, schedule, and cost. When you plan out the work you'll do on a project, you write down all of the activities you'll need to do and save that understanding as your scope baseline. You'll do the same with your understanding of the project's schedule and its cost. That way, you can always compare your actual performance to your plan.

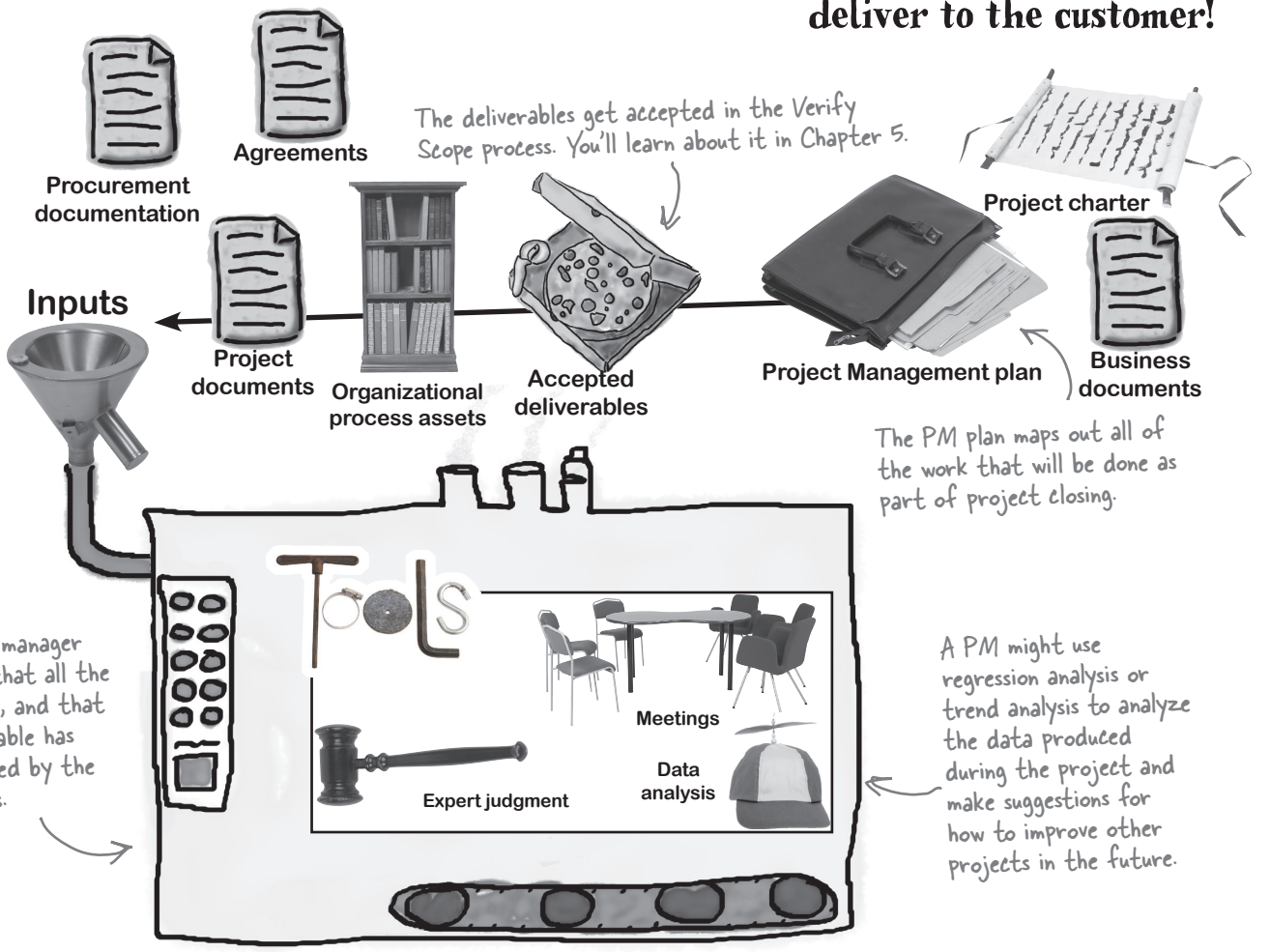
Every time a change is approved, that means the plan has changed. So you have to update your baseline to include the new work (or cost, or schedule).

You always have the authority to make changes to your project if they don't affect cost, schedule, or scope.

Finish the work, close the project

You can't finish the project until you get paid! Most projects start with contracts, and when they do you need to make sure the terms are met. Acme signed a contract with the Midwestern Teachers' Association when the project started, and now it's time to make sure all of the parts of that contract are met. And that's part of what you do in the **Close Project or Phase** process. But an even more important part of this process is that you create the **lessons learned** and add them to your company's organizational process assets. That way you and other project managers can learn from this **historical** information in the future. The inputs to the Close Project or Phase process include the project management plan, organizational process assets, and accepted deliverables. And you use the same familiar **tools and techniques** that you've seen throughout the chapter.

The most important output of the Close Project or Phase process is the final product that you deliver to the customer!



You don't have to go home, but you can't stay here

The teachers have gone through their entire itinerary. They're now on their way to Paris, which is the final leg of their tour. They've had a great time, and now it's time for you to finish up.

Every project needs to end, and that's what the Close Project or Phase process is all about. You want other travel agents at Acme to learn from anything new you've discovered. Remember how you had to scramble with the nonsmoking room request? Maybe your friends at Acme can learn from that, and ask new clients up front what they want! That's why you write down your lessons learned, and that's a big part of closing the project.

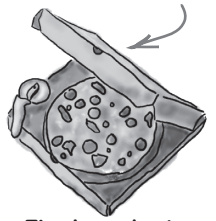
Even if your project ends early, you still need to follow the Close Project or Phase process.

Outputs

You've seen the organizational process assets input a bunch of times now. But where does it really come from? It turns out that it comes from other project managers just like you. Every time a project is closed, you update those assets so that you can use them later. And new project managers will be able to learn from everything that's happened on your project.

Organizational process asset updates

The final product of your project is the thing your customers will remember most.



Final product, service, or result transition

Project documents updates

Lessons learned are finished in Close Project or Phase, but written down throughout the entire project. And it's not just by the project manager—the whole team writes down lessons learned.

The final report summarizes the project performance, including details on how well the projections were met.

Final report

BRAIN POWER

Think about a major project you've heard of that did not end well, like one that was shut down before the work was done. What lessons could have been learned from that project?

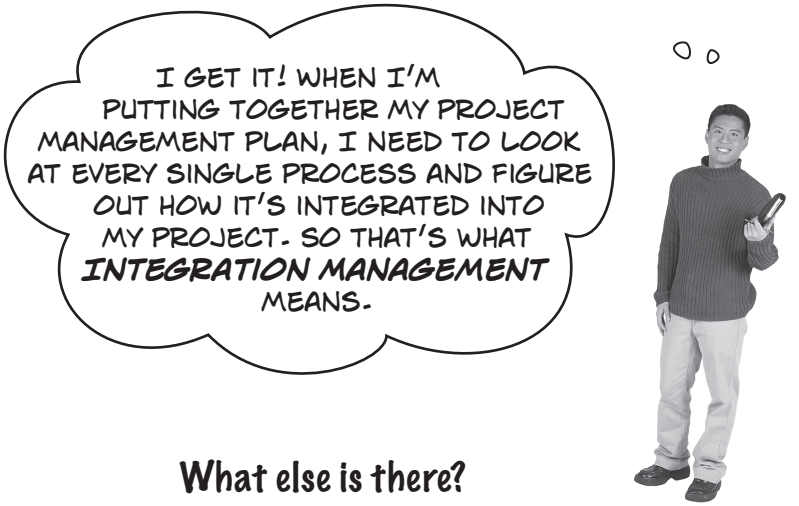
How can the project manager use the Close Project or Phase process to make sure that something good comes out of early termination?

So why INTEGRATION Management?

The Integration Management knowledge area has all of the processes that you do in your day-to-day work as a project manager. So why are they called "Integration Management" processes? Well, think about what it takes to run a project: you need people and other resources from all around your company; knowledge about how your company does its business; standards, templates, and other assets that you've gathered from other projects; and the ability to put it all together—that's what a project manager does. And that's where the "integration" part comes in.

This is especially important when you need to work with consultants, because your job is to procure services for the project. And you need to plan for all of it at the beginning—which is when you **integrate** all of these things together into a single plan. It's your job to make sure that every one of the 49 processes in the *PMBOK® Guide* is addressed in the plan, even if you're not going to use it (for example, if you don't need contractors or consultants, you won't use Procurement processes).

Integration Management means making sure that all of the processes work together seamlessly to make your project successful.



What else is there?

Huh…it seems like we covered the whole project, right? You got authorized to do the work, you planned the project, you executed it, you corrected problems along the way, and you closed it out. Isn't that everything?

Well, of course not! There's a whole lot more planning that you have to do, and many skills that you need to have. Luckily, we've got the *PMBOK® Guide* to help us figure out exactly what we need to know to manage projects effectively.

That's what the rest of the book is about.

Project Integration Management Magnets

These inputs, outputs, and processes are all scrambled up on the fridge. Can you reconstruct them so that the processes go under the correct process groups, and the inputs, outputs, and tools go in the right categories?

Initiating	Planning	Executing	Monitoring and Controlling	Closing

Inputs/Outputs	Tools

Work Performance Data

Direct and Manage Project Work

Expert Judgment

Deliverables

Develop Project Charter

Close Project or Phase

Develop Project Management Plan

Organizational Process Assets Updates

Project Documents Updates

Change Control Tools

Monitor and Control Project Work

Data Analysis

Manage Project Knowledge

Perform Integrated Change Control

Project Integration Management Magnets Solution

These inputs, outputs, and processes are all scrambled up on the fridge. Can you reconstruct them so that the processes go under the correct process groups, and the inputs, outputs, and tools go in the right categories?

Initiating	Planning	Executing	Monitoring and Controlling	Closing
Develop Project Charter	Develop Project Management Plan	Manage Project Knowledge Direct and Manage Project Work	Perform Integrated Change Control Monitor and Control Project Work	Close Project or Phase

Input/Outputs	Tools
Organizational Process Assets Updates Work Performance Data Project Documents Updates Deliverables	Data Analysis Expert Judgment Change Control Tools

Integration Management kept your project on track, and the teachers satisfied

By using all of the Integration Management processes, you kept the project on track. You handled all of the problems that came up, making some important changes in the process, and the teachers got to all of their destinations on time and on budget.

For project managers, Integration Management is where the magic really happens. While there might be experts on your team who are responsible for understanding scoping, cost, or quality decisions, Integration Management is something core to your responsibilities. Now that you've had a chance to think about how all of the processes in the knowledge area fit together, it's a good time to think about how you'll actually use it day-to-day on your projects.

Key Concepts

We've covered how each of the processes works, but it's important to spend a little time thinking about why they work together. Why do you think we integrate all of the processes and knowledge areas when we work on a project?

- An important reason that we do project integration is to make sure that the project stays **aligned with the benefits it's meant to bring**. The project manager is always making course corrections throughout the project to make sure that it will deliver the benefits defined in the Benefits Management plan.
- The project manager **builds the plan** that keeps everyone on the project on the same page about how to work and what their goals are.
- The project manager makes sure that the team learns from the organization's past experience and adds to that experience by keeping track of new **knowledge** that they create.
- The project manager sees that **approved changes** are updated in the plan when the team decides to do things differently than planned, and their results are tracked and learned from.
- Project managers help the team to think about the whole project when asked to **make decisions** about the way the team should act.
- The project manager closes out the project when it's complete and **handles transitions between phases** when they're complete.

The project manager uses all of the process and knowledge areas to keep the project aligned with the benefits it's meant to create.

Trends

Project management is an evolving field. Teams are always identifying new tools and improvements to the way that project managers do their jobs. Here are a few trends in Integration Management that might help you to improve and do Integration Management more effectively.

- Automated tools to collect project data and analyze trends
- Visualization tools to allow for easier analysis and interpretation of project data
- Knowledge tools to help the team gather and share data project data with one another
- Project manager involvement up front in identifying potential project benefits and engaging business stakeholders
- Hybrid methodologies or ways of incorporating agile and other iterative project management practices into the overall framework of knowledge areas and processes

Tailoring

When you make changes to the processes your team will use during the course of your project, there are a few considerations that might influence your decisions:

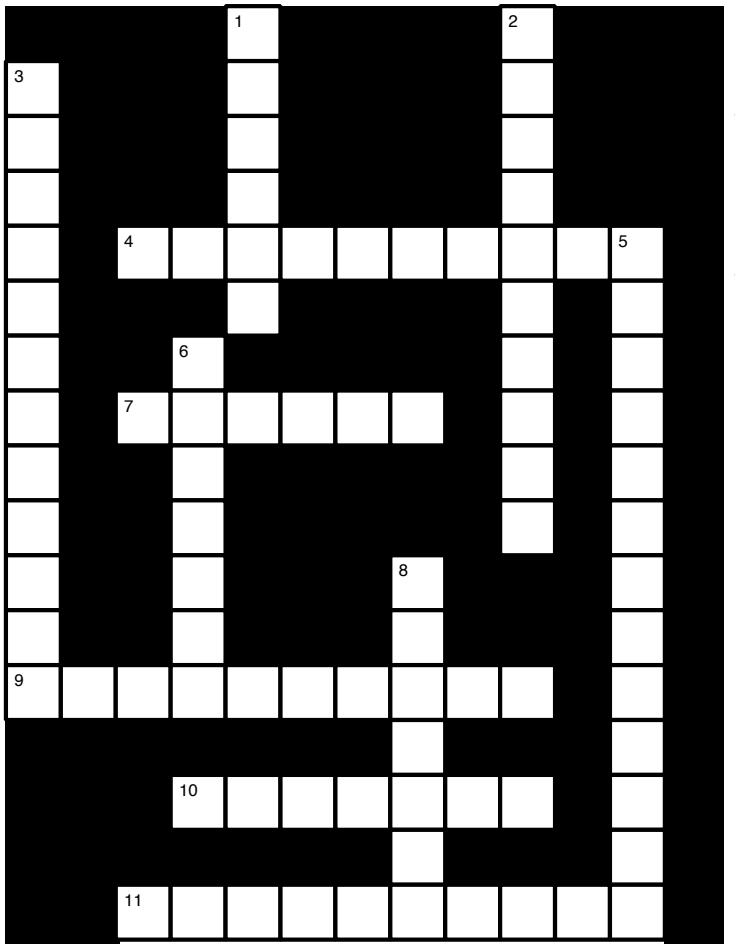
- What lifecycle will your project follow?
- Will your project be developed with predictive methods because you know all of the requirements up front, or will it need to be adaptive because you expect to learn new requirements as you go?
- How does management work in your organization? How can your project fit in to the overall culture?
- How will your project handle change?
- How will your organization oversee your project? How will you keep them informed of your progress?
- What information should you save about your project as you go?
- How will you know if your project is successful?

Agile considerations

Agile teams focus on self-organization and collaboration over following a plan. If the project uses agile methods, the role of the project manager changes from defining the plan and helping the team implement it to providing a way for the team to collaboratively decide how to work and how to handle change.

Integrationcross

Take some time to sit back and give your right brain something to do. It's your standard crossword; all of the solution words are from this chapter.



Across

4. Fixing problems that have already happened is called _____ action.

7. A problem in a deliverable that shows that it does not do what you meant for it to do.

9. The Project Management plan is a collection of _____ plans.

10. When you watch what's happening in your project to look for changes, corrective actions, and preventive actions, you are in the _____ and Control Project Work process.

11. _____ information is an important organizational process asset that comes from documenting lessons learned.

Down

1. When you ask someone who has experience to help you figure something out, you are using the _____ judgment tool and technique.

2. The _____ process group contains the processes that help you start your project.

3. The things your project produces.

5. Work culture and company policies are called enterprise _____ factors.

6. A record of all of the decisions you have made and their consequences that you write when you close your project is called _____ learned.

8. The project _____ is a document that gives the project manager authority over the team.

Answers on page 165.

Sharpen your pencil Solution

Here are a few of the things you might have to deal with in working on the teachers' vacation trip. Figure out which of the seven Integration Management processes you'd use in each situation, and write down the process name in the blank.

1. It turns out that one of the teachers is a vegetarian, so you need to change your plans to include vegetarian meals on the airlines and find restaurants that accommodate him.

   Perform Integrated Change Control

2. You come up with a detailed description of everything that you plan to do to get the teachers where they want to be.

   Develop Project Management Plan

3. The CEO of Acme Travel sends you a document that assigns you to the project.

   Develop Project Charter

4. You write down some notes describing all of the teachers' needs and how you solved them

   Manage Project Knowledge

5. When the teachers get back, you write up everything you learned while handling the trip so other travel agents can learn from your experience.

   Close Project or Phase

6. You book the tickets and hotel accommodations.

   Direct and Manage Project Work

7. You check in with the teachers at each destination to make sure everything is going according to plan.

   Monitor and Control Project Work

Develop Project Charter

Develop Project Management Plan

Direct and Manage Project Work

Monitor and Control Project Work

Perform Integrated Change Control

Close Project or Phase

Manage Project Knowledge

Here is a list of actions that are recommended by a project manager. Which are preventive and which are corrective?

1. A software project is running late, so a software project manager looks to find slack time and reassign resources to get things done more quickly.

☐ Preventive action ☑ Corrective action

2. A caterer notices that the crudités are all gone and assigns a chef to make more.

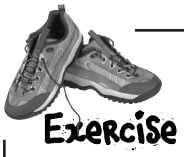
☐ Preventive action ☑ Corrective action

3. A photographer brings an extra camera body to a shoot, in case one breaks down.

☑ Preventive action ☐ Corrective action

4. A consulting company assigns extra resources to a project to compensate for possible attrition.

☑ Preventive action ☐ Corrective action



Below is a whole crop of factors the project team members discovered as they executed the project. Write down which subsidiary plan you'd look in to get some help. If you're not sure, just reread the descriptions of each subsidiary plan on the previous page, and take your best guess.

1. The teachers want to go Bali, but Acme Travel doesn't book flights there so you need to subcontract one leg of the travel to another travel agency.

Procurement Management plan

2. After reading online reviews, the teachers want to stay at better hotels. They tell you to increase their budget by 15% to do that.

Cost Management plan

3. Just as you're about to mail off the teachers' tickets, you notice they've been printed incorrectly.

Quality Management plan

4. The teachers might run into more bad weather, and you've got to figure out what contingencies you can put into place if that happens.

Risk Management plan

5. The teachers are concerned that they won't be able to get in touch with you when they're away.

Communications Management plan

6. One of the teachers realizes that he needs to come back earlier, and you want to make sure the budget reflects his lessened costs.

Cost Management plan

7. You find out that you need to get the tickets out earlier than expected, because the teachers' contract requires that all trips be preapproved by the superintendent of their school district.

Schedule Management plan

Here's a list of things produced by some typical projects. Some of them are deliverables, and others are work performance data produced by running reports. There's also a list of changes, some of which affect the Project Management plan, and some of which just affect the project deliverables. It's up to you to figure out which is which.

1. The software project team builds software.

☑ Deliverable ☐ Work performance data

2. A builder hangs a door.

☑ Deliverable ☐ Work performance data

3. A wedding photographer sends the photo proofs to the client.

☑ Deliverable ☐ Work performance data

4. The cable repair technicians takes an average of four hours per job.

☐ Deliverable ☑ Work performance data

5. The construction crew worked 46 hours of overtime in March.

☐ Deliverable ☑ Work performance data

6. The construction crew built the six houses required by the plan.

☑ Deliverable ☐ Work performance data

7. A software test team finds bugs in the software.

☑ Defect in deliverable ☐ Change to Project Management plan

8. A bride asks the photographer to stop asking her mother for permission to make changes.

☐ Defect in deliverable ☑ Change to Project Management plan

9. A construction crew used the wrong kind of lumber in a house.

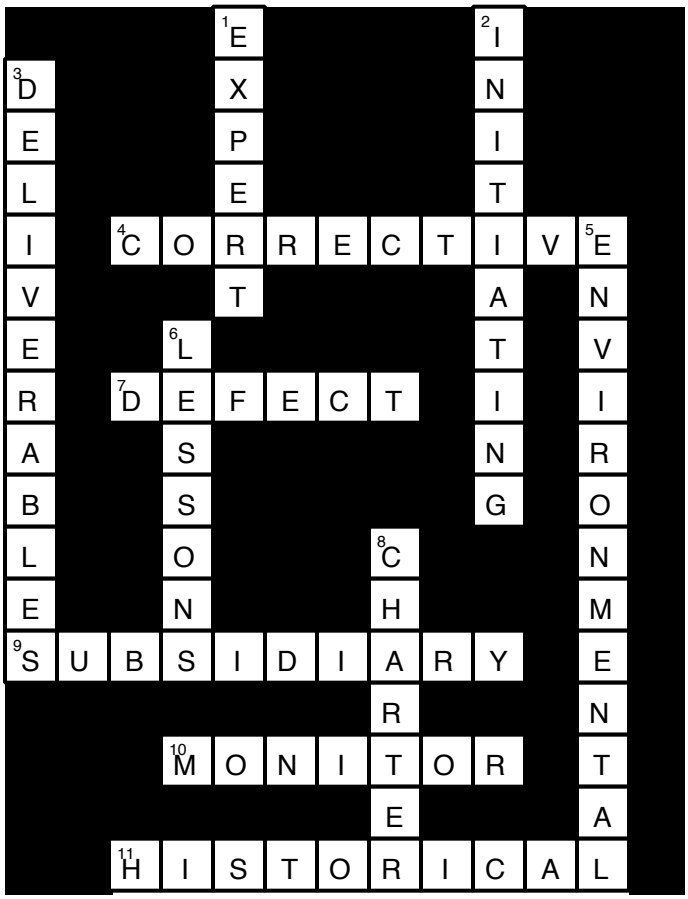
☑ Defect in deliverable ☐ Change to Project Management plan

10. A photographer's prints are grainy.

☑ Defect in deliverable ☐ Change to Project Management plan

Integrationcross Solution

Take some time to sit back and give your right brain something to do. It's your standard crossword; all of the solution words are from this chapter.



Exam Questions

1. You've just received a change request. This means:

A. The project charter is complete, but the work cannot begin yet because you need to make a change to the scope baseline.

B. You are in the Direct and Manage Project Work process, and you can implement the change now.

C. The change needs to be approved before it can be implemented.

D. There is a defect in a deliverable that must be repaired.

2. Which of these is not an input to Develop Project Charter?

A. Enterprise environmental factors

B. Project management plan

C. Agreements

D. Business documents

3. What is the output of Direct and Manage Project Work?

A. Approved change requests

B. Project Management processes

C. Deliverables

D. Forecasts

4. You're managing a graphic design project. One of your team members reports that there is a serious problem, and you realize that it will cause a delay that could harm the business of the stakeholders. Even worse, it will take another two days for you to fully assess the impact—until then, you won't have the whole story. What is the BEST way to handle this situation?

A. Create a change request document and submit it to the change control meeting.

B. Pull out the project charter and show them that you have authority to make decisions.

C. Meet with the stakeholders and tell them that there's a problem, and you need two more days to get them the information they need.

D. Update the lessons learned and add it to your organizational process assets.

5. You're a project manager on a construction project. The electrician has started laying out the wiring, when the client comes to you with a change request. He needs additional outlets, and you think that will increase the cost of the electrical work. What is the first thing you do?

A. Refuse to make the change because it will increase the cost of the project and blow your budget.

B. Refer to the Project Management plan to see how the change should be handled.

C. Consult the contract to see if there is a clause.

D. Make the change, since the client requested it.

Exam Questions

6. The work authorization system:

A. Ensures that every work package is performed at the right time and in the proper sequence

B. Authorizes the project manager to spend money on work

C. Is a set of processes and tools that aids the project manager in effectively guiding the project to completion

D. Is a formalized, written description of how to carry out an activity

7. You're the project manager at a telecommunications company. You recently had stakeholders approach you with changes. You figured out that the changes would cost additional time and money. The stakeholders agreed, you were given additional time and budget, and the changes were approved. Now you have to incorporate the changes into the project. What do you do next?

A. Modify the project charter to include the changes.

B. Use the project management information system to make sure the work is performed.

C. Make sure to track your changes against the project's baseline so you know how much they eventually cost.

D. Incorporate the changes into the baseline so you can track the project properly.

8. You are a project manager on a software project. When you planned the project, your enterprise environmental factors included a policy that all changes that cost over 2% of the budget need to be approved by the CFO, but smaller changes could be paid for by a management contingency fund. One of your stakeholders submitted a change request that requires a 3% increase in the budget. Your company has an outsourcing effort, and you believe that a small change to the way that the change is requested could allow you to take advantage of it and cut your costs in half. What is the BEST way to handle this situation?

A. Work with the stakeholder to figure out how to reduce the cost of the change by a third.

B. Request approval from the CFO.

C. Refuse the change because it is over 2% of the budget.

D. Document the change request, since all changes must be documented.

9. You're on the project selection committee. You're reviewing a document that describes the strategic value of a potential project and its benefits to the company. What's this document called?

A. Project charter

B. Business case

C. Benefit measurement method

D. Contract

Exam Questions

10. One of your team members has discovered a defect in a deliverable and has recommended that it be repaired. Which of the following is NOT true:

A. The project charter has authorized you to perform the work.
B. Your project is in Monitor and Control Project Work process.
C. The defect repair must be approved before the deliverable can be repaired.
D. You must update the Project Management plan to document the defect.

11. You are holding a formal, approved document that defines how the project is executed, monitored, and controlled. You are holding:

A. The Project Management plan
B. The performance measurement baseline
C. The project charter
D. The work breakdown structure

12. You are the project manager for a software project, when the sponsor pulls the plug and cancels the project. What do you do?

A. Give the team the day off to recuperate from the bad news.
B. Create a budget summary for the remaining unspent budget.
C. Follow project closure procedures to close the project and update lessons learned.
D. Find new assignments for any people previously assigned to your project.

13. You are managing a software project, when you find out that a programming team whom you were supposed to have access to has been reassigned to another project. What is the first thing that you should do?

A. Figure out the impact that this will have on your project.
B. Bring a copy of your project's charter to the other manager, and explain that you need that team for your own project.
C. Go to your sponsor and demand the team.
D. Figure out a way to compress the project schedule so that you can work with the team if they become available.

14. You are a project manager on a software project. There are several changes that need to be made, and you need to decide how to apply project resources in order to implement them. What do you do?

A. Decide the priority of the changes and announce them to the team.
B. Call a team meeting and invite the stakeholders, so that everyone can reach a consensus on the priority.
C. Deny the changes because they will delay the project.
D. Consult the Change Prioritization plan for guidance on prioritizing new changes.

Exam Questions

15. You're a project manager on a software project. Your team is busy executing the project and creating the deliverables, but there have been several changes requested by stakeholders over the past few weeks. Each time you got one of these changes, you called a meeting with your team and the stakeholders to discuss it. Why did you do this?

A. Every change needs to be evaluated by a change control board.
B. You're delegating the work of evaluating changes.
C. You do not have a good change control system in place.
D. You are using a project management information system to assign the work.

16. You are the project manager on a construction project, and you have just received a change request. You consulted the Project Management plan, and followed the procedures laid out in the change control system. You are in the process of reviewing the change and documenting its impact. Your manager asks you why you are doing this. Which process are you doing by reviewing the change and documenting its impact?

A. Perform Integrated Change Control
B. Monitor and Control Project Work
C. Manage Requested Changes
D. Direct and Manage Project Work

17. Which of the following is NOT true about the project charter?

A. The project charter defines the requirements that satisfy customer needs.
B. The project charter defines the work authorization system.
C. The project charter makes the business case that justifies the project.
D. The project charter includes the milestone schedule.

18. You have just verified that all of the work on your project is completed. Which of these things is NOT part of the Closing process?

A. Update historical information by documenting lessons learned.
B. Document the work performance data to show the deliverables that have been completed and record the lessons learned.
C. Verify that all of the deliverables have been accepted by the stakeholders.
D. Follow the project closure procedure.

19. Which of the following is NOT true about the Project Management Plan?

A. The Project Management plan contains the Scope Management plan.
B. The Project Management plan gives authority to the project manager.
C. The Project Management plan contains the schedule baseline.
D. The Project Management plan contains the performance baseline.

Exam Questions

20. Which of the following is NOT an output of the Direct and Manage Project Work process?

A. Work performance data
B. Deliverables
C. Project documents updates
D. Forecasts

21. You are a project manager starting a new project. Your manager warns you that previous projects ran into trouble. Which of the following would be BEST for you to rely on to help plan your project:

A. Our project management expertise
B. Historical information
C. The change control system
D. Forecasts

22. Which is NOT true about the project charter:

A. The project manager must be consulted before the charter is finalized.
B. The charter is issued by the project sponsor.
C. The project manager's authority to manage the project is granted by the charter.
D. The charter gives a summary milestone schedule.

23. Which of the following is NOT an input to the Develop Project Management Plan process?

A. Outputs of the planning processes
B. Project charter
C. Expert judgment
D. Enterprise environmental factors

24. You are the project manager on a network engineering project. Two weeks ago, your team began executing the project. The work has been going well, and you are now a day ahead of schedule. Two stakeholders just approached you to tell you that they have an important change that needs to be made. That change will put you behind schedule. What do you do?

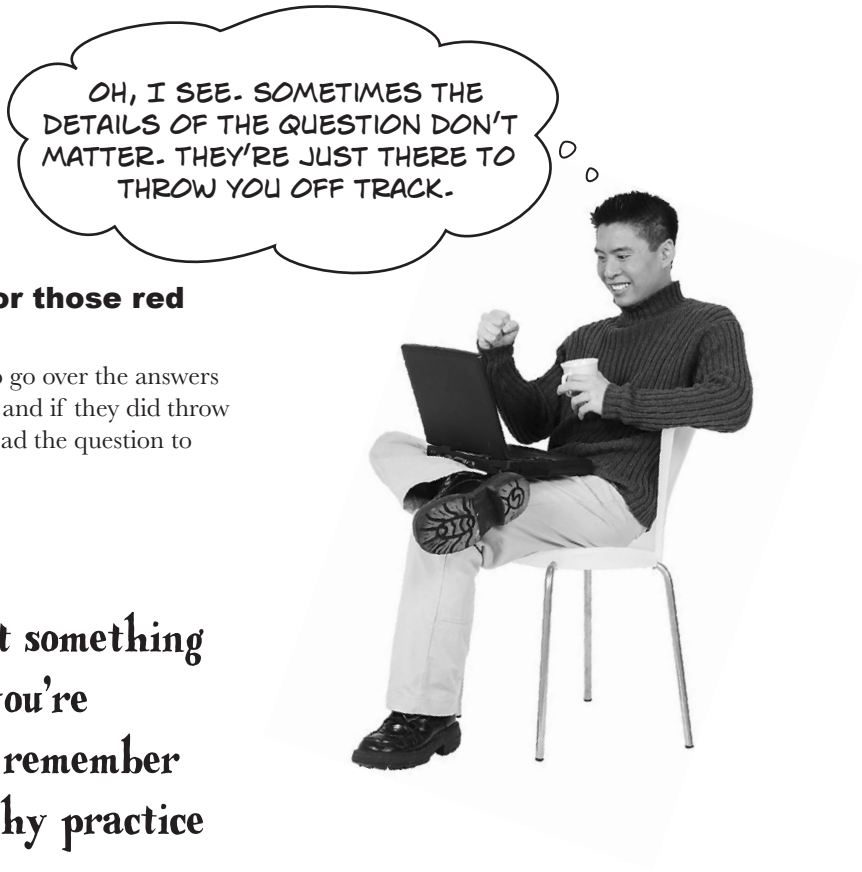
A. Implement the change because you're ahead of schedule.
B. Refuse to make the change because the stakeholders did not take it to the change control board.
C. Refuse to make the change until the stakeholders document it in a change request.
D. Make sure the stakeholders know that you're open to change, and tell them to talk to the project sponsor.

Exam Questions

25. Diane is a project manager at a software company. She just got a change request from one of her stakeholders, but is concerned that it will cause a serious problem with her schedule. She called a meeting with the project team, and decided that there was a real change, and now they need to start change control. Which of the following is NOT an output of the Perform Integrated Change Control process?

A. Project document updates
B. Approved change requests
C. Project Management plan updates
D. Change requests

Start thinking about the kinds of questions you're seeing. Some have extraneous details—we call them "red herrings." Others are about inputs and outputs. That will definitely make the exam more familiar and easier.



Watch out for those red herrings.

Take some time to go over the answers to these questions and if they did throw you off track, reread the question to understand why.

Just remember...if you get something wrong now, that means you're actually MORE likely to remember it on the exam! That's why practice exams are so useful.

Exam Questions Answers

1. Answer: C

This is really a question about inputs and outputs. There's only one process that takes "change requests" as an input, and that's Perform Integrated Change Control. That's where your changes get approved. The other answers all refer to other processes: A is about building a baseline (which is part of Develop Project Management Plan), while B and D are both about Direct and Manage Project Work.

This is a "which–is–not" question. When you see a question asking you to choose which input or output is not associated with a process, one good strategy is to try to think of what it is that process does.

2. Answer: B

The Project Management plan is created in the Develop Project Management Plan process, which happens after Develop Project Charter. Develop Project Charter is the very first process on any project, and the inputs in answers A, C, and D exist before the project started. The Project Management plan is created during the project.

3. Answer: C

The whole reason for the Direct and Manage Project Work process is to actually do the project work, and the deliverables are the products or services that are created by the project. Don't get fooled by answer D—even though the work is performed in Direct and Manage Project Work, the information about how that work is performed is turned into forecasts in Monitor and Control Project Work.

That makes sense. You need to monitor the work to figure out how well it's being performed.

4. Answer: C

When you get a question about communication, look for the answer that provides the most complete, honest, and up-front information, even if that information won't necessarily solve the problem or make everyone happy.

5. Answer: B

All changes must be handled using the change control system, which is a set of procedures that is contained in the Project Management plan. There is no way to tell from the question what specific steps will be in that change control system—answers A, C, and D are all possible ways to deal with changes, depending on the situation. The only way to know for sure what to do is to follow the change control procedures in the Project Management plan.

Exam Questions Answers

6. Answer: A

This is a just-the-facts-ma'am question, and answer A is the actual definition of the work authorization system. (This term is used in the *PMBOK® Guide*—technically it's not specifically defined there, but you might still see it on the exam.)

7. Answer: D

The first thing you do after a change is approved is to update the baseline. If you chose answer C, don't feel bad—it's easy to get a little mixed up about what a baseline is used for. The whole purpose of the baseline is to figure out whether your project has deviated from the plan. But a change isn't a deviation from the plan! A deviation is accidental, while a change is done on purpose. That's why it's so important to get the change approved: that way, everyone knows about it, which means that you can plan for it. And updating the baseline is how you do that planning.

You use the baseline to protect yourself from nasty surprises...and an approved change is not a surprise.

8. Answer: B

When your company has a policy, you need to follow it and not try to work around it. Also, don't get fooled by answer D—the question said that a change request was submitted, so it's already documented. The exam could contain tricks like that!

The important stuff in this question is all in the second and third sentences. The outsourcing detail is a red herring.

9. Answer: B

This is a business case—it describes the benefits of doing a project and can be used to decide whether it's worth it for your company to do the work. Sometimes the benefits will be about gaining capabilities, not just money.

There will be questions on the exam where there are two valid answers but only one BEST answer.

10. Answer: D

Defects do not need to be documented in the Project Management plan. Take a look at the other answers—do you understand why they are correct? Answer A is simply the definition of the project charter; it doesn't have anything to do with the defect, but it's still true. When you're performing the Monitor and Control Project Work process, you need to make sure defect repairs are approved before you change the deliverables, so answer B is true as well. And as far as answer C goes, that's the whole purpose of the Perform Integrated Change Control process: to approve defect repairs, changes, and preventive and corrective actions!

Exam ~~Questions~~ Answers

11. Answer: A

This is the definition of the Project Management plan!

12. Answer: C

Even when a project is terminated, you still need to close it out.

A question like this needs you to actually think about what you'd do—it's not just about applying a rule that you've learned.

13. Answer: A

If a resource is not available to you, it doesn't matter what's in your project charter or what your sponsors and stakeholders want. You need to figure out how to move forward from here, and the first step in doing that is evaluating the impact that this new problem will have on your project.

There's no such thing as a Change Prioritization plan! Keep an eye out for fake artifacts and processes.

14. Answer: A

The project manager must decide the priority of the changes. If the changes need to be made, that means that they were approved. So you can't simply deny them. And you can't call the team in for a meeting, because they need to do the work. Some people may think that the stakeholders need to be involved—but since the change was already approved, you've gotten their buy-in. Now it's up to you to decide the order in which they're implemented.

This is NOT a good change control board because a change control meeting doesn't usually include the whole team!

15. Answer: C

When you get a change request, you need to consult the Project Management plan and follow the procedures defined in the change control system. It is generally not a good idea to involve the entire team in evaluating each change that comes in—there may be many changes, and if you pull your team off the job for each one, they'll never get their job done!

Doesn't C seem like the right answer? Too bad it's not a real process!

16. Answer: A

Once a change is requested, all of the work that you do with it falls under Perform Integrated Change Control, right up until it's approved and you can implement it.

Exam ~~Questions~~ Answers

17. Answer: B

The work authorization system is defined by the company, and it's external to the project. You can think about it as the rules that you are told to follow in order to assign work in your company. They are part of the enterprise environmental factors, an input to Develop Project Charter.

Remember that lessons learned are documented throughout the project, not just at the end! That's why they're part of work performance data.

When you close a process or phase, you need to make sure each deliverable has been accepted by the stakeholders.

18. Answer: B

The work performance data is documented as part of Direct and Manage Project Work. By the time the project closes, it's too late to use the work performance data! That's why it's an input to Monitor and Control Project Work—so you can take corrective action if the work is not being performed well.

We'll learn about Scope Management in the next chapter.

19. Answer: B

The project charter authorizes the project manager.

IT SEEMS LIKE HISTORICAL INFORMATION IS AN IMPORTANT CONCEPT. I'LL BET THERE WILL BE A QUESTION OR TWO ABOUT IT ON THE EXAM.

20. Answer: D

You'll learn about forecasts in Chapter 7—they're used to help predict whether the project will come in on time and within budget. If not, preventive or corrective actions will be needed! But you don't need to know that to know they're not an output of Direct and Manage Project Work.

21. Answer: B

Historical information is an important input into Develop Project Charter, which is the first process that you perform when you start a new project. Historical information is very important, because it's how you learn about past projects' successes and failures. It's not actually listed as its own input. It's a part of organizational process assets—and it really is a huge asset to any organization!

When you add lessons learned to your organizational process assets, you're recording important historical information that other project managers can use later.

Exam ~~Questions~~ Answers

22. Answer: A

The project manager may be consulted when the project charter is created, but that's not always the case. It's possible that the project manager for a project is not even known when the charter is created!

23. Answer: C

While you may employ good judgment in developing your Project Management plan, expert judgment is not an input. It's a tool/technique used in the various processes.

Didn't D look like a good answer?

24. Answer: C

The first step in handling any change is to document it. That's why change requests are an input to Perform Integrated Change Control: the change control process cannot begin until the change is written down!

25. Answer: D

If you're having trouble remembering what the inputs and outputs are for Monitor and Control Project Work and Perform Integrated Change Control, one way to think about it is that change control is all about deciding whether or not to do something. Monitor and Control Project Work is where you spot the problems—that's why all of the *requested* changes are outputs of it, and inputs into Perform Integrated Change Control.

Perform Integrated Change Control is where those recommendations get evaluated and turned into *approved* actions and changes. The ones that are not approved are rejected. Then they go back to Direct and Manage Project Work, where they are implemented, because that's project work and all project work happens in that process.

REJECTING CHANGES MEANS THAT SOMETIMES YOU NEED TO SAY NO TO PEOPLE TO MAKE THEM HAPPY IN THE END. THEY MIGHT NOT LIKE IT, BUT THEY'LL END UP SATISFIED WHEN THE PROJECT GOES WELL.

Remember, this is how you handle changes: Find it...evaluate it...fix it.

So how did you do?

5 Scope management

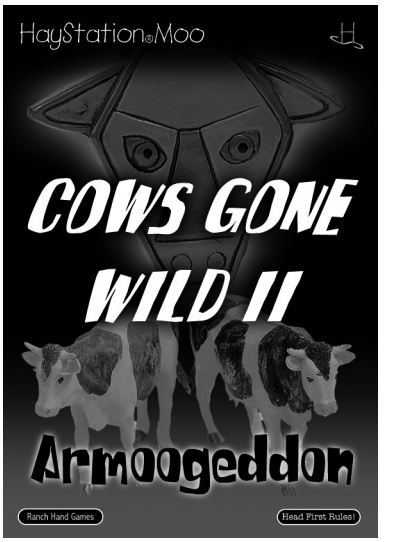
Doing the right stuff

Confused about exactly what you should be working on?

Once you have a good idea of what needs to be done, you need to **track your scope** as the project work is happening. As each goal is accomplished, you confirm that all of the work has been done and make sure that the people who asked for it are **satisfied with the result**. In this chapter, you'll learn the tools that help your project team **set its goals** and keep everybody on track.

Out of the frying pan...

The people at Ranch Hand Games have been working hard for over a year on the sequel to their most successful title, *Cows Gone Wild*. It seemed like the project would never end…



...and right back into the fire

Since it took so long to get this version out, it's already time to start working on the next version. But nobody wants to see that project spin out of control the way it did last time.

BRAIN POWER

The *Cows Gone Wild II* team ran into a lot of changes throughout the project. Could they have done something to avoid that problem?

Cubicle conversation

Brian: The project rocked in the beginning. We brought in some really talented programmers so that we could handle all of the technical challenges that might come up. We spent all that time whiteboarding and working our way through the technical issues in design. It really felt like this game was going to be amazing and fun to build. What went wrong?

Amy: We got sidetracked all over the place. Remember what happened with the website? We spent months making that site look just like the game. It got to the point where it actually looked a lot better than the game did.

Brian: Yeah, you're right. And there were all these changes along the way—the story got updated like a thousand times. It was nuts.

Amy: I remember that. What a mess.

Brian: Totally. Oh man, and that time we realized you had to redraw all the artwork for the Haymaker level? We all slept in the office for like a week!

Amy: Right…um, so what's gonna keep that from happening this time?

Maybe the Cows Gone Wild II project would have gone better if they'd had a project manager on board...

How would you solve these problems that happened in *Cows Gone Wild II* so they don't cause the same kind of trouble on *CGW III*?

Just write down a short sentence for each of these.

1. The website got larger and larger and took almost as much time to build as the game itself.

.....

The team had to rework a bunch of artwork because the game story changed.

2. There were lots of last-minute story changes. .....

.....

3. Artwork changes caused rewrites at the last minute. .....

.....

4. The game was over a year late. .....

.....

Exercise Solution

Here are some answers that are good for dealing with these scenarios.

1. The website got larger and larger and took almost as much time to build as the game itself.

Keep the team from doing unnecessary work.

You can't depend on the team to figure out what to do along the way. You need to scope out the work from the very beginning.

Luckily, if you nail down the scope up front, your team won't waste time doing unnecessary work later.

2. There were lots of last-minute story changes. **Plan ahead and avoid late-breaking changes.**

Writing down all of the work and the effort required to do it will help everyone understand the impact of their changes.

If the creative team figured out earlier that they'd need to make changes, the programmers could have worked on parts that weren't going to change. That would have been a lot more efficient.

3. Artwork changes caused rewrites at the last minute.

Get started on the artwork changes sooner.

It's easier to figure out what's going to have to change if everyone is in sync on the scope.

Sounds like this game was late because the scope kept changing. Better planning could have fixed this.

4. The game was over a year late. **Start planning sooner. Figure out what the team is going to do before they start.**

Knowing what you're going to build BEFORE you build it means you can do a better job predicting how long it will take.

Doing more planning at the start of the project helps you prioritize so that the most important work gets done efficiently.

It looks like we have a scope problem

All of the major problems on *Cows Gone Wild II* were **scope problems**. The website was bloated with features that were added on late in the project. The creative team kept realizing that they had to do a lot more work. These are classic scope problems.

The product scope is all about the final product—its features, components, pieces.

When people talk about scoping out their products, a lot of times they're talking about figuring out the features of the product, not the work that goes into it.

Product scope means the features and functions of the product or service that you and your team are building.

When we talk about scoping out a project, we mean figuring out all of the work that needs to be done to make the product.

Project scope is all of the work that needs to be done to make the product.

THIS is a big part of what the project manager is concerned with...the work the team has to do.

Scope creep means uncontrolled changes that cause the team to do extra work.

This means changes that just went in without anyone bothering to figure out what effect they'd have on the project's time, cost, scope, quality, risk, or resources.

For the exam, you need to understand both product and project scope.

Sharpen your pencil

Here are some attributes of *Cows Gone Wild III*. Which are project scope and which are product scope?

1. Programming

☐ Project scope ☐ Product scope

2. 34 levels in the game

☐ Project scope ☐ Product scope

3. Graphic design

☐ Project scope ☐ Product scope

4. Four playable characters

☐ Project scope ☐ Product scope

5. Great graphics

☐ Project scope ☐ Product scope

6. Testing

☐ Project scope ☐ Product scope

7. Mac and PC compatible

☐ Project scope ☐ Product scope

8. A "boss battle" milk fight level at the end

☐ Project scope ☐ Product scope

Answers on page 244.

there are no Dumb Questions

Q: Does the scope include all of the stuff that I make, like a project schedule or a budget? What about things that are used to build the product but not actually delivered to the people who use it?

A: Yes, the project scope includes every single thing made by you and the team, and that includes the project plan and other project management documents. There are plenty of things on a project that are deliverables, but which the people who use the product will never see…like a project schedule, specifications, blueprints, and budgets. And while some of these things are made by the project manager, there are a lot of them that aren't, and it's not your job to figure out what goes into them. You just need to make sure they get done.

Q: Won't the team care more about what they are making than how they are making it?

A: Yes, definitely. It's your job as project manager to worry about all of the work the team does to build the product, so that they can focus on actually building it. But that doesn't mean you don't need their cooperation to make sure you've written down all of the work, and nothing else.

Q: Does that mean the project manager doesn't care about the product scope at all, just the project scope?

A: No, you still need to think about your project's final product. You can never ignore product scope, because most projects have changes to the product scope along the way. You'll have to change your project scope to include the work that's caused by product scope changes. Changes like that will probably have an impact on time and cost, too.

Here's an example: if somebody asks for a new feature in *Cows Gone Wild III*, the first thing the team needs to do is understand how much work is involved to accommodate it, and what that scope change will do to the cost and schedule.

As a project manager, your main concern is understanding that impact, and making sure everyone is OK with it before the change gets made. It's not your job to decide which is the best feature for the product, just to help everybody involved keep their priorities in mind and do what's best for the project.

You've got to know what (and how) you will build before you build it

You always want to know exactly what work has to be done to finish your project *before* you start it. You've got a bunch of team members, and you need to know exactly what they're going to do to build your product. So how do you write down the scope?

That's the goal of the **six Scope Management processes**. They're about figuring out how you will identify all of the work your team will do during the project, coming up with a way to make sure that you've written down what work will be done (and nothing else!), and making sure that when things change on your project, you keep its scope up to date so that your team is always building the right product.

Scope Management means figuring out what's OUT OF scope, not just what's part of it.

Scope Management plan

You need to write down exactly how you're going to do all of those things in the Scope Management plan.

CAN'T I JUST HAVE MY TEAM SPEND A DAY BRAINSTORMING A LIST OF *EVERY POSSIBLE THING* THEY MIGHT HAVE TO DO?

That's a good idea. But what happens if they miss something?

It often seems like you should just be able to get everyone in the same room when the project starts and just hash all this stuff out. But it's really easy to miss something, and it's even easier for a team to get sidetracked.

It's way too easy for people to go off track and start doing things that don't really contribute to the project—like building the website for a video game instead of building the game itself.

This is why the Scope Management plan needs to say how you're going to keep unnecessary work out of the project.

The Scope Management plan describes how you write down the scope, make sure it's right, and keep it up to date.

The power of Scope Management

When you take control of your project's scope, you're doing more than just planning. It turns out that when projects have scope problems, the results are actually pretty predictable. Take a look at these problems that the Ranch Hand team ran into. Do any of these sound familiar to you? Many project managers run into similar problems on their own projects.

1. **The team had trouble getting the project off the ground.** Everyone on the team was good at their individual jobs, but it seemed like nobody knew how to get the project started.

They'd sit around in meetings talking about what they wanted to build, but it seemed like weeks before anything started getting done.

2. **There were a lot of false starts.** Just when they thought they were getting the project under way, it seemed like something would shift and they'd be back to square one.

3. **The sponsor and stakeholders were unpredictable.** There were three different times that Amy and Brian thought they were done. But each time, a stakeholder found a problem that sent them back to the drawing board.

The worst part about this was that there was no way to know when they were done with the project without asking for the sponsor's opinion...and it seemed like that opinion was always changing.

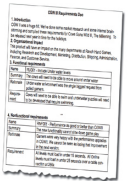
4. **There were a whole lot of changes.** They were always scrambling to keep up with shifting priorities and ideas, and they never knew for sure what they'd be working on each week.

The team was tempted to lay down the law and forbid any changes...but a lot of those changes were necessary, and good ideas.

The six Scope Management processes

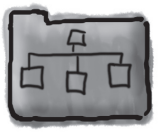
Each of the Scope Management processes was designed to help you avoid the kinds of scope problems that cause a lot of projects to go off track. One of the best ways to remember these processes for the exam is to understand why they're useful, and how they solve the kinds of problems that you've seen on your own projects.

Project Management plan



Requirements documentation

Project scope statement



Work breakdown structure

Change requests

Accepted deliverables

Plan Scope Management

Here's where you write down the subsidiary plan for the Project Management plan that we talked about in the last chapter. You plan out all of the work you'll do to define your scope, make sure the team is planning to do the right work, and control it.

Collect Requirements

In this process, you find out all of the stakeholders' needs and write them down so that you know what to build and your requirements can be measured and tracked.

Define Scope

Here's where you write down a detailed description of the work you'll do and what you'll produce.

When you do this right, the stakeholders are never unpredictable because you already understand their needs.

Create WBS

The work breakdown structure (WBS) organizes all of your team's work into work packages—or discrete pieces of work that team members do—so that you can keep the momentum of the project going from the start.

Pay attention to the WBS—there will be a lot of questions about it on the exam.

Control Scope

We already know how important it is to control changes on your project. When scope changes aren't controlled, it leads to the most frustrating sort of project problems. Luckily, you already know about change control, and now you can use it to manage your project's scope.

Remember integrated change control from Chapter 4? Now you'll see it in action.

Validate Scope

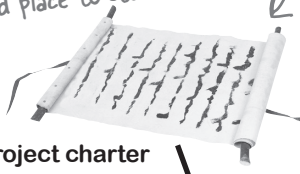
Once the work is complete, you need to make sure that what you're delivering matches what you wrote down in the project scope statement. That way, the team never delivers the wrong product to the customer.

On the exam, "customer" can mean the same thing as "client" and "sponsor."

Plan your scoping processes

Here's where you figure out how you'll approach defining and validating the scope of your project. The **Plan Scope Management** process is where you lay out your approach to figuring out what work you'll do and what's out of scope. All of the other processes in the Scope Management knowledge area are defined and described in this document. It's the blueprint you'll use for everything else you'll do to manage scope through the project.

The charter already includes a high-level description of the scope of the project. So it's a good place to start.



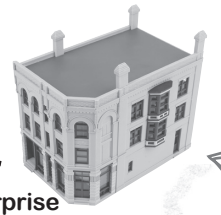
Project charter

Organizational process assets

Project Management plan

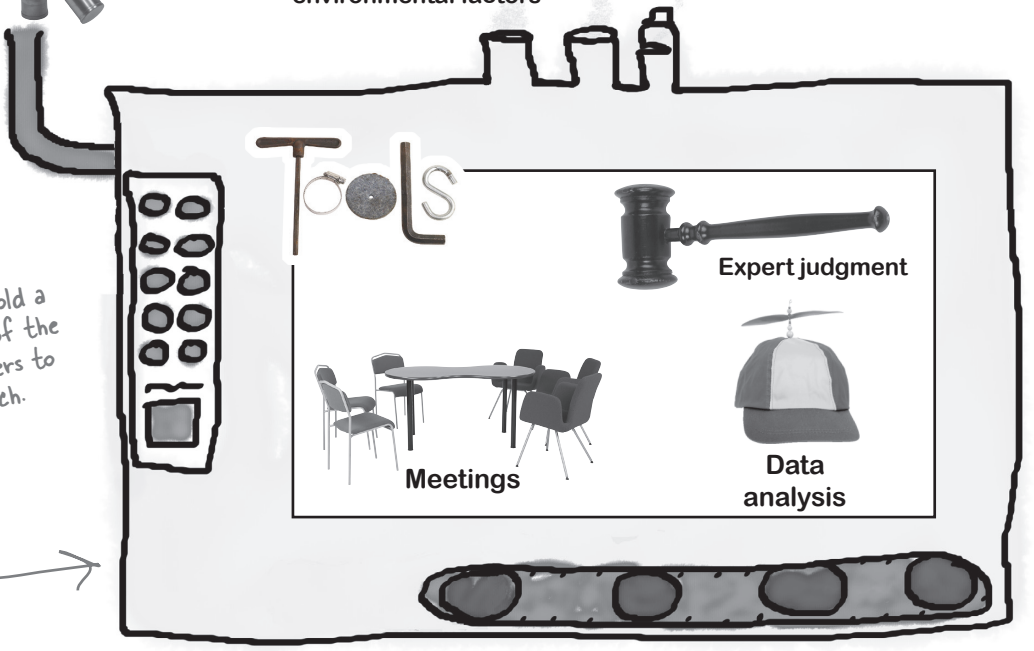
Since you're in the process of creating these plans for the other knowledge areas at the same time as this one, there's a good chance that you can use some of the same ideas in this plan that you've uncovered in the process of creating your Schedule Management plan, your Cost Management plan, or any of the other subsidiary plans.

Inputs



Enterprise environmental factors

Your company's culture and accepted practices will have a big impact on the way you manage scope on this project too.



You might need to hold a meeting with some of the project's stakeholders to agree on an approach.

Now you've got a roadmap for managing scope

There are two outputs of the Plan Scope Management process: the Scope Management plan and the Requirements Management plan. Both of them help you define the scope of your project and make sure that you and your team are focused on only the work that will help you satisfy your customers' needs. The Scope Management plan keeps you on track by detailing the processes you and your team will follow as you document your scope, figure out your work breakdown structures, and validate and control your scope for the rest of the project. The Requirements Management plan details the process you'll use to collect requirements and how you'll manage them once they've been written down.

Outputs

Your Requirements Management plan will describe all of the processes your team will use to document your requirements and maintain that document throughout the project.

The Scope Management plan isn't just about writing a scope document; it details the process you use to come up with your work breakdown structure too.

Requirements Management plan

Here's where you'll find a description of the approach the team will take to planning, tracking, and reporting on requirements. You'll use this document to describe the prioritization process for requirements, and how you'll build a traceability matrix for your requirements as well.

Scope Management plan

Here's where you write down the subsidiary plan for the Project Management plan that we talked about in Chapter 4. You plan out all of the work you'll do to define your scope, with the right work planned for the team, and control it.

The Plan Scope Management process helps you think through everything you'll need to do to keep your project focused on the right work from beginning to end.

Cubicle conversation

Meet Mike, the new project manager at Ranch Hand Games.

Brian: So we finally hired a project manager. Welcome aboard!

Amy: I'm glad they brought you in to help fix this mess.

Brian: So what are you gonna do to help us? Because I don't see what you can really change.

Mike: Thanks for the vote of confidence. Look, I might not be able to fix everything, but we should be able to keep this scope under control.

Brian: Sure, you say that now. But we all thought the last project would go fine too, and that one was a real pain!

Mike: Well, did you gather the requirements for your last project?

Amy: No, but we've built video games before and we knew basically what we needed to do when we started out.

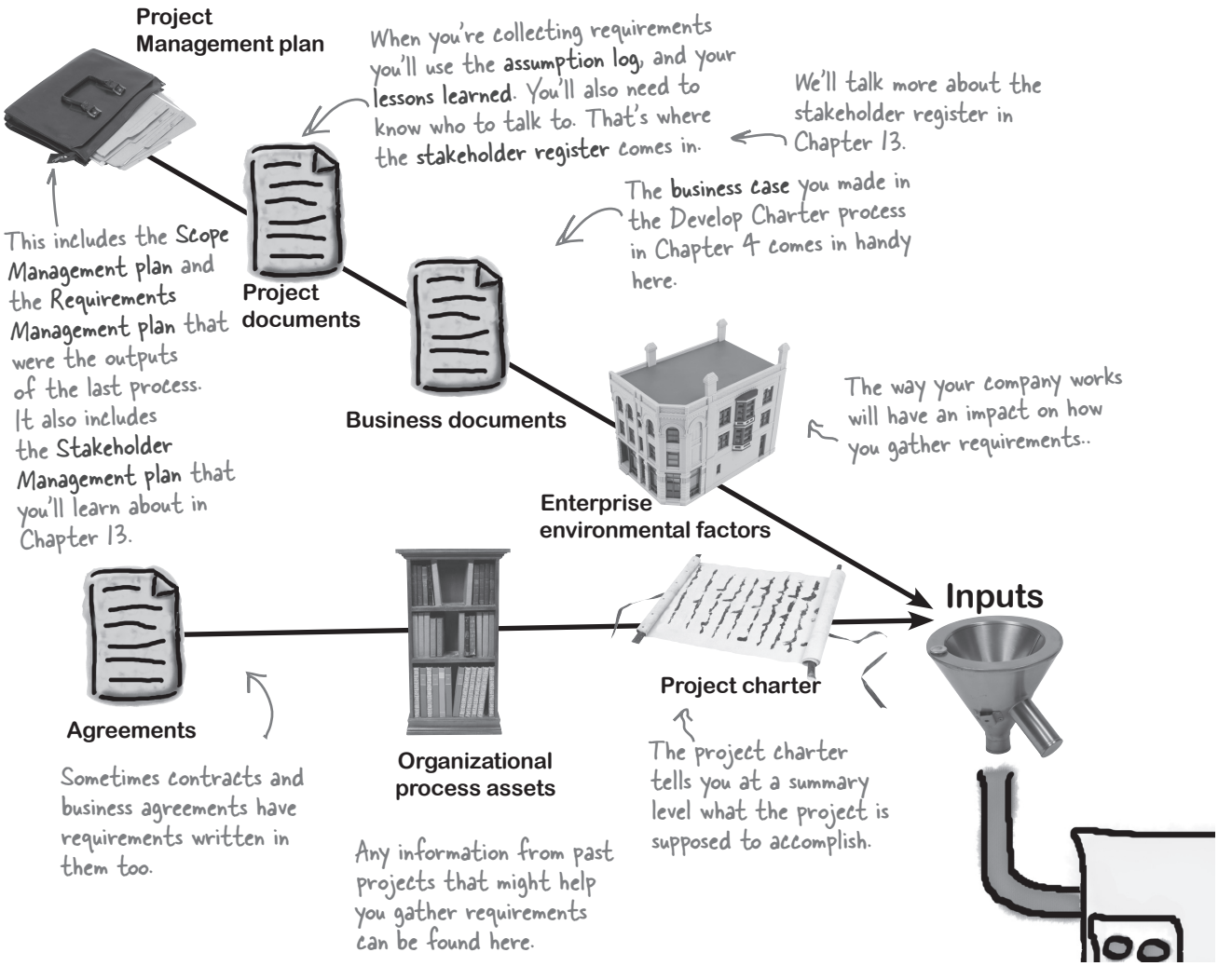
Mike: It sounds like that wasn't enough.

BRAIN POWER

What's the first thing Mike should do to make sure that *Cows Gone Wild III* goes well?

Collect requirements for your project

Gathering requirements is all about sitting down with all of the stakeholders for your project and working out what their needs are, and that's what you do in the **Collect Requirements** process. If your project is going to be successful, you need to know what it will take for all of your stakeholders to agree that your project has met its goals. You need to have a good idea of what's required of your project up front, or you'll have a tough time knowing whether or not you're doing a good job as you go. That's why you need to write down all of your project and product requirements with enough detail that you can measure your team's progress.



Talk to your stakeholders

The **Collect Requirements** process involves talking to the people who are affected by your project to find out what they need. All of the tools in this process are focused on getting your stakeholders to tell you about the problem that the project is going to solve. Sometimes that means sitting down with each of them one-on-one, and other times you can do it in a group setting. One of the most important things to understand about requirements is that every requirement fulfills a specific stakeholder need. Lucky for you, a lot of those needs are already written down—in your business case document.

But that's not the only place you'll find requirements, so here are a few really useful **data gathering** tools and techniques to help you gather requirements:

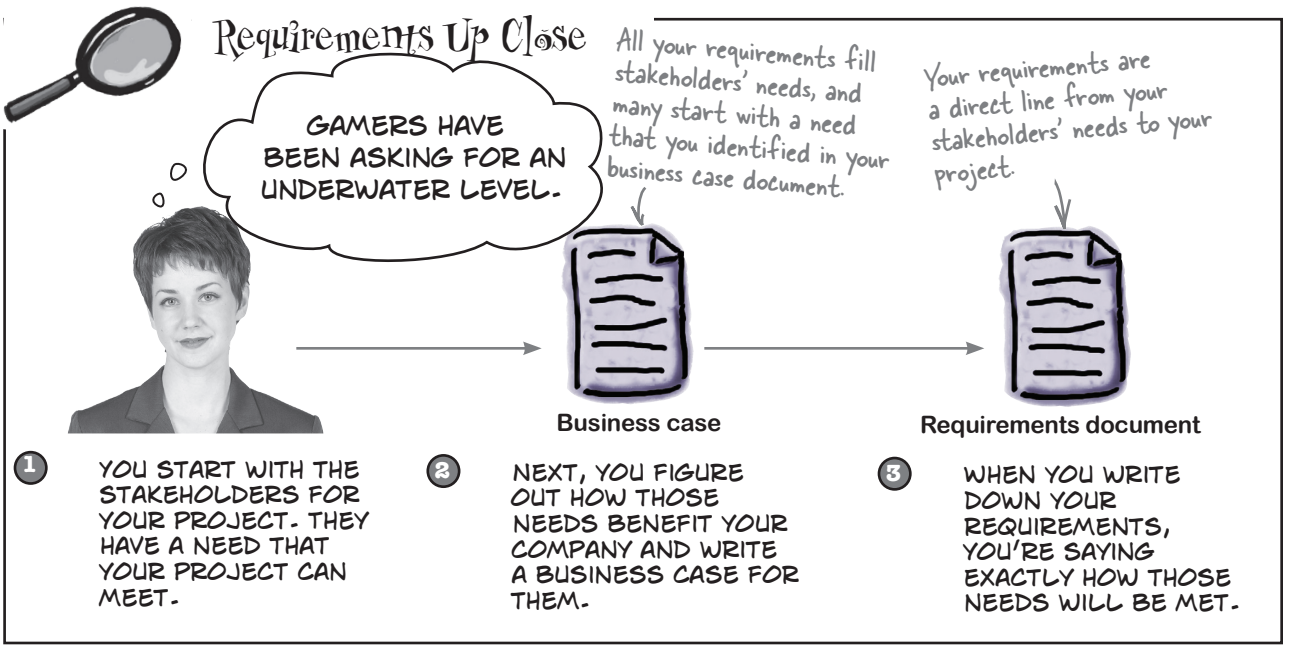
Interviews are important ways to get your stakeholders to explain how they'll use the product or service your project is creating. By talking to people one-on-one, you can get them to explain exactly what they need so that you can be sure that your project can meet its goals.

Questionnaires and surveys are a way of writing down the questions you want to ask the people who will benefit from the software and reviewing their responses all together.

Focus groups are another way to get a group of people to discuss their needs with you. By letting a group discuss the end product together, you can get them to tell you requirements that they might not have thought of by themselves.

Brainstorming is one of the most commonly used ways of collecting requirements. Whenever you sit a group of people down to think of new ideas, you're brainstorming.

Benchmarking is a way of comparing the processes and practices used in building your software with the practices and processes in other organizations so you can figure out the best ideas for improvement.



Make decisions about requirements

A big project usually has a lot of stakeholders, and that means a lot of opinions. You'll need to find a way of making decisions when those opinions conflict with each other. There are four major decision-making options you can choose from. These are referred to as **decision-making techniques** on the test.

Unanimity means everyone agrees on the decision.

Majority means that more than half the people in the group agree on the decision.

Plurality means that the idea that gets the most votes wins.

Autocratic decision making is when one person makes the decision for the whole group.

Multicriteria decision analysis is when teams use numbers to help them map out decisions. Teams might compare optional decisions based on numeric values they've given for uncertainty, risk, business value, time criticality, or other important factors.

You'll need to know the difference between the different decision-making techniques for the exam. Here are the minutes from a facilitated workshop that the CGW team held with all of its stakeholders. Identify which decision-making technique was used in each case.

1. The group voted on the CCG (cud-chewer gun) five times, but decided not to include it because they couldn't get everyone to agree to it.

- ☐ Unanimity
- ☐ Plurality
- ☐ Majority
- ☐ Autocratic

2. The VP of Engineering told everyone that they had to come up with a new character for Team Guernsey. Since he's the highest-ranking person in the room, nobody argued with him.

- ☐ Unanimity
- ☐ Plurality
- ☐ Majority
- ☐ Autocratic

3. There were 10 new scenery suggestions up for approval, but only 5 could make it into the game. The team chose the top 5 in a general vote.

- ☐ Unanimity
- ☐ Plurality
- ☐ Majority
- ☐ Autocratic

4. Over half the group wanted to see a new story that involved Farmer Ted. So that requirement was recorded as an absolute necessity.

- ☐ Unanimity
- ☐ Plurality
- ☐ Majority
- ☐ Autocratic

Answers: 1. Unanimity 2. Autocratic 3. Plurality 4. Majority

Understand your requirements

Understanding all of the documents that have been created in the initial discussions about your project will help you to get a better handle on what your project will create. That's why the Collect Requirements process includes a tool called **data analysis**.

The data analysis tool/ technique includes document analysis. Here are examples of documents that you'll analyze when you collect requirements.

Document analysis is a way of collecting requirements by reading through all of the existing documents for your product. Here are some of the documents you will draw from when you're collecting requirements:


Agreements


Business plans


Current process flows


Marketing literature


Use cases

The stakeholders know a lot about the project already

Requirements are all about people's needs, so it shouldn't be a surprise that you'll need to use your **interpersonal and team skills** to get everyone on the same page about what the project needs to accomplish.

The nominal group technique is a form of brainstorming where you write down the ideas as you find them and have the group vote on which ones they like the best. You then use the votes to rank all of the ideas and separate the ones that aren't important from the ones you want to delve into deeper.

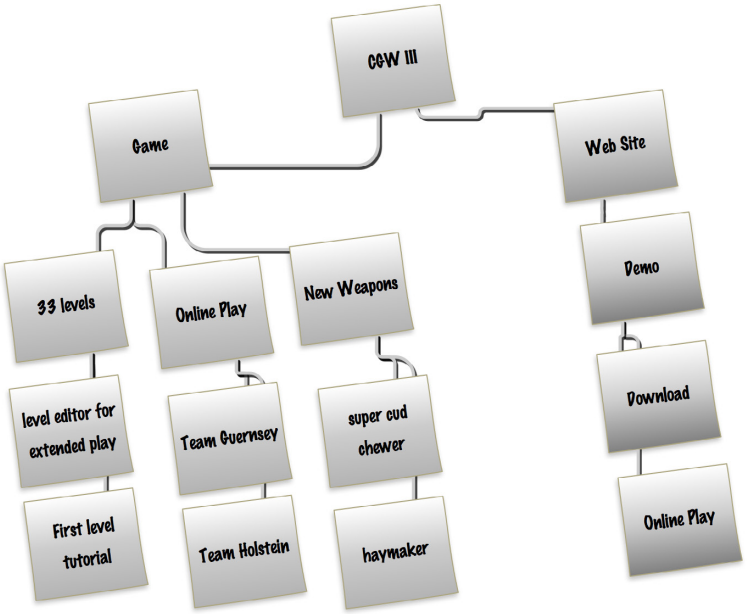
Facilitation of requirements discussions means using collaborative techniques to get everybody together to talk about what they think the project needs to accomplish and how to achieve it. Here are some of the kinds of group requirements discussions you might use to collect project requirements.

- **Joint application design** is a facilitated workshop where users and the development team work together to define requirements. It's sometimes called a JAD Session.
- **Quality function deployment** is a workshop often used in manufacturing projects where the team identifies customer needs, prioritizes them, and then figures out goals for the team to meet to deliver those requirements.
- **User stories** are short descriptions of functionality that end users need. Often teams collaborate to write user stories and use the actual story they write as a reminder of the discussion they had together. User stories are often written using this format:

As a <*type of user*>, I want to <*specific action I'm taking*> so that <*the benefit from the action I've just taken*>.

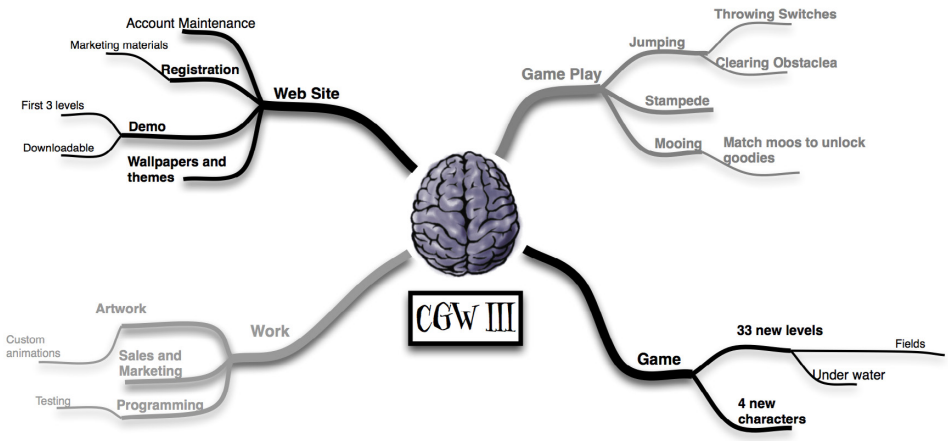
See your ideas better

Getting your team to think creatively can help you create a better product from the start. **Data representation** is all about visualizing your ideas so that everyone can see how they relate to each other.



Affinity diagrams are great when you have a lot of ideas and you need to group them so you can do something with them. A lot of people make affinity diagrams using Post-it notes on walls. That way, you can move the ideas around and change the groupings when you think of new areas to explore. Sometimes just putting requirements in categories will help you to find new ones.

Idea/mind maps are a good way to visualize the way your ideas relate to each other. When you've finished working through an idea, it sometimes helps to create a map of how you got there and show which ideas can be grouped together.



Context diagrams help your team show the way all of the processes and features in your product scope relate to each other. It's a picture of the scope of your product that shows how users will interact with it.

Use a questionnaire to get requirements from a bigger group of people

The *Cows Gone Wild* development team needed to talk to the people who play their games to figure out what would make the gamers happy in the next version. The team obviously couldn't go around to every customer's house asking questions, so they wrote a questionnaire about new possible features for the game that they sent to gamers who had registered the game.

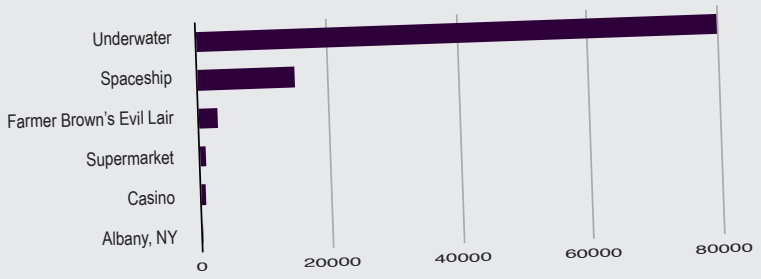
When it was time to start collecting requirements for the new version, the team started with all of the data they'd gathered from those surveys and did some analysis to figure out which features were most important to the gaming community. Here's an excerpt from their survey results:

Questionnaires are considered data gathering techniques when you're studying for the exam.

Cows Gone Wild II Registration Survey Results

The *Cows Gone Wild* series released *Cows Gone Wild II* three months ago. Since then, we've sold 500,000 copies of the game. Of those sales, 350,000 have been registered and 100,000 have responded to the *CGW III* requirements collection survey. Here are the results:

Artwork:
Which new environments would you like to see included in a follow-up to the game?



Observation is one of the interpersonal and team skills tools you'll use to collect requirements.

Observation can help you see things from a different point of view

Sometimes observing the people who will use your product while they work with it will give you a better idea of how to solve their problems. People don't always know what to say when you ask them for requirements, so watching them deal with the problem your product is going to address can help you to find requirements that they might not tell you about on their own.

Expert judgment is another tool used in requirements gathering.

A prototype shows users what your product will be like

Sometimes the best way to get your stakeholders to give you an opinion on what your product should be is to show it to them in a **prototype**. Prototypes are models of the product that you're going to build that give your stakeholders a better idea of what your team is thinking. Sometimes users who are experimenting with a prototype will come up with a brand new requirement that they never thought of before. If you can get them to find it in the prototype, it's a lot easier to deal with than if you wait until the end of the project to show to them. When you're making a really complicated product, it can make sense to prototype it as part of the requirements collection process so that you can find changes that your users will ask for early on.

Prototypes are a great tool if you're developing your project using iterative techniques. If you're using agile software development processes or defining requirements in phases, prototypes are a great way to keep your stakeholders involved in the project and get their feedback on changes that might be needed.

there are no Dumb Questions

Q: In my company, business analysts collect the requirements, not project managers. Why do I need to know all this stuff?

A: Good point. A lot of project teams will have a business analyst who will work on gathering requirements for the project and writing specifications for it. As the project manager, though, you are responsible for making sure that the needs of all of the stakeholders are met. So it's a good idea for you to stay on top of the requirements collection process, and be an active participant in it.

Some organizations even divide up the requirements-gathering activities into project requirements and product requirements. The project requirements would be things like staying within the budget, meeting specific deadlines, and using a certain number of resources, while product requirements would be about features of the product. Even if you are lucky enough to have a business analyst on your project to help you gather requirements, you'd better understand both the project and product requirements if you're going to keep your project on track.

Q: Can I just skip these requirements-gathering tools and jump straight into code? We do iterative development where I work. That means I can jump right in and plan the work as it's happening, right?

A: The short answer is no. The more you know up front, the easier it's going to be for you to plan out your project. Even iterative projects must plan out their requirements for each phase up front. Now, it's true that you should be able to get through the Collect Requirements process more quickly if you're only gathering requirements for a small phase of your project, but it doesn't mean that you can skip requirements altogether.

Q: How do I know when I'm done collecting requirements?

A: That's a good question. Your requirements need to be measurable to be complete. So it's not enough to write down that you want good performance in your product. You need to be able to tell people what measurement counts as good performance for you. You have to be able to confirm that all of your requirements are met when you close out your project, so you can't leave requirements up to interpretation.

You know your requirements are complete when you've got a way to verify each of them once they're built.

Now you're ready to write a requirements document

The outputs of the Collect Requirements process are the **requirements documentation** and a requirements traceability matrix, which allows you to follow the requirements from the document through implementation and verification.

Outputs

***CGW III* Requirements Document**

1. **Introduction**

CGW II was a huge hit. We've done some market research and some internal brainstorming and compiled these requirements for *Cows Gone Wild III: The Milkening,* which will be released next year in time for the holidays.

2. Organizational impact

This product will have an impact on many departments at Ranch Hand Games, including Research and Development, Marketing, Distribution, Shipping, Administration, Finance, and Customer Service.

3. Functional requirements

Name	RU001—Include Underwater levels.
Summary	The cows will need to be able to move around underwater.
Rationale	Underwater environment was the single biggest request from polled gamers.
Requirement	Cows will need to be able to swim, and underwater puzzles will need to be developed that require swimming.

...

4. Nonfunctional requirements

Name	RNF001—Performance as good or better than *CGW II*.
Summary	The new functionality cannot slow down gameplay.
Rationale	Gamers were very happy with the performance upgrades in *CGW II*. We cannot be seen as losing that improvement in the next version.
Requirement	All levels must load in under 15 seconds. All online levels must load in under 25 seconds over a cable connection at 256K.

This requirement is measurable. If the end product has puzzles that involve swimming, the requirement will pass its test. If not, it will fail.

Here, you can load the levels and time it to figure out if the product meets its requirements.

The requirements document needs to list all of the functional and nonfunctional requirements of your product. **Functional requirements** are most of the kinds of things that you think of right away: new features, bug fixes, and new or different behavior. **Nonfunctional requirements** are sometimes called *quality attributes* because they're things that you expect from your deliverables, but aren't specific features. Some examples of nonfunctional requirements are performance, reliability, error handling, and ease of use.

CGW III Requirements Traceability Matrix

Origin codes: Business case: BC, Survey: S1, Internal: I
Requirement nos: Cross-reference with requirements document
Work module: Where implemented, cross-reference with WBS
Test: Where verified, cross-reference with design of experiments

Requirements for Underwater Levels

Origin	Requirement	Module	Test
S1	RU001	3.3.1	TC01–TC57
BC1	RU002	3.4.1	TC101–TC350
S3	RU003	3.6.2, 3.7.1	TC2

This document shows where the requirements come from, where they get implemented, and how they get verified. It's a great way to take a quick high-level look at all your requirements and make sure they're mapped to specific test cases.

We'll be talking more about what a WBS is and how to build one in just a few pages.

CGW II Requirements Management

The Requirements Collection Process:
The following techniques will be used for requirements elicitation:

1. Questionnaires and surveys
2. Facilitated workshops
3. Delphi technique
4. Focus groups
5. Interviews
6. Observation

They will be prioritized based on strategic alignment with *CGW III*'s business case document.

Requirements will be managed as part of integrated change control once approved.

The Requirements Management plan tells how requirements will be gathered and analyzed.

Once the requirements document is approved by the stakeholders, any changes to it need to be approved using integrated change control.

BULLET POINTS AIMING FOR THE EXAM

- **Product scope** means the features and functions of the product or service being built. **Project scope** means the work that's needed to build the product.
- **Functional requirements** are the behavior of the product. **Nonfunctional requirements** are implicit expectations about the product.
- **Scope Management** is about figuring out all of the work that's going to be needed for the project, and making sure only that work is done—and nothing else.
- The **Scope Management plan** is created as part of the Project Management plan. It defines the process you'll use for defining scope and managing changes to it.
- You'll need to know the **order of processes** for the exam. A good way to remember them is to understand how the output of one process is used as the input for another.

Write down the Collect Requirements tool or technique that's being used in each one of these scenarios.

1. The team got together to come up with ideas for the game. As they thought of them, they grouped them on different-colored index cards and used thumb tacks to arrange them on a bulletin board by type.

.....

2. Ranch Hand Games listed questions for people visiting the website to answer in exchange for a game promo coupon.

.....

3. The team got together to brainstorm and periodically voted to rank requirements and separate the least important from the most important.

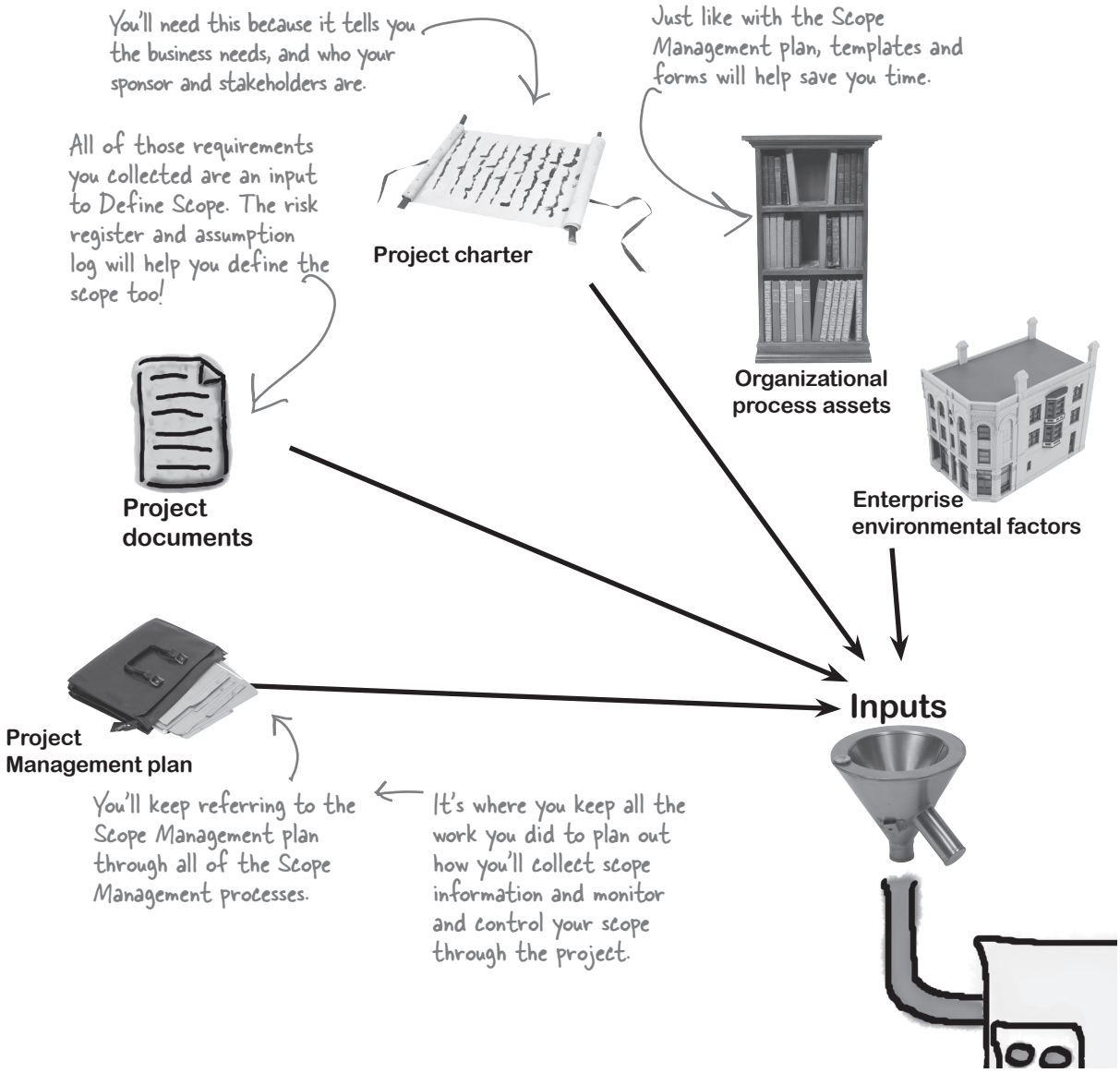
.....

Answers: 1. Affinity diagram, 2. Questionnaire, 3. Nominal group technique

Now that Mike's gathered the requirements, what do you think he should do with them? How can he make sure they actually get implemented in the game?

Define the scope of the project

Now that the Ranch Hand team has a project manager, everything will go smoothly, right? Well, not exactly. Just assigning a project manager isn't enough to get the scope under control. That's why you need the **Define Scope** process. Even the best project managers need to rely on things from the company and the people around them. That's why the inputs to Define Scope are so important. They contain everything you need to know before you can begin to break the project down into the work that the team members will do.



How do you define the scope?

These are the five tools and techniques of Define Scope.

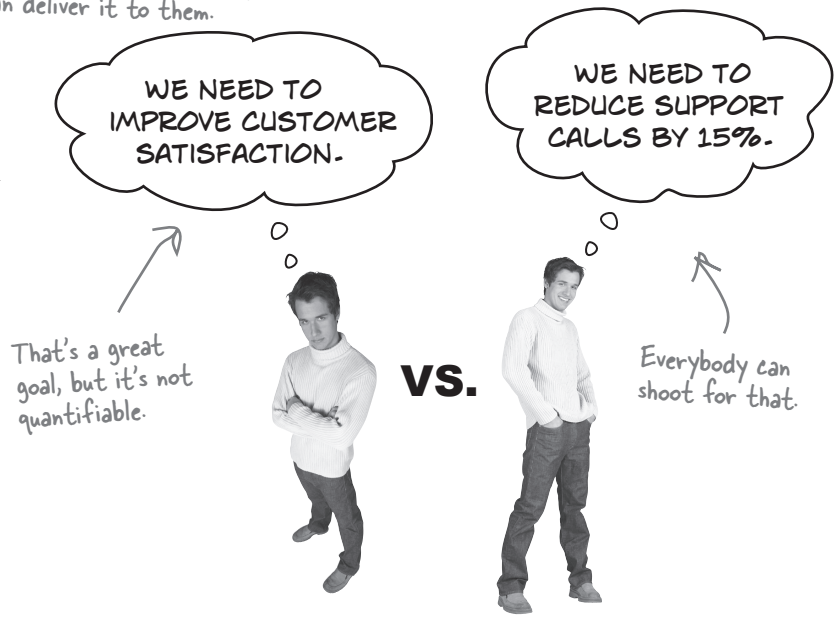
You already got a head start on defining the project scope when you wrote down the requirements. But now you need to go a lot further and write down all of the work that you and your team are going to do over the course of the project. Luckily, the **Define Scope process tools and techniques** are there to help guide you through creating the project scope statement (which you'll learn about in a minute).

You need to figure out what the stakeholders need so you can deliver it to them.

Interpersonal and team skills

When you do facilitated workshops with your stakeholders, figure out what they need, and write it all down. The reason you do this is because you need to make sure that what you're delivering really meets the needs of the stakeholders. This keeps the team from delivering a poor product.

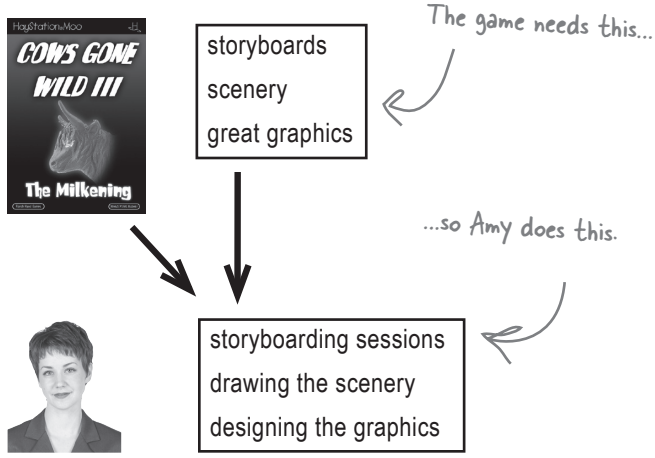
An important part of stakeholder analysis is doing your best to set **quantifiable goals**. That means writing down specific project goals that you can measure, which makes it a lot easier for the team to plan for the work they have to do.



Product analysis

Remember product versus project scope? People naturally think about the product they are making when they start to define the scope. This tool is all about turning those things into project work that needs to be done.

Once the work is complete, you're going to have to make sure that what you're delivering matches what you put in your requirements. The better your product analysis is at the start of the project, the happier your stakeholders will be with the product, and the less likely it is that you'll discover painful, last-minute problems at the end.



Data analysis

Think of other ways that you could do the work. Exploring different ways to do the work will help you find the one that is most efficient for the project. It's always possible that you might find a better way of doing things and need to change your original plan. Teams will often spend time performing **alternatives analysis** as part of the data analysis work they do when they define the scope of a project.

Designing the graphics: alternatives

A. Hire a graphic designer

B. Send the design work to an outside studio

C. License artwork that already exists

Expert judgment

You've seen this one before! Bring in an expert to help you figure out what work needs to be done.

Expert judgment

Decision making

Here you identify the criteria that will help you make a good decision about what to include and exclude from scope in your project and assign numeric values to them so you can figure out which requirements are most important in terms of business value to your stakeholders.

there are no Dumb Questions

Q: Is product analysis the same as requirements gathering?

A: Not exactly. When people gather requirements, they're trying to understand what needs the product should fill. Requirements are the contents of the product. When you use product analysis to define the scope of the work to be done, you're figuring out what deliverables the team needs to work on in order to build your project scope statement. So product analysis is concerned with how the work will be done, not what's in it.

Q: What if there is only one way to do something? Do I still need to do alternatives analysis?

A: There aren't too many things out there that can only be done one way, but if you happen across one, then you don't have to spend much time on alternative analysis because there aren't any alternatives to identify.

Q: What if a stakeholder can't tell me how to measure his needs?

A: That can get kind of tricky. Sometimes stakeholders know that they want things to get better, but they don't know how to tell when they've succeeded. You need to work with them to find something that can be measured in their ideas about project success. Without a way to measure your success, you won't know whether or not you are accomplishing your goals.

The project scope statement tells you what you have to do

After you have done your scope planning, figured out as much as you could using stakeholder and product analysis, and identified all of the possible ways of doing the work, you should be ready to add any new findings to the project scope statement.

Outputs

Cows Gone Wild III: The Milkening
Project Scope Statement

Product Scope Description: The product must contain 34 levels and 4 playable characters, and must be created for both Mac and PC platforms.

Project Exclusions: This project does not include a companion website. That will need to be done by another project team.

Project Deliverables: The deliverables for this project are:

Game
Design documents
Contract
Test plan
Test reports
Budget
Source code
Defect reports
Project Management plan
Schedule
Change requests

Project Acceptance Criteria: The product must not have an adverse impact on existing systems. All defects found must be judged of low enough priority and severity to be acceptable to all stakeholders.

This means looking for all the work the project DOESN'T include.

The deliverables listed here are EVERYTHING the project creates, including project management stuff.

This is the other output of the process, and it has to do with change control. We'll get to that when we talk about the Control Scope process.

Project documents updates

Here are a few things that Mike left out of the *CGW III* project scope statement. Can you figure out where each of them should go?

1. The game must have fewer than 15 defects per 10,000 lines of code.

2. There will be four graphic designers reporting to the art director, and six programmers and four testers reporting to the development manager.

3. No more than 15 people can be allocated to work on the game at any time.

4. Scenery artwork.

5. The product will not include bug fixes for the previous version.

6. The game needs to run on a machine with 1 GB of memory or less.

A. Project exclusions

B. Project deliverables

C. Project constraints

D. Project assumptions

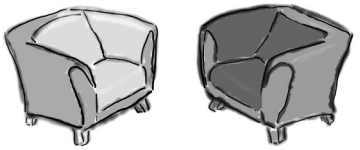
E. Project requirements

F. Acceptance criteria

→ Answers on page 245.

The project scope statement tells what work you are—and are not—going to do in the project.

Fireside Chats



Tonight's talk: **Requirements Documentation and Project Scope Statement spar over what's important in Scope Management**

Requirements Documentation:

I'm glad we're finally getting a chance to chat in person.

I wouldn't say that! It's just that, well, I think it's not hard to see why I'm such a critical part of Scope Management.

Well, it ought to be. I mean, you wouldn't even exist if it weren't for me.

There's no work to do if there's no product and without me, nobody knows what to build. So without me, really, who needs you?

But they still need me to tell them what to build. I tell everybody what the product needs to be.

That's true. And it's no wonder that so many projects have problems. But the more you know up front, the easier it is to plan for what might happen along the way.

Project Scope Statement:

Really? I never got the impression that you had much respect for me.

Typical. Everything's about you.

How do you figure?

Now that's just not fair. You think that just because people get together and talk about you in focus groups and brainstorming sessions, you're something special. Without me, people would be arguing over your requirements forever. I'm the one who puts limits on all of this stuff.

That may be true, but think about it for a minute. Your requirements almost always change from the time you start the project until it ends. You're so high-maintenance. You hardly ever hear of a project where the team gets all of the requirements right from the beginning. And when you change, I have to change too. It's so obnoxious.

Requirements Documentation:

I guess that means that knowing the project scope up front is pretty important too, now that I think about it.

But you're so broad. I mean, if you really want to know what's getting done on a project, you have to look at me. I represent the need the project is filling; without me, it never would've happened in the first place.

That seems almost as important as my job to me.

Project Scope Statement:

That's exactly my point. We're both useful, but I'm the one everyone thinks of first when they think about managing scope.

Here we go again with your attitude. Trust me, without me, no one would know how those needs were going to be met. I'm just as important as you are.

I guess we're never going to see eye-to-eye on this.

You'll need to know the difference between defining the scope and collecting the project's requirements for the exam. Which of these things is part of the project scope statement, and which is part of the requirements document?

1. The work required to create the graphics

☐ Requirements document ☐ Project scope statement

2. New characters in the game

☐ Requirements document ☐ Project scope statement

3. 33 new levels

☐ Requirements document ☐ Project scope statement

4. The performance requirements for the product

☐ Requirements document ☐ Project scope statement

5. A description of how the WBS is created

☐ Requirements document ☐ Project scope statement

6. How the software will be tested

☐ Requirements document ☐ Project scope statement

7. How the stakeholders will verify the deliverables

☐ Requirements document ☐ Project scope statement

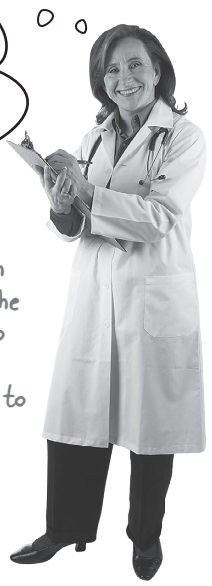
8. A list of all artwork that will be created

☐ Requirements document ☐ Project scope statement

Answers: Requirements doc: 2, 3, 4, 8 Project scope statement: 1, 5, 6, 7

Question Clinic: The which-is-BEST question

WHEN YOU'RE TAKING ANY SORT OF EXAM, THE MORE FAMILIAR YOU ARE WITH IT, THE MORE RELAXED YOU'LL BE. AND ONE WAY TO GET FAMILIAR WITH THE PMP EXAM IS TO GET TO KNOW THE DIFFERENT KINDS OF QUESTIONS YOU'LL SEE. ONE IMPORTANT SORT IS THE WHICH-IS-BEST QUESTION.



The which-is-BEST question sometimes starts with a sentence or two talking about a particular situation.

This is one of those questions where "customer" is used in place of "sponsor."

OK, now you have enough information to answer the question. What do you do when you find out that certain deliverables need to change?

36. You are the project manager for a building contracting project. You schedule a meeting with your customer and stakeholders to give them an update on the progress of the project. At that meeting, they tell you that certain deliverables need to be changed before they can be accepted. Which is the BEST way for you to proceed?

Some of the answers will simply be wrong. You should be able to eliminate them first.

A. Inform the stakeholders that they have no authority to decide what deliverables are acceptable.

This one sounds good... That's what the project charter is for, right? But wait a minute! What does the charter have to do with the scope of the work?

B. Consult the project charter and use it to show the stakeholders that you are the authorized project manager.

OK, this actually seems right—you do need to do that. But is it really the BEST answer?

C. Figure out what needs to be fixed so that you can tell the team how to make the deliverables acceptable.

D. Document the requested changes so that you can put them through change control.

THE WHICH-IS-BEST QUESTION MAY HAVE MORE THAN ONE GOOD ANSWER, BUT IT ONLY HAS ONE ***BEST*** ANSWER.

Aha! Here's the BEST answer! Even though C was technically correct, D is a much better description of how change control actually works.

HEAD  LIBS

Fill in the blanks to come up with your own which-is-BEST question.

You are the project manager for _____ (an industry or the name of a project). At the end of _____ (a Scope Management process), you ran into a problem. You find out that _____ (a tool or technique that is part of that process) was not performed by _____ (the team member or person who is supposed to do that tool or technique) correctly. Which is the BEST way for you to proceed?

A. _____
(an obviously wrong answer where the person or project manager uses the tool or technique incorrectly)

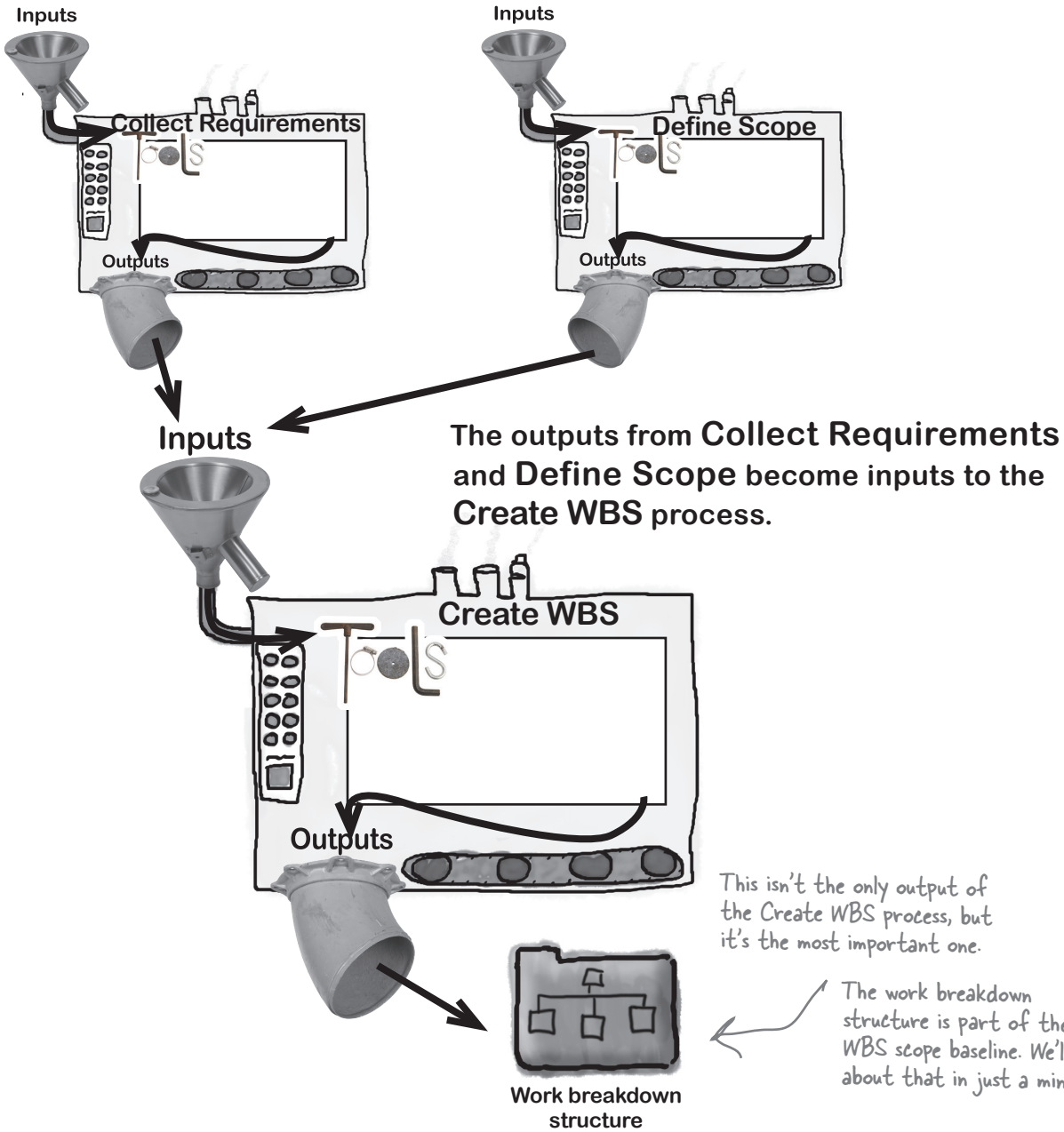
B. _____
(an answer that sounds correct, but isn't the BEST answer)

C. _____
(the BEST answer that describes exactly how to use the process properly)

D. _____
(an answer that says something that's true about an irrelevant process, like one from Chapter 4)

Create the work breakdown structure

The **Create WBS** process is the most important process in the Scope Management knowledge area because it's where you actually figure out all the work you're going to do. It's where you create the **work breakdown structure** (or WBS), which is the main Scope Management output. Every single thing that anyone on the project team—including you—will do is written down in the WBS somewhere.



The inputs for the WBS come from other processes

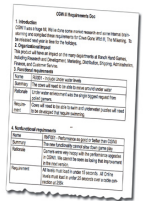
You've already seen all of the inputs that you need to create the WBS. It shouldn't be too surprising that you need the requirements document, project scope statement, and organizational process assets before you create the WBS. When you're developing these things, you're learning what you need to know in order to decompose the project work.

When you see "project documents," that includes the requirements documentation and project scope statement.

Organizational process assets

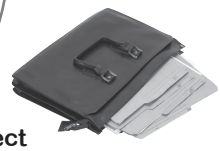
The forms and templates here will be really useful!

When you're building these, you're doing the research and making the contacts you need to build the WBS.



Requirements documentation

Project scope statement



Project Management plan

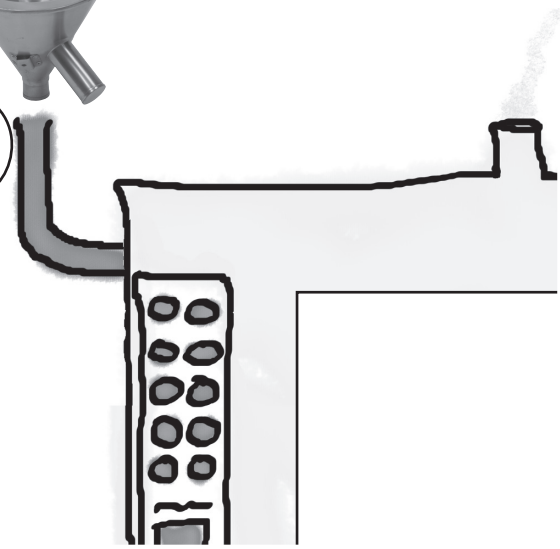
This plan tells you about all the processes you'll use to create the WBS.

Enterprise environmental factors

Your company's culture will play a big part in how you break the work down.

Inputs

HEY, I GET FORMS AND TEMPLATES FROM MY ORGANIZATIONAL PROCESS ASSETS. SO I DON'T HAVE TO START MY WBS FROM SCRATCH?

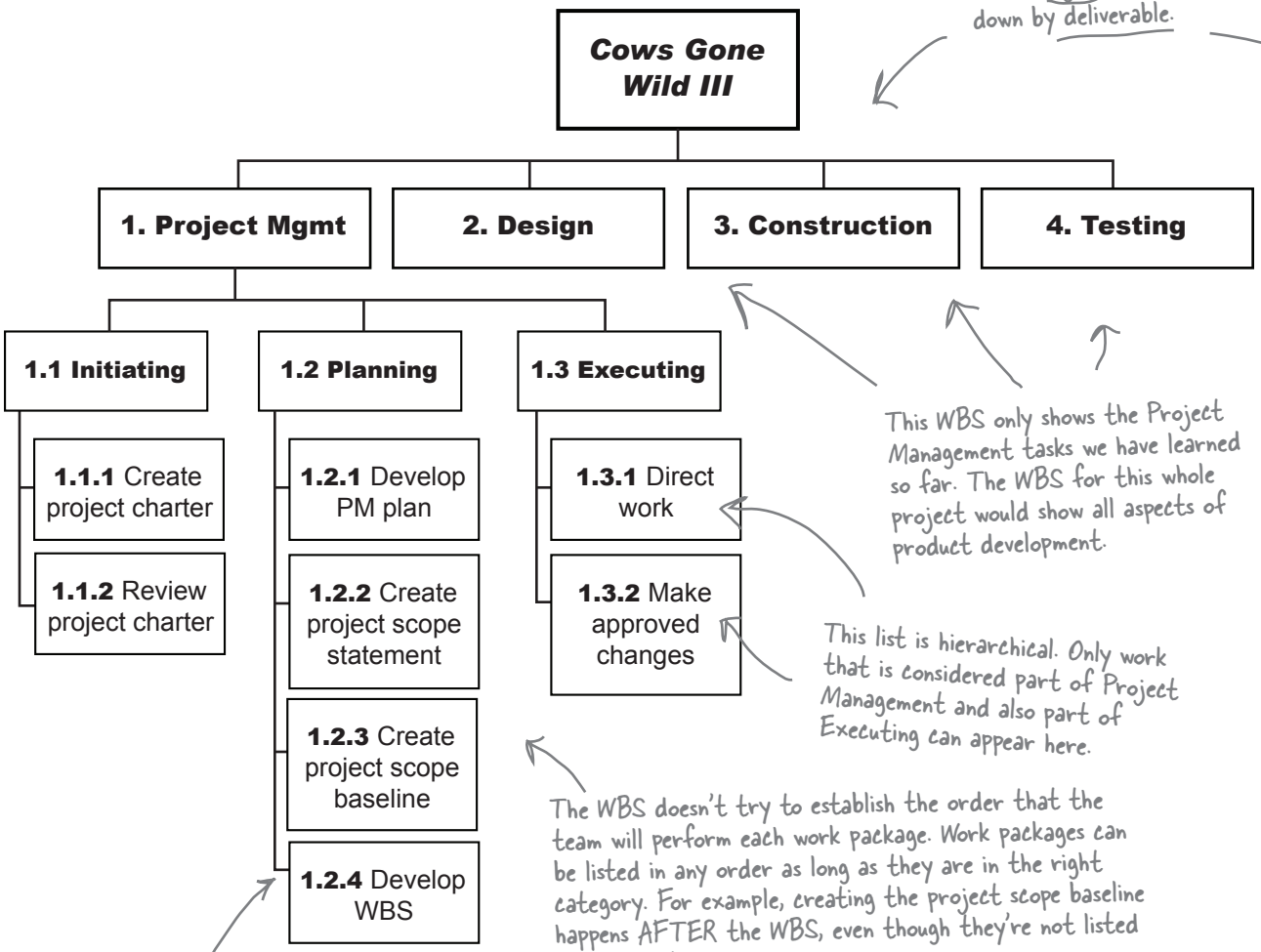


That's what they're there for!

On the next page, you'll see what a WBS looks like. When you go to build one yourself for your next project, you don't need to start from nothing. You'll usually start with a template that you get from the organizational process asset library.

Breaking down the work

One way to get a clear picture of all of the work that needs to be done on a project is to create a work breakdown structure. The WBS doesn't show the order of the work packages or any dependencies between them. Its only goal is to show the work involved in creating the product.



This WBS breaks the project work down by phase; the one on the right breaks them down by deliverable.

This WBS only shows the Project Management tasks we have learned so far. The WBS for this whole project would show all aspects of product development.

This list is hierarchical. Only work that is considered part of Project Management and also part of Executing can appear here.

The WBS doesn't try to establish the order that the team will perform each work package. Work packages can be listed in any order as long as they are in the right category. For example, creating the project scope baseline happens AFTER the WBS, even though they're not listed here in that order.

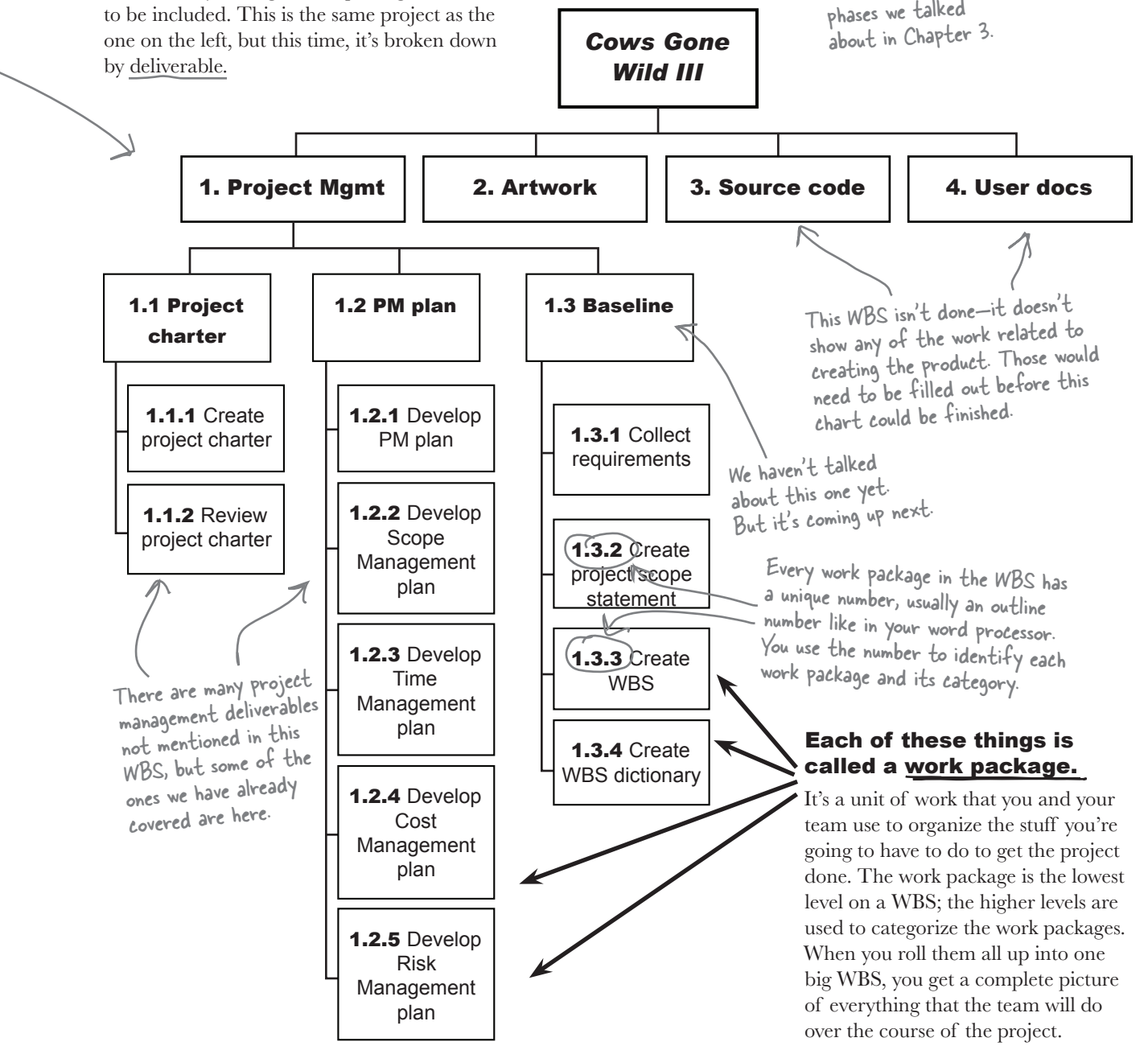
This picture helps everybody to see the magnitude of the work that needs to be done, and sometimes catches work packages that you might not find in a document.

Why would you break the project down by phase rather than deliverable? Why would you want to break it down by deliverable?

Break it down by project or phase

A WBS can be structured any way it makes the most sense to you and your project team. The two most common ways of visualizing the work are by deliverable or by phase. Breaking down the work makes it easier to manage, because it means you are less likely to forget work packages that need to be included. This is the same project as the one on the left, but this time, it's broken down by deliverable.

These are the same phases we talked about in Chapter 3.



This WBS isn't done—it doesn't show any of the work related to creating the product. Those would need to be filled out before this chart could be finished.

We haven't talked about this one yet. But it's coming up next.

Every work package in the WBS has a unique number, usually an outline number like in your word processor. You use the number to identify each work package and its category.

There are many project management deliverables not mentioned in this WBS, but some of the ones we have already covered are here.

Each of these things is called a work package.

It's a unit of work that you and your team use to organize the stuff you're going to have to do to get the project done. The work package is the lowest level on a WBS; the higher levels are used to categorize the work packages. When you roll them all up into one big WBS, you get a complete picture of everything that the team will do over the course of the project.

Decompose deliverables into work packages

Creating the WBS is all about taking deliverables and coming up with work packages that will create them. When you do that, it's called **decomposition**, and it's the main tool you use to create a WBS.

Expert judgment is the other tool in Create WBS, and it's really important when you're doing decomposition.

Artwork and packaging

Start with a major deliverable.

Organize the project based on how you work

So you need to talk to the team. Are they satisfied that you've given them enough detail to do the job?

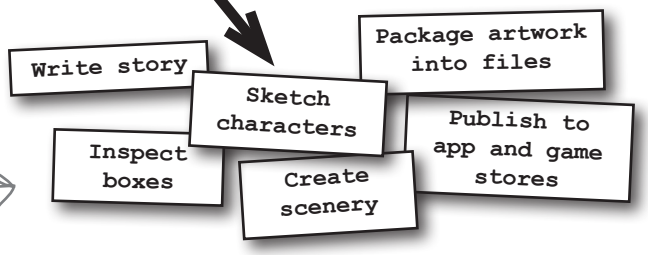
Then begin breaking down the project into smaller and smaller pieces.

Make sure the team has enough information about the work package to get the job done

This means you should begin to think about how you're going to estimate the work packages when you're decomposing them. We'll talk more about this in the next chapter.

Each work package has to be compact enough to make it easy to organize

At the end of decomposition, you end up with a bunch of work packages that add up to the major deliverable.



You won't find any solutions for this, because there aren't any right or wrong answers! It's your chance to take a minute to think things through—that'll get it into your brain.

Sharpen your pencil

You'll need to understand decomposition for the exam. Here are a few deliverables from *Cows Gone Wild III*. Based on what you've seen so far, decompose them into work packages. There are no right or wrong answers—this is practice for thinking about decomposition.

Software

Artwork

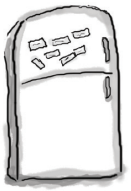
Marketing materials

Throwing a party for the team

Online play promotional events

Game add-ons

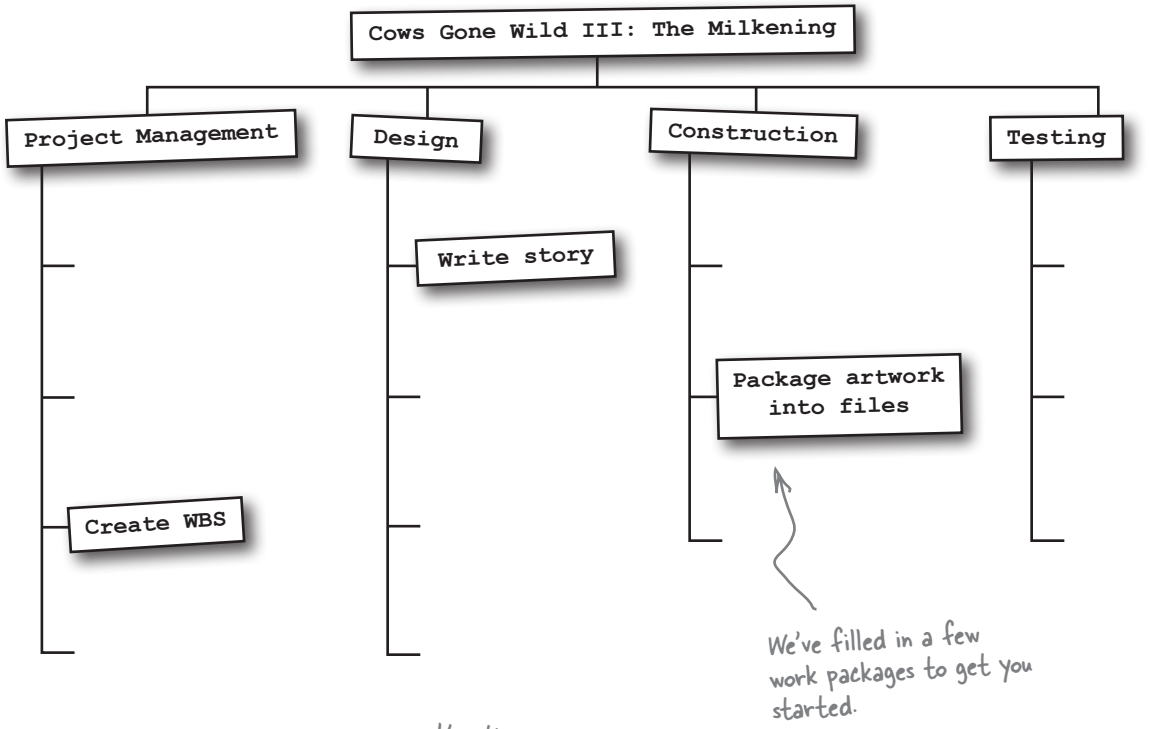
Support forums and message boards



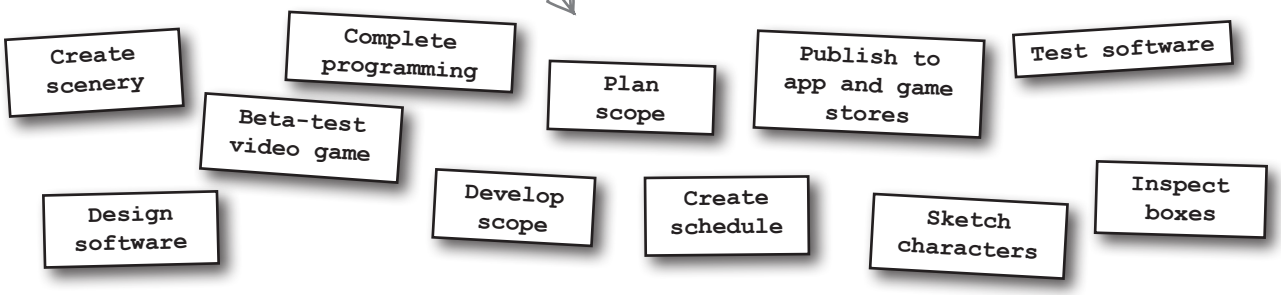
Project Scope Management Magnets

Understanding how to build a work breakdown structure is very important for the exam—it's one of the most important parts of the Scope Management knowledge area. Here's your chance to create a WBS for *Cows Gone Wild III: The Milkening*. There are two ways you can break down the work. See if you can use decomposition to do it!

On this page, create a work breakdown structure broken down by project phase.



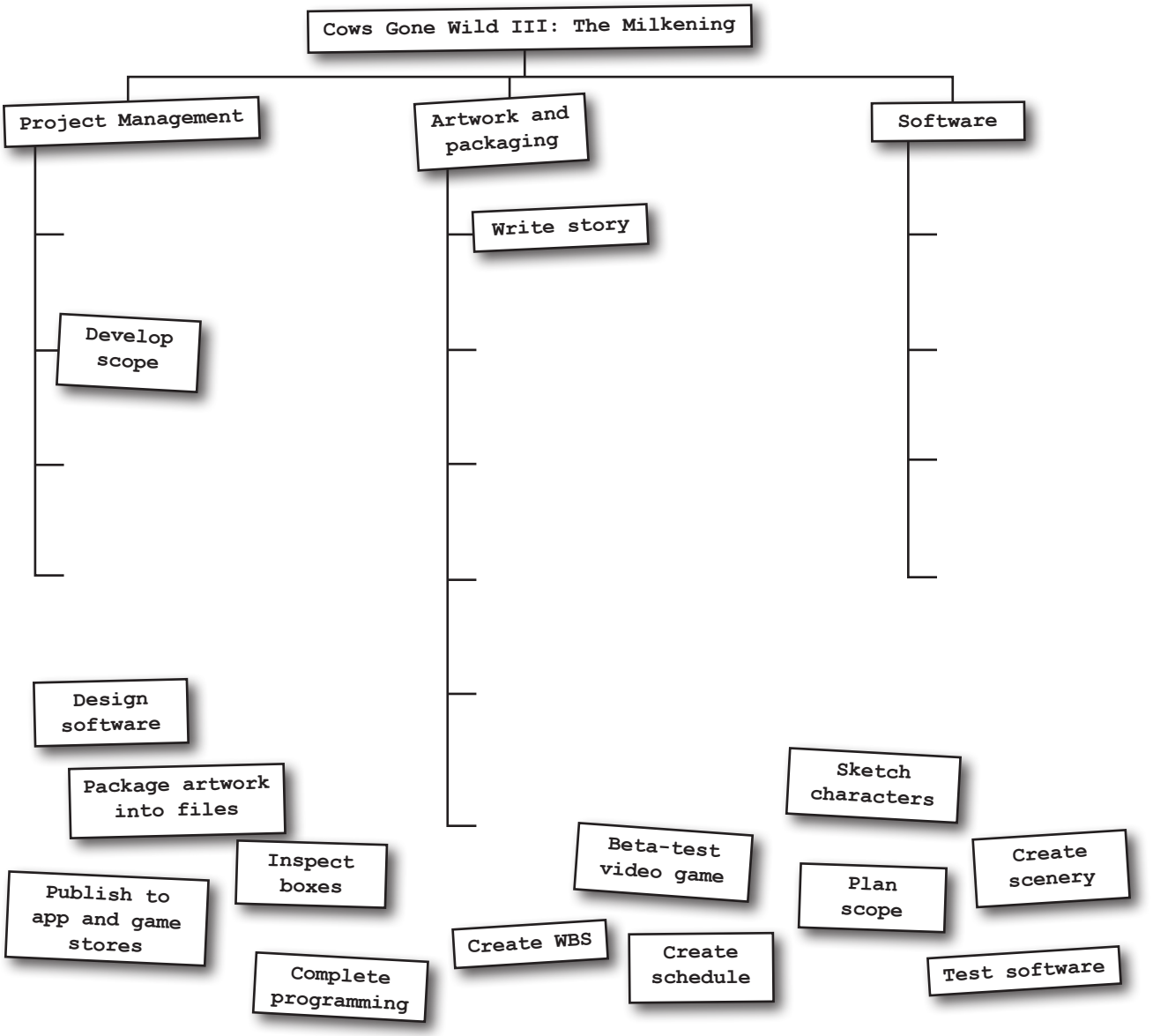
Use these magnets to fill in the blank WBS.



More Magnets

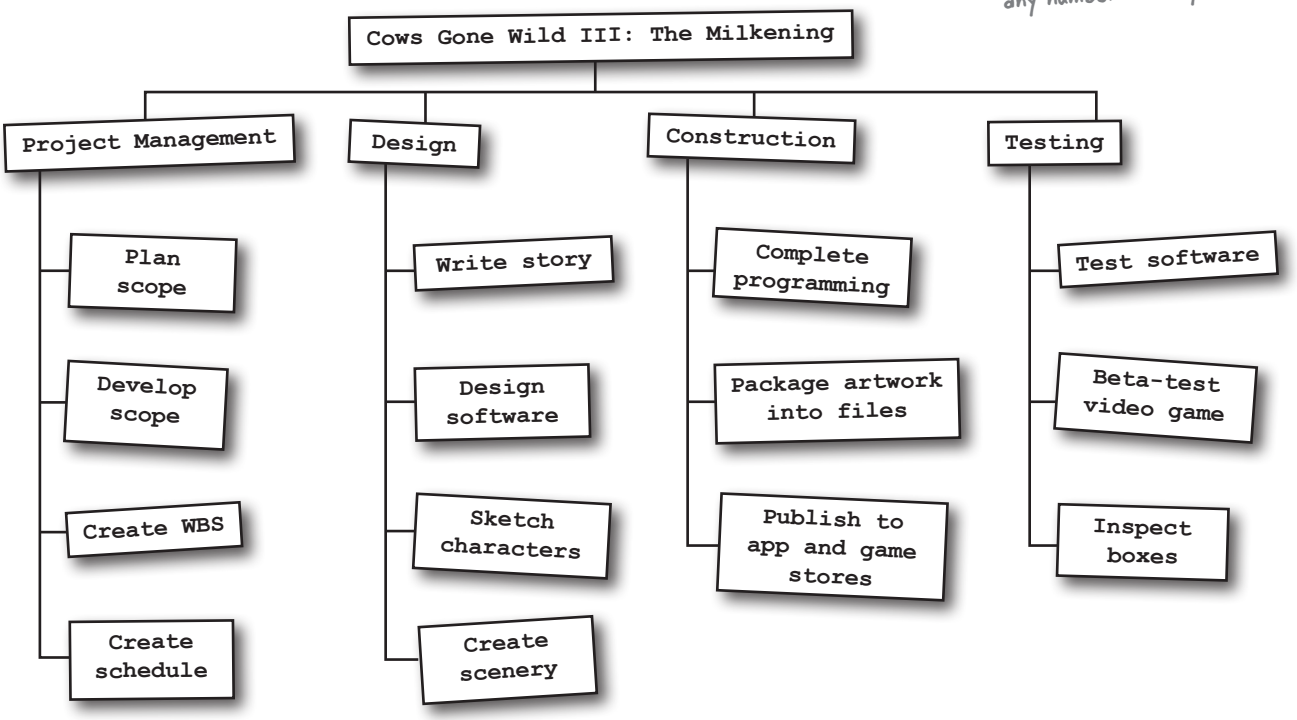
Oops! Looks like the magnets fell off the fridge. Here's your chance to practice breaking down the work to create a different WBS using the same magnets as before. But this time, instead of decomposing project phases into work packages, break the project down by deliverable.

On this page, create a work breakdown structure broken down by deliverable.



Project Scope Management Magnets Solutions

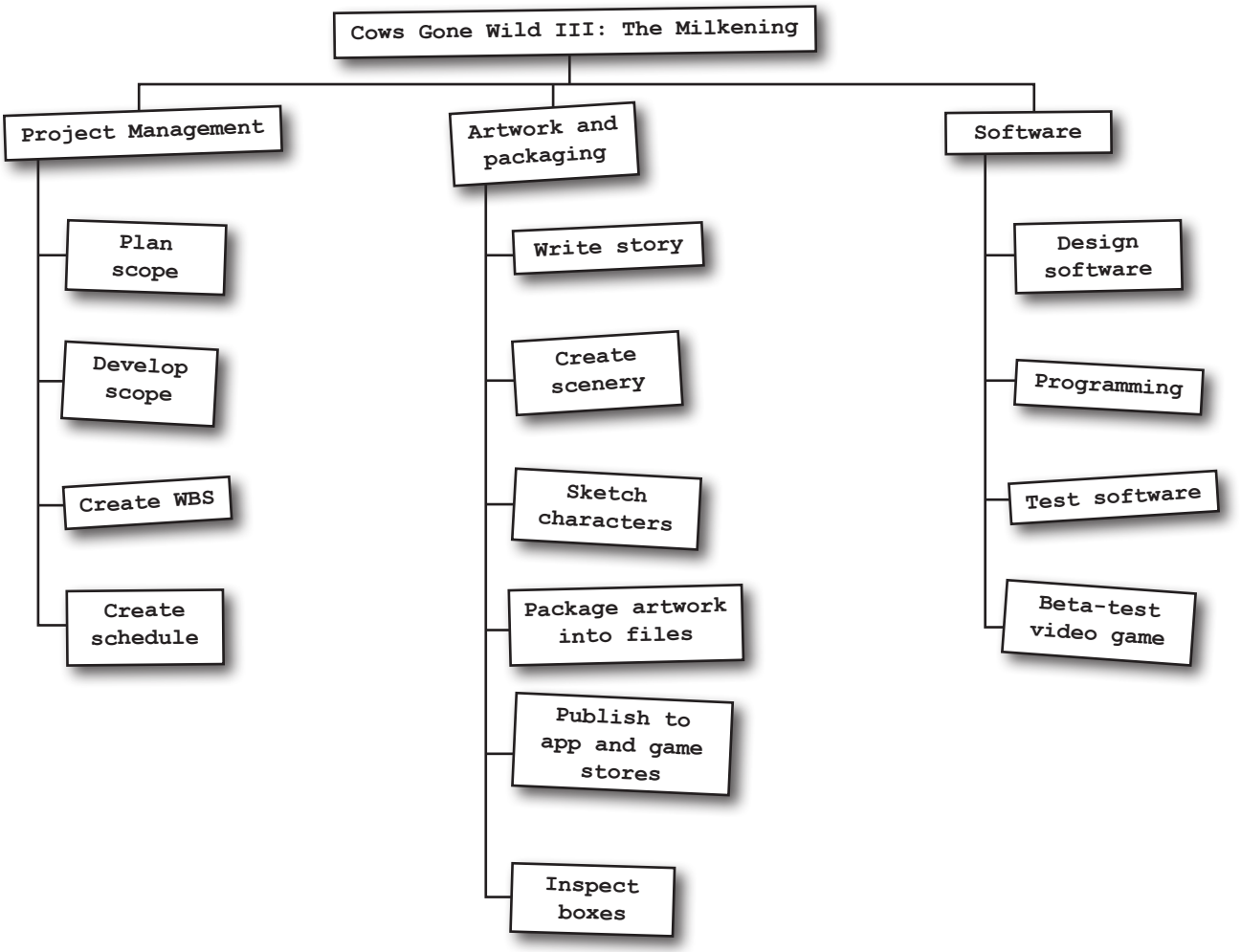
You can break down the work for a project in any number of ways.



It's OK if you decided that, say, creating scenery is a work package under construction, not design. The important thing here is to learn about the WBS, not video game design.

Can you think of a reason that Mike would break down *Cows Gone Wild III* work by phase? Can you think of why he'd break it down by deliverable?

This WBS has the same work packages, but they're broken down differently.



Did you notice how the project management work packages are the same in both WBSes? You could break them down into more detailed project management deliverables, and then you'd see a difference.

Inside the work package

You've probably noticed that the work breakdown structure only shows you the name of each work package. That's not enough to do the work! You and your team need to know a lot more about the work that has to be done. That's where the **WBS dictionary** comes in handy. It brings along all of the details you need to do the project work. The WBS dictionary is an important output of the Create WBS process—the WBS wouldn't be nearly as useful without it.

The WBS dictionary contains the details of every work package. It's a separate output of the Create WBS process.

This is one of the WBS Dictionary entries for the Cows Gone Wild III project. It goes with the Test Software work package in the WBS.

Each work package has a name, and in many WBSes the work packages will also have ID numbers.

Test Software
WBS Dictionary Entry

Work Package ID and Name: 3.2.4 – Test Software

Statement of Work:

The goal of software testing is to verify that the *Cows Gone Wild III* software implements all of the requirements. Each requirement will be fully tested by a team of quality engineers.

Responsible Organization: Ranch Hand Games QA Team

Schedule Milestones:

- 4/26 – Programming team delivers software
- 6/18 – Functional testing and graphics testing completed
- 8/10 – QA approves software for beta testing

Quality Requirements:

The software must meet the requirements defined by the Ranch Hand Games QA team's quality standards document ("RHG QA Standards.doc")

Code of Account Identifier: RHG-236

Required Resources and Cost Estimate:

- Test planning – One QA lead and two QA analysts ($8,500)
- Functional testing – 2 leads, 3 analysts, 11 testers ($36,000)
- Monitor beta testing – 2 leads, 1 analyst ($6,000)

Here's what the WBS entry would look like with this ID number.

3.2.4 – Test Software

This is just a description of the work that needs to be done.

Each work package should be small enough to make cost and resource estimates.

*This account identifier is important—it's how you hook your WBS into your company's accounting system. That way, you can make sure all of the work is paid for.

Don't forget that the WBS doesn't show dependencies among work packages.

Here's another chance for you to think things through. Putting it down on paper helps the cognitive process.

Sharpen your pencil

It will help you on the exam to know why all of the outputs are important, and the WBS is one of the most important ones. Write down as many reasons for using a WBS as you can think of.

there are no Dumb Questions

Q: Does the work breakdown structure need to be graphical? It looks like a lot of work. Can't I just write out a list of tasks?

A: The WBS has to be hierarchical: it needs to show all of the work packages, and how they decompose into phases or deliverables. A graphical WBS happens to be a good way to show hierarchy. When you look at a simple WBS, it might seem like you could manage your work packages just as efficiently using a simple list. But what if you have a large team with dozens, hundreds, or even thousands of work packages? That's when you'll be really happy that you know how to decompose deliverables into a hierarchy.

Q: What if one work package depends on another one?

A: There are definitely dependencies among work packages. For example, the Ranch Hand QA team can't begin to test the software until the programming team has finished building it. But while this information is important, the WBS isn't where you figure out the dependencies.

The reason is that you need to figure out what work needs to be done before you start to figure out how the work packages depend on each other.

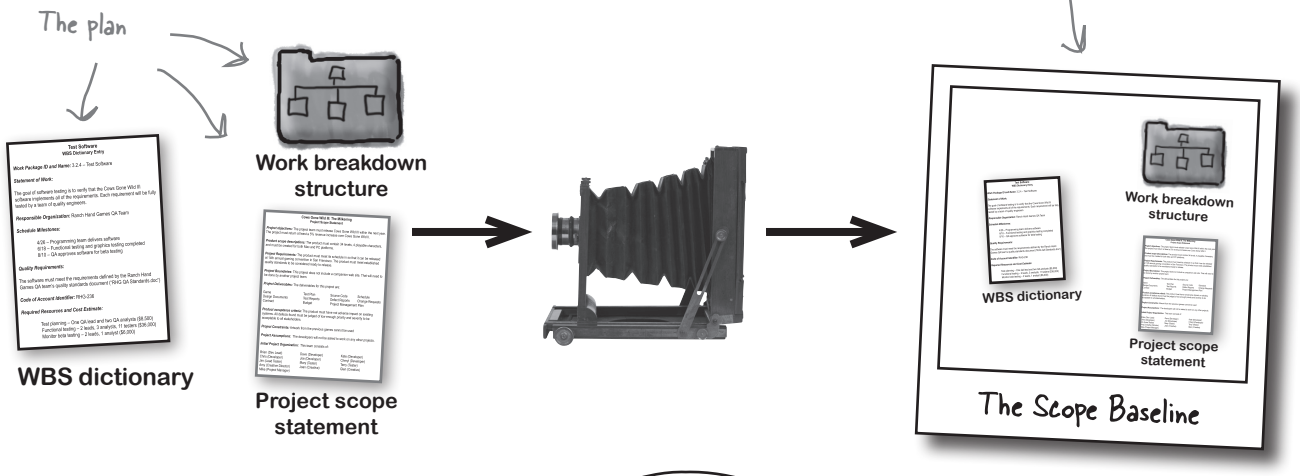
Q: What if I don't know enough to estimate the cost of a work package? What do I add to the WBS dictionary?

A: The WBS dictionary should contain only information that you can fill in when you create it. A lot of the time, you'll know all of the information that needs to go into it. If you have an estimate and know the resources that should be used, then put it in. But if all you have is a statement of work and an account code, then that's all the information you'll be able to add to the entry.

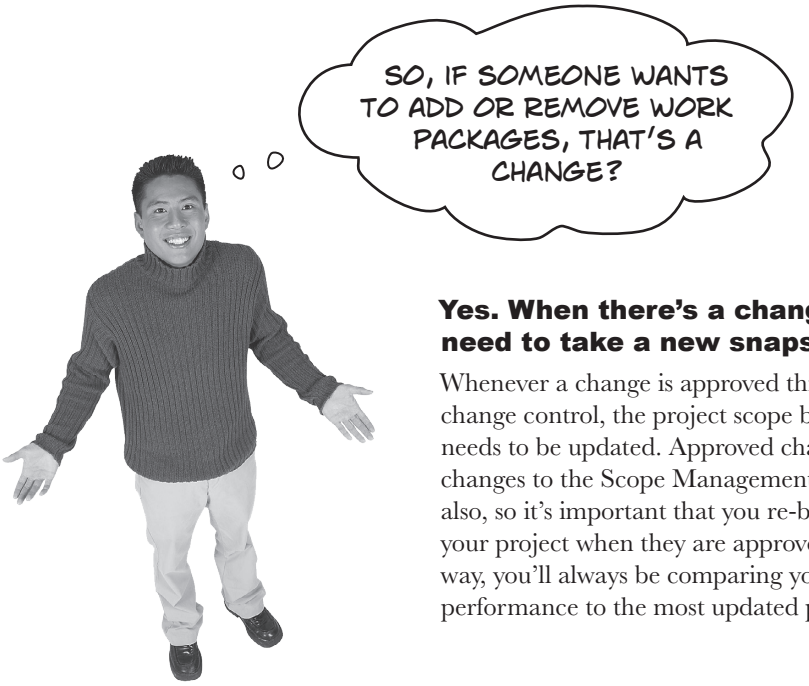
The project scope baseline is a snapshot of the plan

As the project goes on, you will want to compare how you are doing to what you planned for. So, the **project scope baseline** is there to compare against. It's made up of the project scope statement, the WBS, and the WBS dictionary. When work gets added to the scope through change control, you need to change the baseline to include the new work packages for that work, so you can always track yourself against the plan.

The project scope baseline is a snapshot of the plan, and it's an important output of Create WBS.



Putting together a baseline just means making copies of your project documents so you can compare them with later versions after you put your project through change control.



Yes. When there's a change you need to take a new snapshot.

Whenever a change is approved through change control, the project scope baseline needs to be updated. Approved changes are changes to the Scope Management plan also, so it's important that you re-baseline your project when they are approved. That way, you'll always be comparing your performance to the most updated plan.

there are no Dumb Questions

Q: What happens if I need to change the scope after I created the baseline?

A: You need to put it through change control—just like a change to the product scope. As you're building the product, it's always possible that some work will pop up in an unexpected place.

It could be that the initial technical design is inadequate or buggy. Or maybe you just think of a better way to do things while you're working. In either case, you have to determine the impact to the schedule, the budget, the scope, and the quality of the product, and put the proposed change through change control. That's what it means to look at the project constraints every time there's a change.

Once everyone understands the impact and approves the change, you need to go back and adjust your project scope baseline to include the new work. If your budget or schedule is affected, you'll need to change those baselines too and integrate all of them into the Project Management plan. But we'll talk more about that in later chapters.

Q: Do I really need to create a project scope baseline?

A: Yes. It might seem like a formality in the beginning, but the baseline is a really useful tool. As you are building your project, you will need to refer back to the baseline if you want to know how you are tracking against stakeholders' expectations.

Let's say you said it would take you 12 months to build *Cows Gone Wild III*, and a wrong technical decision creates a two-week delay. You can use the project scope baseline to figure out the impact of that change to all of the different plans you have made, and then explain to everybody the impact of the change.

You can think of the baseline as a way of keeping track of the project team's understanding of their goals and how they are going to meet them. If the goals change, then the understanding of them needs to change too. By telling everyone who needs to approve the two-week delay about it, you make sure that the goals change for the team as well. Then you change the baseline, so you can measure your team against the new deadline of 12 and a half months.

Q: Wait a minute. Doesn't that mean I need to do change control and update the baseline every time I make any change to the document while I'm writing it? That's going to make it really hard to write the first version of anything!

A: Don't worry, you don't have to go through change control until the baseline is approved. And that goes for ANY document or deliverable. Once it's accepted and approved by all of the stakeholders, only then do the changes need to go through change control. Until it's approved, you can make any changes you want. That's the whole reason for change control—to make sure that once a deliverable is approved, you run all of the changes by a change control board to make sure that they don't cause an unacceptable impact to the schedule, scope, cost, or quality.

Q: How can you know all of this up front?

A: You can't. Even the best planned projects have a few surprises. That's why the scope planning cycle is iterative. As you find out something new about your scope of work, you put it through change control. When it's approved, you need to add it to your Scope Management plan, your project scope statement, your WBS, and your WBS dictionary.

It's also possible that you might find new things that the team should do when you're making your WBS or your project scope statement. So all of the scope planning documents are closely linked and need to be kept in sync with one another.

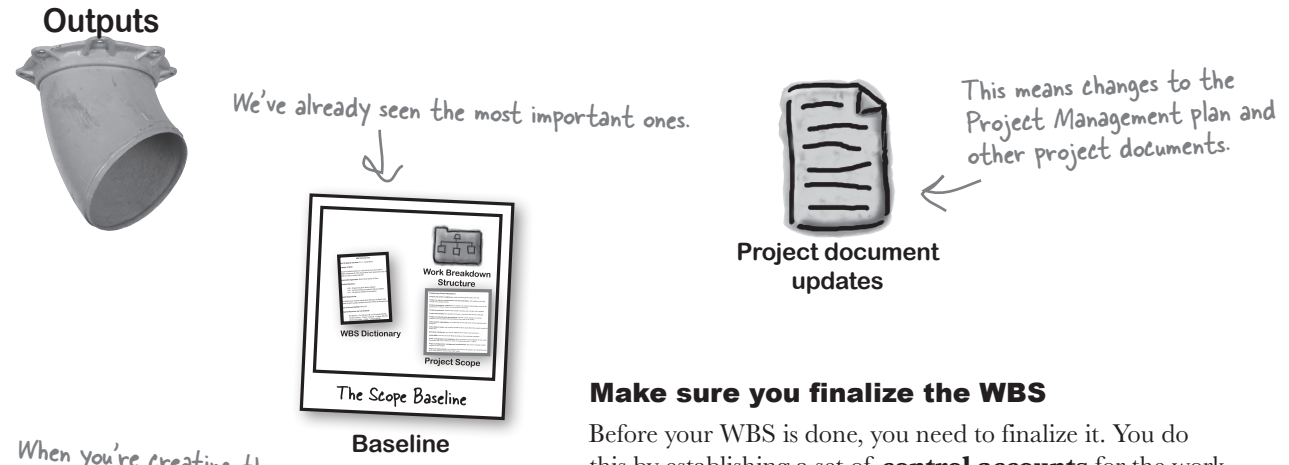
Q: What if I come up with new work for the team later on?

A: You use change control to update the baseline. Your project can change at any time, but before you make a change you need to figure out how it will affect the project constraints—and make sure your sponsors and stakeholders are OK with that impact. That's what change control does for you.

Once you've created the baseline, any time you make a change, you need to get it approved, and then update the baseline.

The outputs of the Create WBS process

The Create WBS process has three major outputs: the **work breakdown structure**, the **WBS dictionary**, and the **baseline**. But there are others as well. When you create the WBS, you usually figure out that there are pieces of the scope that you missed, and you may realize that you need to change your plan. That's what the project document updates are for.



When you're creating the WBS, you often discover missing pieces of the scope. You'll need to go back and plan for them. That kicks off the planning cycle again.

Make sure you finalize the WBS

Before your WBS is done, you need to finalize it. You do this by establishing a set of **control accounts** for the work packages. A control account is a tool that your company's management and accountants use to track the individual work packages. For example, Mike gets a list of control accounts from Ranch Hand Games' accounting department, so they know how to categorize the work for tax purposes.

BULLET POINTS: AIMING FOR THE EXAM

- The **Create WBS** process is a really important process on the PMP exam.
- You create the WBS by **decomposing** large work products into **work packages**.
- To finalize the WBS, **control accounts** are established for the work packages.
- The **WBS dictionary** is a description of each work package listed in the WBS.
- The inputs to WBS creation are the outputs to the Define Scope and Collect Requirements processes: the requirements document and the project scope statement.
- As you decompose the work, you find new information that needs to be added to the requirements document and the project scope statement. That information is treated as a change and goes through change control. Once it's approved, it can be added into the document, and that kicks off the planning cycle again.

there are no Dumb Questions

Q: How do I know if I should use phases or deliverables for my WBS?

A: It really depends on the project. You want to present the information so that it enables the management in your organization to visualize and control your project. So, if most people in your organization divide it by phases, then you should, too.

If people do it different ways from project to project where you work, then you might make your decision based on how people think about the work you are about to do.

The point of the WBS is to help other people see the work that is necessary to get the project done, so if your management thinks of projects in terms of phases and understands them best that way, then it's better to divide your project work along those lines.

It could be that the work you are doing is anxiously awaited by a lot of people who will look at the WBS to understand the project, and, in that case, it probably makes sense to divide your work up by deliverable.

Q: How do I know when I have decomposed the work to a small enough work package?

A: The short answer is that you should decompose the work until it is manageable.

You need to be careful when you come up with the work packages for your WBS. If you decompose to the most granular level, you could end up wasting everybody's time trying to figure out exactly how much effort goes into, say, writing up meeting minutes for each and every meeting in your project.

So, you should break down the work into small enough packages that everybody can understand what's being done and describe it in the dictionary…and no further.

Q: I know how to make scope changes during Planning. What do I do if I run into scope changes during Execution?

A: Any time you run into a change to your scope, regardless of where you are in the process, you put it through change control. Only after examining the impact and having the change approved can you incorporate the change.

Q: Can you back up a minute and go over the difference between the Scope Management plan and the Project Management plan one more time?

A: Remember how the Project Management plan was divided into subsidiary plans? The Project Management plan tells you how to manage all of the different knowledge areas, and it has baselines for the scope, schedule, and budget.

The Scope Management plan is one of those subsidiary plans. It has really specific procedures for managing scope. For example, Mike's Scope Management plan tells him which stakeholders he needs to talk to when he's gathering requirements. It lists what tools and techniques he's planning to use when he uses scope definition to define the scope (for example, it says that he needs to consult with specific experts when he does alternatives analysis). And when there's an inevitable change—because even the best project manager can't prevent every change—it gives him procedures for doing Scope Management. So even though the Scope Management plan is created in the Develop Project Management Plan process, it's used throughout all of the Scope Management processes. So definitely expect questions about it on the exam!

Cubicle conversation

Everything is great. The project is rolling along, and there are no problems with the scope…until something goes wrong.

Brian: At first I thought we could use the same five backgrounds over and over, but it's starting to look really stale.

Amy: Huh, I guess you're right. It looks like we need to create more scenery.

Mike: Why were we trying to limit the backgrounds in the first place?

Amy: I think they were worried about disk space.

Brian: Yeah, but that's not so much a concern right now.

Amy: Great! Let's just change the artwork, then.

This is work that was not planned for, and isn't in the WBS. That means it's a scope change.

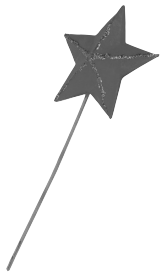
Mike: Not so fast, Amy. There are a couple of things we need to do first…

What homework do you need to do before you make a change to the scope by adding or removing project work? Why?

Why scope changes

Sometimes something completely unexpected happens. Say, a really important customer asks for a new feature that nobody saw coming and demands it right away. Or a design for a feature just isn't working, and you need to rethink it. Or new stakeholders come on board and ask for changes.

The scope can change while you are working for a lot of reasons. Some changes are good for your project, while others will definitely reduce your chance of success. Change control is there to help you to see which is which.



Good change

A good change makes the product better with very little downside. It doesn't cost more time in the schedule or more money from the budget, and it doesn't destabilize the product or otherwise threaten its quality.

Good changes happen pretty rarely, and nearly EVERY change has some impact that should be fully explored before you go forward.

Bad change

A bad change is one that might seem from the outside like a good idea but ends up having an impact on the project constraints. Here are a couple of examples:

Scope creep

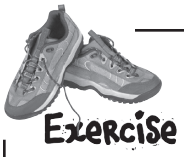
This happens when you think you know the impact of a change so you go ahead, but it turns out that *that* change leads to another one, and since you are already making the first change, you go with the next. Then another change comes up, and another, and another, until it's hard to tell what the scope of the project is.

The way to avoid scope creep is to plan your changes completely.

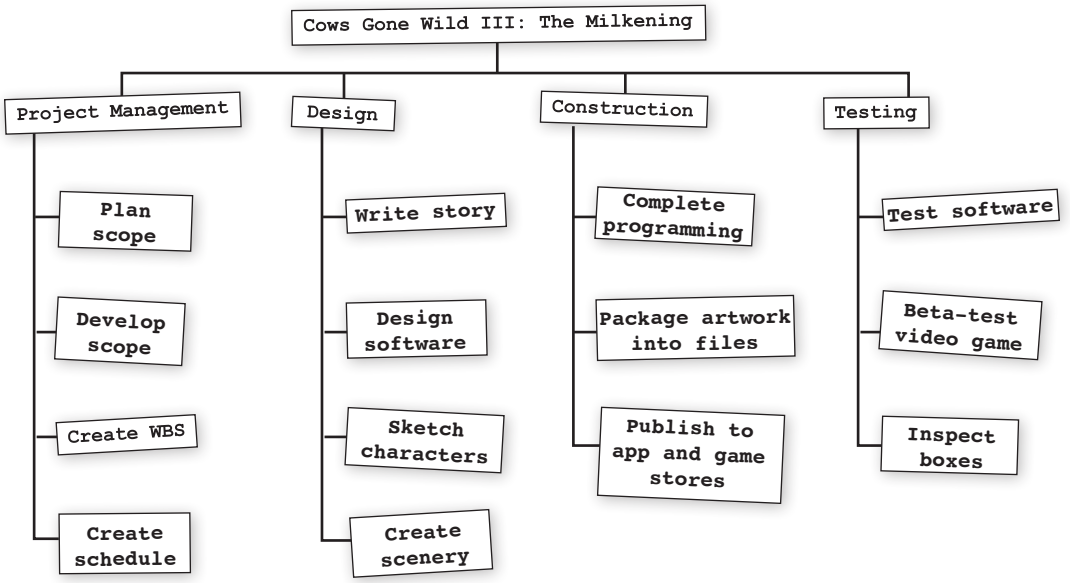
Gold plating

Sometimes people think of a really great improvement to the product and go ahead and make it without even checking the impact. In software, this can happen pretty easily. A programmer thinks of a way to make a feature better, for example, and just implements it, without talking it over with anybody. This may sound good, but it's not—because now you have to pay for these features you never asked for.

Be on the lookout for examples of scope creep and gold plating on the exam. Both are considered very bad and should never be done.



Here's the WBS that you created for the *Cows Gone Wild III* project, and below that are some changes that the team has asked Mike to make since the work started. All of them are bad changes. Check either scope creep or gold plating for each one.



1. We need to create a screensaver to market the game. Let's kill two birds with one stone and test out a brand new graphics engine on it. Oh, and we'll need a story for the screensaver, so we should write that too. Of course we have to recruit some killer voice talent for the screensaver. Memorable names sell more games.

   ☐ Scope creep ☐ Gold plating

2. Testing the most recent build, I just noticed that if the player presses x–x–z–a–Shift–Shift–Space in that order, Bessie does the Charleston—it's a really funny easter egg the developer just added at random.

   ☐ Scope creep ☐ Gold plating

3. We should add a calculator for tracking gallons of milk collected in the game. It will be really easy. We could even release the calculator as a separate add-in, and we could probably make it full-featured enough for the folks developing the game down the hall to use it too.

   ☐ Scope creep ☐ Gold plating

4. The printer just told us that she could also do silk screen T-shirts for everybody as a ship gift. Let's get our design team to do some special artwork for them. We can have everybody's names written in cows!!! Then we could use the same artwork on posters that we put around the office—oh, and coffee mugs for new people, too

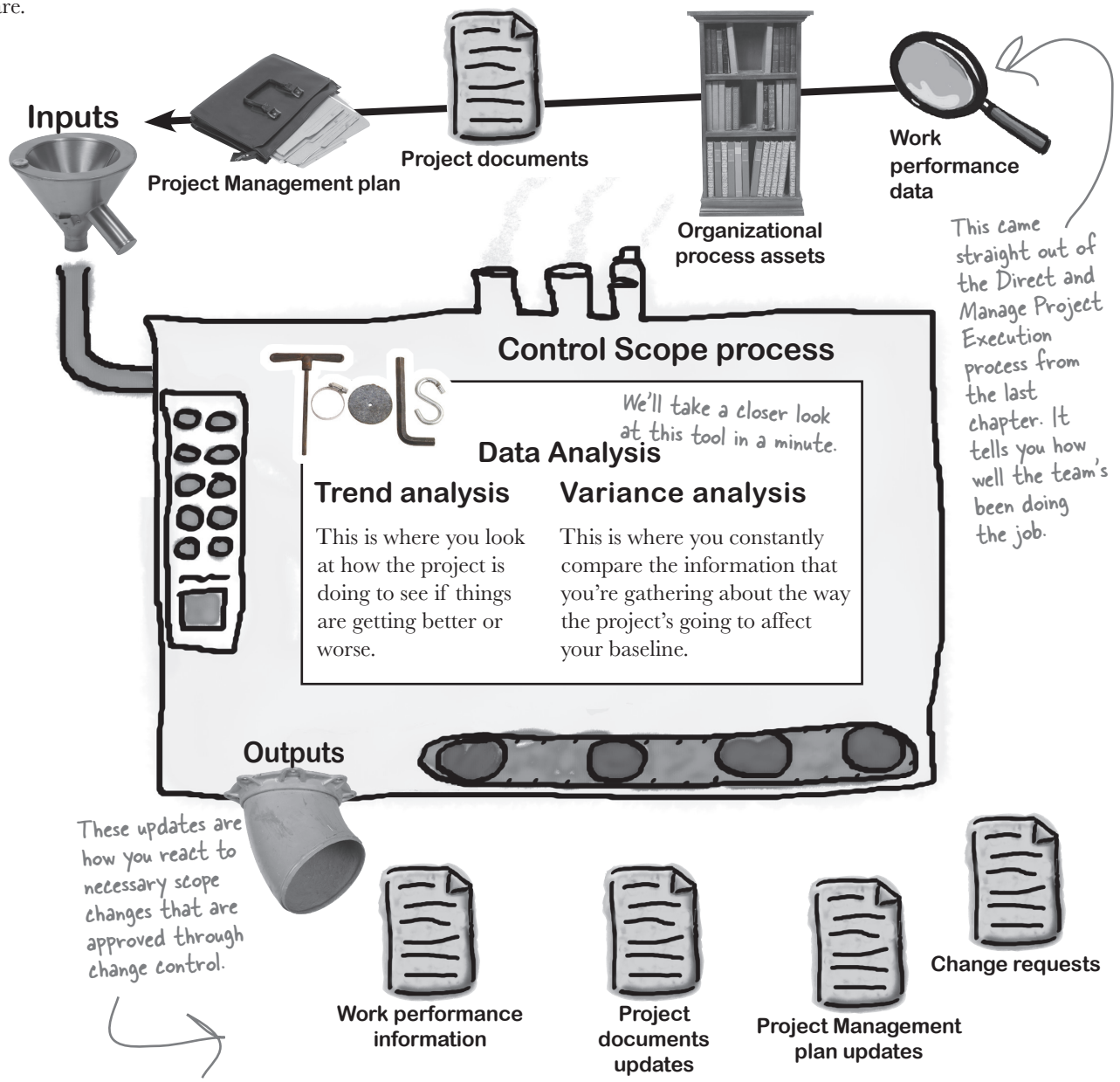
   ☐ Scope creep ☐ Gold plating

Answers: 1, 3, and 4 are scope creep. 2 is gold plating

The Control Scope process

There's no way to predict every possible piece of work that you and your team are going to do in the project. Somewhere along the way, you or someone else will realize that a change needs to happen, and that change will affect the baseline. That's why you need the **Control Scope** process. It's how you make sure that you make only those changes to the scope that you need to make, and that everyone is clear on what the consequences of those changes are.

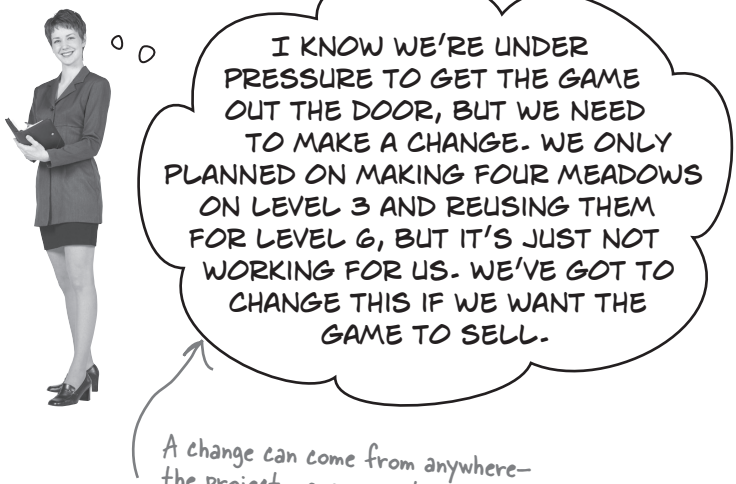
You'll also use organizational process assets as an input here.



Anatomy of a change

Let's take a closer look at what happens when you need to make a change. You can't just go and change the project whenever you want—the whole reason that you have a baseline is so you can always know what work the team is supposed to do. If you make changes, then you need to make sure that the change is ***really*** necessary. Luckily, you have some powerful tools to help you manage changes:

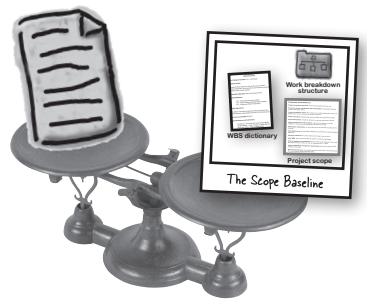
1 **A change is needed.**
Every change starts the same way. Someone realizes that if the project sticks with the plan, then the outcome will lead to problems.



A change can come from anywhere—the project manager, a team member, even a stakeholder!

2 **Create a change request.**
Before a change can be made, it needs to be approved. That means that it needs to be documented as a requested change. The only way to get a handle on a change is to write it down and make sure everyone understands it.

3 **Do impact analysis.**
When you do impact analysis, you evaluate the effect the change will have on the project. This is where you decide whether you need to take some sort of corrective action. You compare the baseline against the change that you want to make, and figure out just how big the change really is.

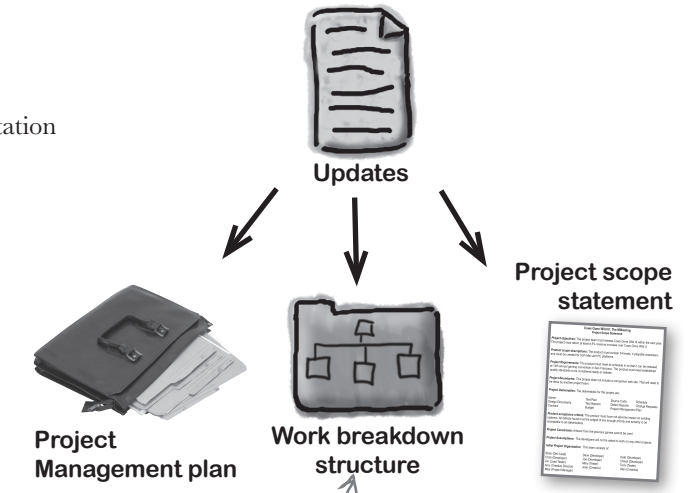


You're weighing the change against the baseline to see if it's going to require a big change to your plan.

Think of integrated change control as a kind of machine that converts requested changes into approved changes.

4 **Get the change approved.**
Remember integrated change control from Chapter 4? That's the process where the project manager takes a requested change and works with the sponsor and stakeholders to get approval to put it in place.

5 **Replan the work.**
Now it's time to go back to the scope documentation and update it to reflect the change.

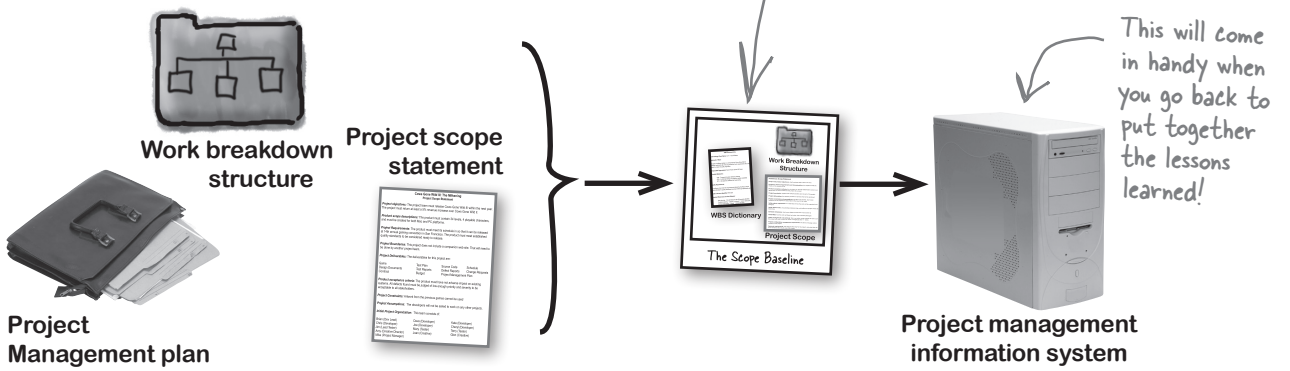


Don't forget to update the WBS dictionary, too.

6 **Create a new baseline.**
Now that you've figured out that you need to change the scope, it's time to update the baseline. Go back to the scope statement, WBS, and WBS dictionary, and update them so that they reflect the change that needs to be made.

The change is done!
Now you can move on with the project using the new baseline that you saved and distributed to the team.

This will come in handy when you go back to put together the lessons learned!

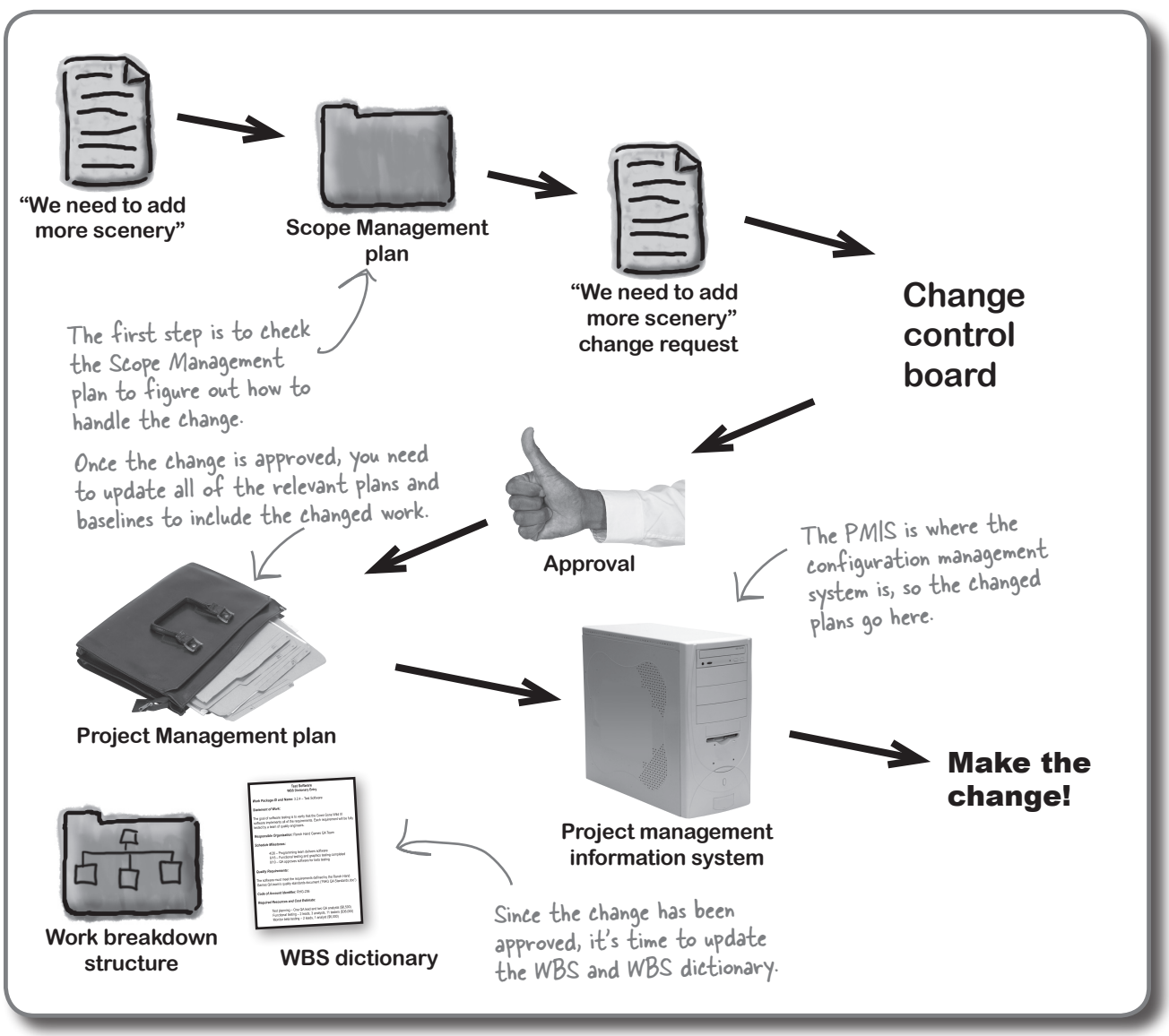


A closer look at the change control system

One of the most important tools in any Monitoring and Controlling process is the **change control system**. Let's take a closer look at how it works.

Since the folks at Ranch Hand need a change to add more scenery to *Cows Gone Wild III*, Mike takes a look at the Scope Management plan to understand the impact before forwarding it to the change control board. Once they approve the change, he updates the Project Management plan, checks it into the **configuration management system**, and changes the WBS and WBS dictionary to include the new work packages.

Remember this from Chapter 4? It's exactly the same change control system tool that we already learned about.



Just two Control Scope tools and techniques

There are only two tools and techniques in the Control Scope process. They're pretty intuitive: take a minute and think of what you would need to do if you had to make a change to your project's scope. You'd need to figure out how big the change is, and what needs to change. And when you do that, it's called **variance analysis**. While you're thinking about how big the change is, you probably want to pay attention to the way the project has been going so far and whether the project is performing better or worse than planned. That's where **trend analysis** comes in.

Variance analysis

This means comparing the data that can be collected about the work being done to the baseline. When there is a difference between the two, that's variance.

This tool of Control Scope is all about analyzing the difference between the baseline and the actual work to figure out if the plan needs to be corrected. If so, then you recommend a corrective action and put that recommendation through change control.

The goal of Control Scope is updating the scope, plan, baseline, and WBS info.

There's no "right order" for the Control Scope and Validate Scope processes

If you've got a copy of the *PMBOK® Guide* handy, take a look at how it presents the Scope Management processes. Did you notice how the section on the Validate Scope process comes before Control Scope? We're putting these processes in this book in a different order (but don't worry, we don't do this often—you'll see it again in Chapter 8). That's not because the *PMBOK® Guide* is wrong—it isn't! We could do this because there is no "right" order: Control Scope can happen at any time, because project changes can happen at any time. Validate Scope (the next process you'll learn about) is *usually* the last Scope Management process that you'll do in a project. The trick is that sometimes you'll find a scope problem while you're verifying the scope, and you'll need to do Control Scope and then go back and gather new requirements, rebuild the WBS, and so on. So the Control Scope process can happen ***either before or after*** Validate Scope.

So why did we change the order? Because thinking about how the two processes relate to each other will help you remember this for the exam!

A lot of things can happen along the way during a project, especially when you have a lot of changes. What happens if the deliverables you and the team build don't quite match up to what your stakeholders expect?

there are no Dumb Questions

Q: Is Control Scope always about work and *project* scope? Can it ever be about deliverables and *product* scope?

A: No. As a project manager, you manage the work that the team is doing, not the things that they're making. Now, that doesn't mean you should never pay attention to deliverables. You still need to pay attention to the scope of the product, too, since the two are pretty closely related. For example, in the *CGW III* project, any time somebody wants to add a new feature to the game, a programmer will need to program it, an artist will need to make new artwork, and a tester will have to test it. Any time you make changes to the project scope, it affects the product scope, and vice versa.

Q: What if a change is really small? Do I still have to go through all of this?

A: Yes. Sometimes what seems like a really small change to the scope—like just adding one tiny work package—turns out to be really complex when you take a closer look at it. It could have a whole lot of dependencies, or cause a lot of trouble in other work packages. If you don't give it careful consideration, you could find yourself watching your scope creep out of control. Each and every change needs to be evaluated in terms of impact. If there is any impact to the project constraints—time, cost, scope, quality, resources, or risk—you HAVE to put it through change control.

Q: How can you do variance analysis without knowing all of the changes that are going to happen?

A: You do variance analysis as an ongoing thing. As information comes in about your project, you constantly compare it to how you planned. If you're running a month behind, that's a good indication that there are some work packages that took longer than your team estimated—or that you missed a few altogether. Either way, you need to take corrective action if you hope to meet your project objectives.

Waiting until all possible changes are known will be too late for you to actually meet your goals. So you need to constantly check your actuals versus your baseline and correct where necessary (after putting your recommended actions through change control, of course!).

Q: I thought the configuration management system was part of the project management information system from Chapter 4. What does that have to do with change control?

A: When you write and modify documents throughout your project, you need to make sure that everybody is working with the same version of them. So you check them into a configuration management system, and that way everybody always knows where to go for the latest version.

Since you are checking all of your documents in, that's where you will keep your work performance information also. The most recent version of the schedule, any reports you have gathered on defects, and individual work performance should all be there. So, when you want to figure out what's going on in your project, you look there first.

It follows that you would modify your documents and check them back into the CMS after any change has been approved too.

Every scope change goes through the Control Scope process.

Control Scope Process Magnets

Whenever you make a scope change, you need to go through all of the steps of change control. So what are those steps? Arrange the magnets to show the order that you handle changes to the scope.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

Create a change request

Compare the change against the baseline

Store the updated baseline in the Configuration Management system

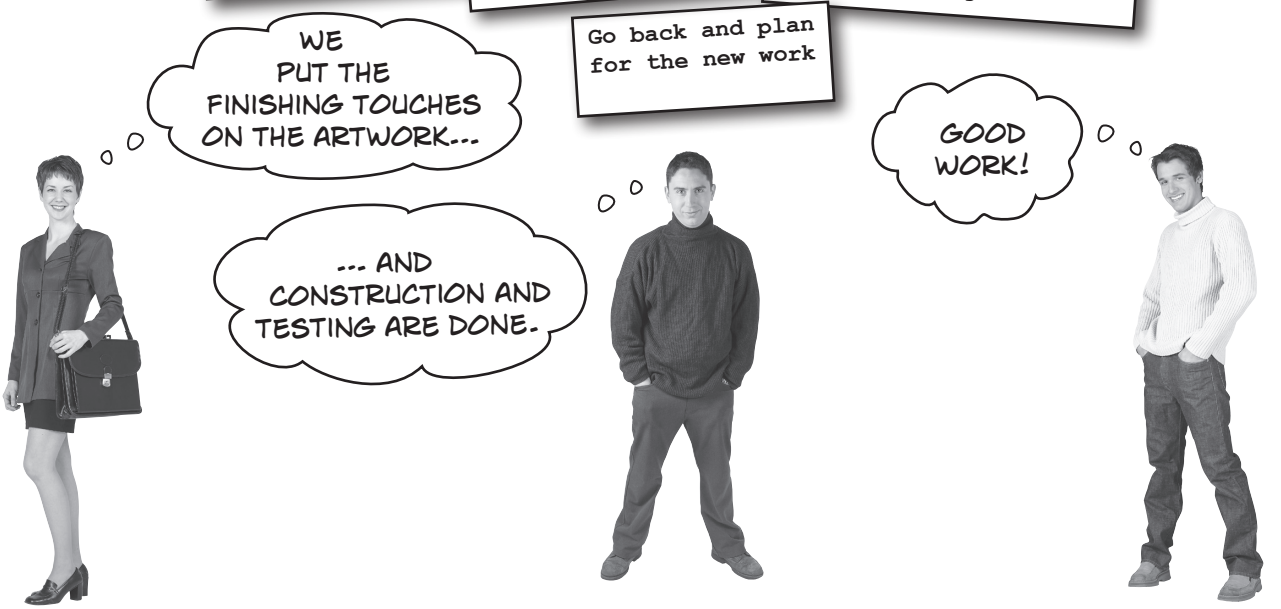
Update the baseline

You figure out that you have to make a change

Now the team can change the way they do the work

Get approval to make the change

Go back and plan for the new work



Control Scope Process Magnets Solutions

Arrange all of the activities you do to control scope in the right order.

1. You figure out that you have to make a change
2. Create a change request
3. Get approval to make the change
4. Compare the change against the baseline
5. Go back and plan for the new work
6. Update the baseline
7. Store the updated baseline in the Configuration Management system
8. Now the team can change the way they do the work

The whole idea behind change control is that you start by figuring out that a change needs to be made, you make sure the change is really worth making, and then you update your baseline so you can keep track of it.

Remember, Control Scope is all about changes to the baseline.

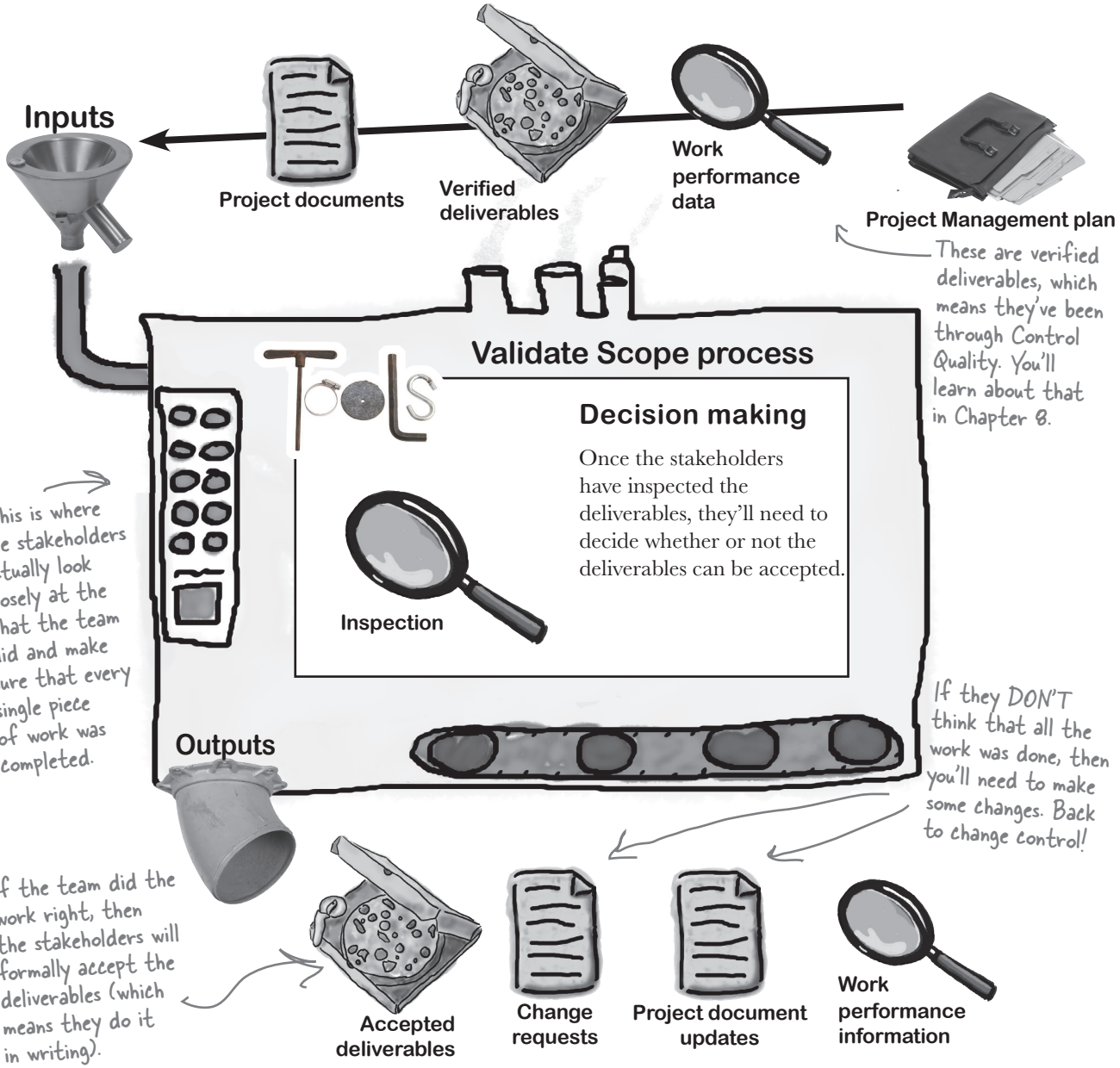
HOLD ON, IT SEEMS LIKE WE KEEP GOING AROUND IN CIRCLES WITH ALL OF THESE CHANGES. HOW DO I KNOW WHEN THE PROJECT IS DONE?

Ask the stakeholders.

You need to go back to the stakeholders and get formal acceptance. That's what the Validate Scope process is for, and it's coming up next.

Make sure the team delivered the right product

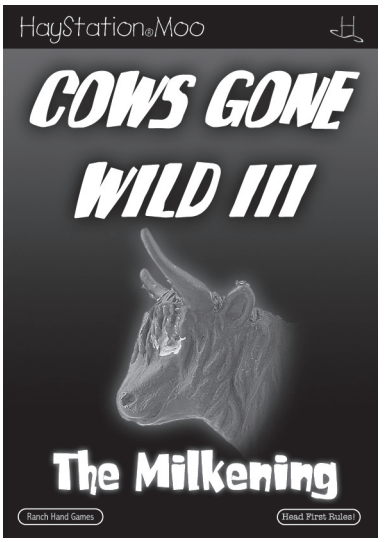
When the team is done, what happens? You still have one more thing you need to do before you can declare victory. You need to gather all the stakeholders together and have them make sure that all the work really was done. We call that the **Validate Scope** process.



The stakeholders give you criteria for deciding when you're done

As you deliver the features in your scope statement, you need to make sure that each of the deliverables has everything in it that you listed in the scope statement. You inspect all of your deliverables versus the scope statement, the WBS, and the Scope Management plan. If your deliverables have everything in those documents, then they should be acceptable to stakeholders. When all of the deliverables in the scope are done to their satisfaction, *then* you're done.

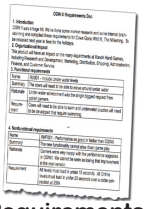
Check this...



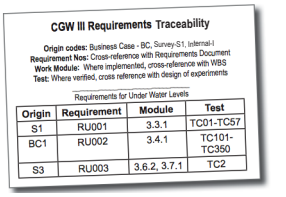
using this

Inspection

...against these



Requirements documentation



CGW III Requirements Traceability

Origin codes: Business Case - BC, Survey-S1, Internal-I
Requirement Nos: Cross-reference with Requirements Document
Work Module: Where implemented, cross-reference with WBS
Test: Where verified, cross reference with design of experiments

Requirements for Under Water Levels

Origin	Requirement	Module	Test
S1	RU001	3.3.1	TC01-TC57
BC1	RU002	3.4.1	TC101-TC350
S3	RU003	3.6.2, 3.7.1	TC2

Why do you think you need the requirements documentation and the traceability matrix to verify your scope?

Inspect the deliverables and confirm that each of the acceptance criteria in the scope statement is met.

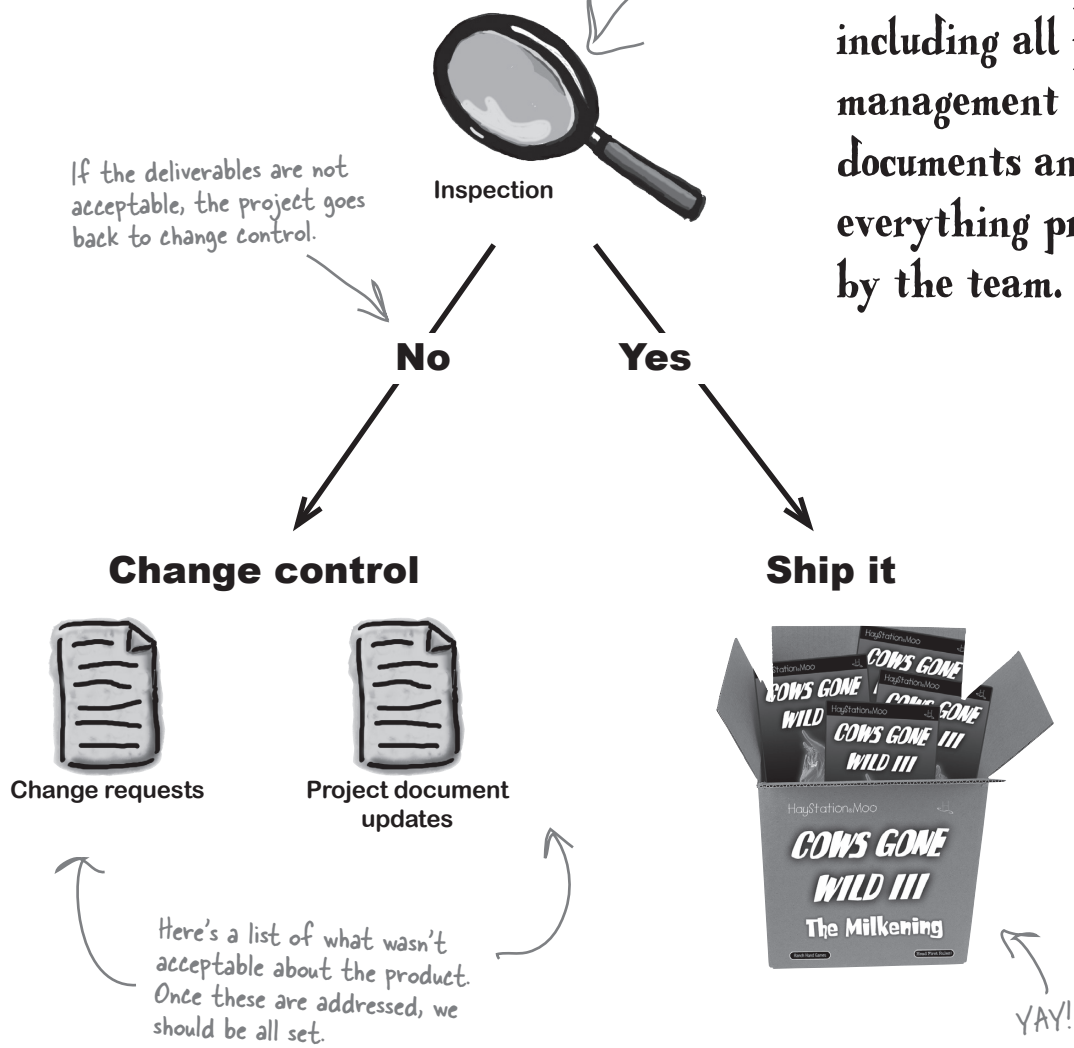
Formal acceptance means that you have written confirmation from all of the stakeholders that the deliverables match the requirements and the Project Management plan.

Is the product ready to go?

Once the deliverables are ready for prime time, you inspect them with the stakeholders to make sure that they meet acceptance criteria. The purpose of Validate Scope is to obtain formal, written acceptance of the work products. If they are found to be unsatisfactory, the specific changes requested by the stakeholders get sent to change control so that the right changes can be made.

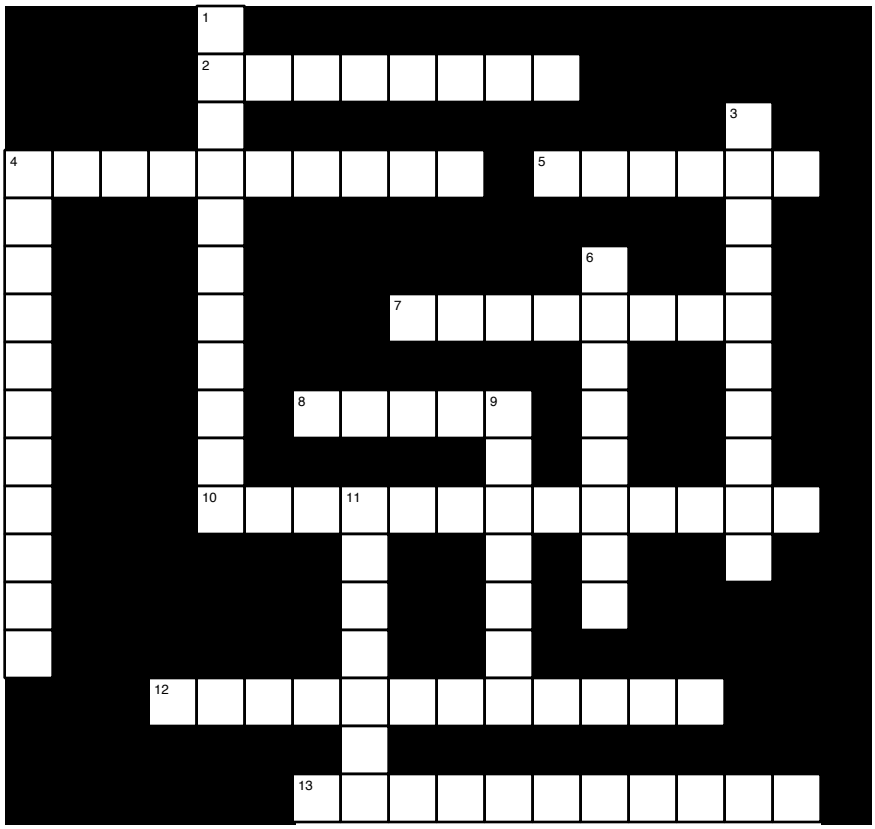
Inspection just means sitting down with the stakeholders and looking at each deliverable to see if it's acceptable.

EVERY deliverable should be inspected, including all project management documents and everything produced by the team.



Scopecross

Take some time to sit back and give your right brain something to do. It's your standard crossword; all of the solution words are from this chapter.



Across

2. Bob used an _____ diagram to get a handle on all of the ideas he collected from stakeholders.

4. The details of every work package in the WBS are stored in the WBS _____.

5. The process where you write the project scope statement is called _____ Scope.

7. Figuring out how big a change is by comparing it to the baseline is called _____ analysis.

8. When one change leads to another and another and another, it's called scope _____.

10. Getting work packages out of deliverables.

12. Exploring all of the ways that you can do the work so that you can find the best way to do the work in your project is called _____ identification.

13. A quantified and documented need or expectation of a sponsor, customer, or other stakeholder.

Down

1. A JAD session is an example of a _____ workshop.

3. Looking closely at the product to see if you completed all of the work is called _____.

4. When you're making a WBS, you can break the work down by phase or _____.

6. A version of the Scope Management plan, work breakdown structure, and product scope that you will compare your project to is called the scope _____.

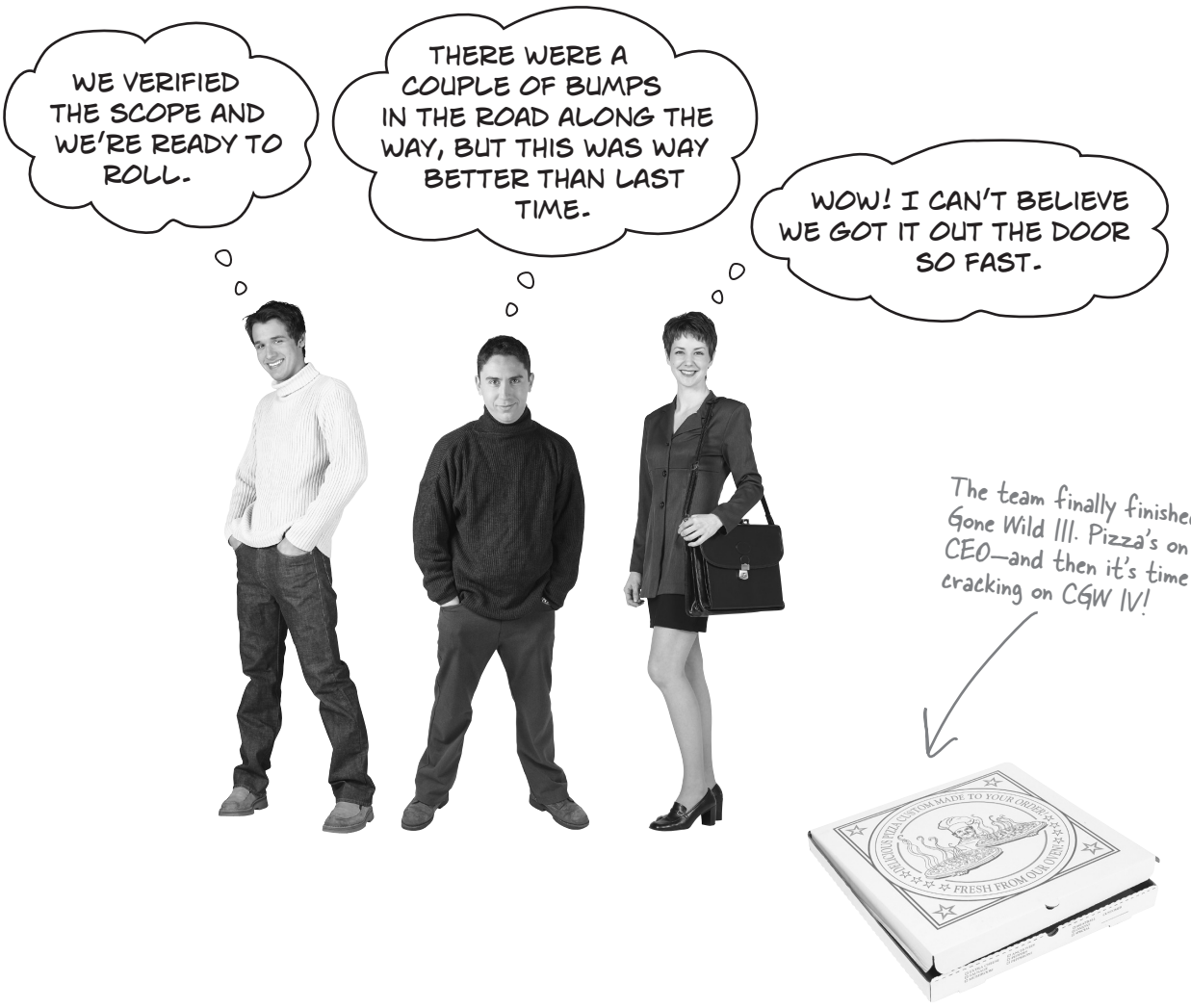
9. _____ scope means the features or functions of the thing or service that you are building.

11. A good way to gather requirements is to _____ how the people who will use your deliverables perform their jobs.

Answers on page 246.

The project is ready to ship!

There were a few unexpected changes to the scope along the way. But, for the most part, everything went according to plan. The stakeholders and the CEO got together with the team and went through everything they did—and it's ready to go. Great job, guys!



How your team defines the scope of the work they do says a lot about how they'll run their project. Whether you're talking about the scope of the product you're creating or the scope of project you're managing, the practices your team uses to identify scope and stay on top of scope changes are the difference between an end product that realizes the benefits it set out to achieve and one that doesn't.

Key Concepts

We've talked about the processes you and your team will use when identifying and managing scope, but it's worth taking a minute to think about how scope management impacts your project as a whole.

- You need to be concerned with the overall **scope of the product** your team is creating and that's where product requirements come in. During the Collect Requirements process, you and the team work to define all of the requirements of the product your project will produce.
- Understanding the scope of product is only part of the story. Most of the processes in the Scope Management knowledge area are about figuring out the scope of the work that you and your team will do. The **scope of the project** is all of the work that will happen as you create the product that satisfies all of the requirements you've collected.
- In predictive projects, the team tries to nail down the scope of product at the beginning of the project. They save that initial understanding of the scope as the **scope baseline**, and then manage changes to the baseline as an ongoing process of validation and control.
- Adaptive or agile processes treat both the product and project scope as variable and focus on prioritizing the work they do rather than controlling changes to a scope baseline.

Scope management is about getting a handle on what the team will do and how they'll do it.

Trends

Here are a few trends in Scope Management that might help you to improve and manage the scope of work on your projects more effectively.

- Collaborating with business analysts as they define product scope by working with stakeholders to elicit and document them.
- Helping the team to understand the business needs for your project.
- Understanding the needs that all of the stakeholders for your project represent.
- Beginning requirements analysis as early as possible.

Tailoring

When you make changes to the processes your team will use during the course of your project, there are a few considerations that might influence your decisions:

- What development lifecycle will your project follow? Should you focus on understanding requirements up front, or will they emerge throughout the project?
- Does your team need to manage the requirements of your project as part of a larger knowledge management strategy within your company?
- Once you identify requirements, are they likely to remain unchanged?
- Does your organization require documentation of product or project scope because of regulatory or governance concerns?

Agile considerations

Agile teams focus on frequent collaboration and feedback to understand the requirements of the projects they work on. Instead of investing time in understanding all of the project scope up front, agile teams identify high-level goals for the project they work on and decompose those goals into smaller pieces that can be delivered in short increments. As each increment is created, it is reviewed by the whole team as a collaboration. New requirements are identified through this feedback loop and the requirements of the project emerge as the team iterates on the incremental deliverables together.

Here are some attributes of *Cows Gone Wild III*. Which are project scope and which are product scope?

1. Programming

☑ Project scope ☐ Product scope

2. 34 levels in the game

☐ Project scope ☑ Product scope

3. Graphic design

☑ Project scope ☐ Product scope

4. Four playable characters

☐ Project scope ☑ Product scope

5. Great graphics

☐ Project scope ☑ Product scope

6. Testing

☑ Project scope ☐ Product scope

7. Mac and PC compatible

☐ Project scope ☑ Product scope

8. A "boss battle" milk fight level at the end

☐ Project scope ☑ Product scope

Here are a few things that Mike left out of the *CGWIII* project scope statement. Can you figure out where each of them should go?

1. The game must have fewer than 15 defects per 10,000 lines of code.

2. There will be four graphic designers reporting to the art director, and six programmers and four testers reporting to the development manager.

3. No more than 15 people can be allocated to work on the game at any time.

4. Scenery artwork.

5. The product will not include bug fixes for the previous version.

6. The game needs to run on a machine with 1 GB of memory or less.

A. Project exclusions

B. Project deliverables

C. Project constraints

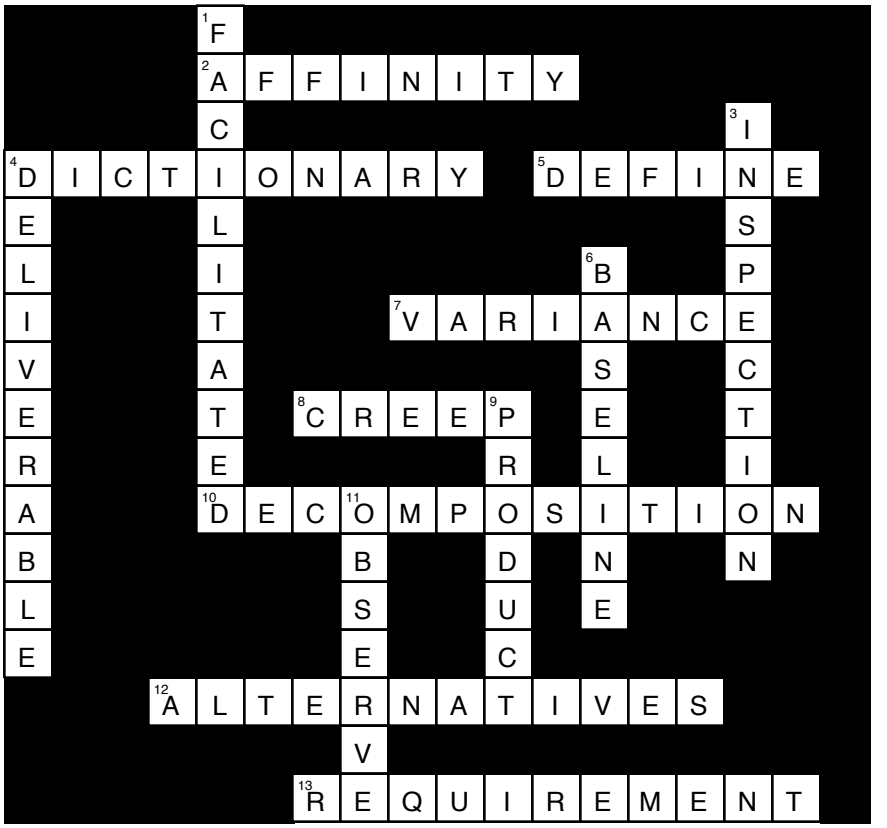
D. Project assumptions

E. Project requirements

F. Acceptance criteria

Scopecross

Take some time to sit back and give your right brain something to do. It's your standard crossword; all of the solution words are from this chapter.



Exam Questions

1. Which of the following is TRUE about a work breakdown structure?

A. It contains work packages that are described in a linear, unstructured list.
B. Each item in the WBS represents a feature in the product scope.
C. The WBS represents all of the work that must be done on the project.
D. The WBS is created by the product sponsor and stakeholders.

2. Which is NOT an output of a Scope Management process?

A. Business case
B. WBS dictionary
C. Change requests
D. Accepted deliverables

3. Which of the following is NOT TRUE about a work breakdown structure?

A. It describes procedures to define the scope, verify work, and manage scope changes.
B. It contains a graphical, hierarchical list of all work to be performed.
C. It can be broken down by project phase or deliverable.
D. It is an important element of the baseline.

4. What is the correct order of the Scope Management processes?

A. Plan Scope Management, Define Scope, Create WBS, Collect Requirements, Validate Scope, Control Scope
B. Plan Scope Management, Collect Requirements, Control Scope, Create WBS, Validate Scope
C. Plan Scope Management, Collect Requirements, Define Scope, Create WBS, Validate Scope, Control Scope
D. Plan Scope Management, Collect Requirements, Baseline, Define Scope, Control Scope, Validate Scope

5. You are managing a software project. Your team has been working for eight weeks, and so far the project is on track. The lead programmer comes to you with a problem: there is a work package that is causing trouble. Nobody seems to know who is responsible for it, the accounting department does not know what cost center to bill it against, and it's not even clear exactly what work should be performed. Which of the following would BEST help this situation?

A. Alternatives analysis
B. WBS dictionary
C. Scope Management plan
D. Scope validation

Exam Questions

6. The goal of Validate Scope is:

A. To inspect the scope statement for defects so that it is correct
B. To gain formal acceptance of the project deliverables from the sponsor and stakeholders
C. To get everyone in the project working together toward a common goal
D. To verify that all *PMBOK® Guide* processes are complied with

7. Historical information and lessons learned are part of:

A. Organizational process assets
B. Enterprise environmental factors
C. Project management information system (PMIS)
D. Work performance information

8. You've taken over as a project manager on a highway construction project, and the execution is already under way. Your sponsor tells you that moving forward, all asphalt should be laid down with a 12" thickness. The scope statement and the WBS call for 9" thick asphalt. What is the BEST course of action?

A. Look for a cheaper supplier so the cost impact is minimized.
B. Tell the sponsor that the work is already under way, so you can't accommodate his request.
C. Refuse to alter the plans until the change control system has been used.
D. Tell the team to accommodate the request immediately.

9. Which of the following BEST describes the purpose of a requirements traceability matrix?

A. It describes how WBS dictionary entries are traced to work packages, and how work packages are decomposed from deliverables.
B. It's used to make sure that all of the subplans of the Project Management plan have been created.
C. It helps you understand the source of each requirement, and how that requirement was verified in a later deliverable.
D. It's used to trace the source of every change, so that you can keep track of them through the entire Control Scope process and verify that the change was properly implemented.

10. It's the end of execution for a large highway construction project. The work has been done, and the workers are ready to pack up their equipment. The project manager and project sponsor have come by with specialists to check that each requirement has been met, and that all of the work in the WBS has been performed. What process is being done?

A. Control Scope
B. Validate Scope
C. Scope Testing
D. Define Scope

Exam Questions

11. You have just been put in charge of a project that is already executing. While reviewing the project documentation, you discover that there is no WBS. You check the Scope Management plan and discover that there should be one for this project. What is the BEST thing for you to do:

A. Immediately alert the sponsor and make sure the project work doesn't stop.
B. Stop project work and create the WBS, and don't let work continue until it's created.
C. Make sure you closely manage communications to ensure the team doesn't miss any undocumented work.
D. Mark it down in the lessons learned so it doesn't happen on future projects.

12. A project manager on an industrial design project finds that the sponsor wants to make a change to the scope after it has been added to the baseline, and needs to know the procedure for managing changes. What is the BEST place to look for this information?

A. WBS
B. Scope Management plan
C. Change request form template
D. Business case

13. You have just started work on the project scope statement. You are analyzing the expected deliverables when you discover that one of them could be delivered in three different ways. You select the best method for creating that deliverable. What is the BEST way to describe what you are doing?

A. Alternatives analysis
B. Decomposition
C. Define scope process
D. Stakeholder analysis

14. You're the project manager on a software project. Your team has only completed half of the work when the sponsor informs you that the project has been terminated. What is the BEST action for you to take?

A. Verify the deliverables produced by the team against the scope, and document any place they do not match.
B. Call a team meeting to figure out how to spend the rest of the budget.
C. Work with the sponsor to see if there is any way to bring the project back.
D. Tell the team to stop working immediately.

15. You are managing an industrial design project. One of your team members comes to you with a suggestion that will let you do more work while at the same time saving the project 15% of the budget. What is the BEST way for you to proceed?

A. Tell the team to make the change because it will deliver more work for less money.
B. Refuse to make the change until a change request is documented and change control is performed.
C. Refuse to consider the change because it will affect the baseline.
D. Do a cost-benefit analysis and then make sure to inform the sponsor that the project scope changed.

Exam Questions

16. You are the project manager for a telecommunications project. You are working on the project scope statement. Which of the following is NOT included in this document?

A. Authorization for the project manager to work on the project
B. Requirements that the deliverables must meet
C. A description of the project objectives
D. The list of deliverables that must be created

17. Which of the following is NOT an input to Control Scope?

A. Work performance data
B. Project management plan
C. Requested changes
D. Organizational process assets

18. Which of these processes is not a part of Scope Management?

A. Scope Identification
B. Collect Requirements
C. Control Scope
D. Validate Scope

19. You are the project manager for a new project, and you want to save time creating the WBS. Which is the BEST way to do this?

A. Make decomposition go faster by cutting down the number of deliverables.
B. Use a WBS from a previous project as a template.
C. Don't create the WBS dictionary.
D. Ask the sponsor to provide the work packages for each deliverable.

20. The project manager for a design project is using the Define Scope process. Which BEST describes this?

A. Creating a document that lists all of the features of the product
B. Creating a plan for managing changes to the baseline
C. Creating a document that describes all of the work the team does to make the deliverables
D. Creating a graphical representation of how the phases or deliverables decompose into work packages

21. You are the project manager for a construction project. You have completed project initiation activities, and you are now creating a document that describes processes to document the scope, decompose deliverables into work packages, verify that all work is complete, and manage changes to the baseline. What process are you performing?

A. Develop Project Management plan
B. Define Scope
C. Create WBS
D. Develop Project Charter

Exam Questions

22. You are a project manager working on a project. Your sponsor wants to know who a certain work package is assigned to, what control account to bill it against, and what work is involved. What document do you refer her to?

A. Scope Management plan
B. WBS
C. WBS dictionary
D. Scope statement

23. You are the project manager for a software project. One of the teams discovers that if they deviate from the plan, they can actually skip one of the deliverables because it's no longer necessary. They do the calculations, and realize they can save the customer 10% of the cost of the project without compromising the features in the product. They take this approach, and inform you the following week what they did during the status meeting. What is the BEST way to describe this situation?

A. The project team has taken initiative and saved the customer money.
B. A dispute is resolved in favor of the customer.
C. The team informed the project manager of the change, but they should have informed the customer, too.
D. The team did not follow the Control Scope process.

24. Which of the following BEST describes the purpose of the project scope statement?

A. It describes the features of the product of the project.
B. It is created before the Scope Management plan.
C. It decomposes deliverables into work packages.
D. It describes the objectives, requirements, and deliverables of the project, and the work needed to create them.

25. A project manager at a cable and networking company is gathering requirements for a project to build a new version of their telecommunications equipment. Which of the following is NOT something that she will use?

A. Specific descriptions of work packages that will be developed
B. One-on-one interviews with the senior executives who need the new equipment for their teams
C. An early working model of the telecommunications equipment to help get feedback from stakeholders
D. Results from a focus group that she ran when starting the project

26. Which of the following is NOT an output of Collect Requirements?

A. Requirements observations
B. Requirements traceability matrix
C. Requirements documentation
D. Requirements Management plan

Exam ~~Questions~~ Answers

1. Answer: C

The work breakdown structure is all about breaking down the work that your team needs to do. The WBS is hierarchical, not linear and unstructured. Did you notice that answer B was about *product* scope, not *project* scope?

2. Answer: A

There are two ways you can get to the right answer for this question. You can recognize that the WBS dictionary, change requests, and accepted deliverables are all Scope Management process outputs. (You'll see change requests in every knowledge area!) But you can also recognize that the business case is used in the Develop Project Charter process, which is part of the Initiating process group.

3. Answer: A

Did you recognize that answer A was describing the Scope Management plan? Once you know what the WBS is used for and how to make one, questions like this make sense.

4. Answer: C

You'll need to know what order processes come in, and one good way to do that is to think about how the outputs of some processes are used as inputs for another. For example, you can't create the WBS until the scope is defined, which is why A is wrong. And you can't do change control until you have a baseline WBS, which is why B is wrong.

Take a minute and think about how there's no "right" order for Validate Scope and Control Scope. You could have a scope change at the beginning of the project, so Control Scope would come first. But a change could happen late in the project, too! If there's a major change to the project after the scope's verified, you need to redo it.

5. Answer: B

An important tactic for a lot of exam questions is to be able to recognize a particular tool, technique, input, or output from a description. What have you learned about that tells you who is responsible for a work package, tells what control account to associate with it, and describes the work associated with it? That's a good description of the WBS dictionary.

Inspection isn't just done at the end of the project. You do Validate Scope on every single deliverable made by you and the team.

6. Answer: B

There are some questions where you'll just have to know what a process is all about, and this is one of them. That's why it's really helpful to know why Validate Scope is so helpful to you on a project. You use Validate Scope to check that all of the work packages were completed, and get the stakeholders and sponsor to formally accept the deliverables.

Exam Questions Answers

7. Answer: A

It's easy to forget that organizational process assets is more than just an input. It's a real thing that's part of your company. Take a second and think about what **assets** are in your **organization** that help you carry out each **process**. Get it? Good! So what is historical information, anyway? It's stuff like reports and data that you or another project manager wrote down on a previous project and stored in a file cabinet or a database. That's an asset you can use now! What are lessons learned? Those are lessons you wrote down at the end of a previous project and stuck in a file cabinet or a database. And now those lessons are another asset you can use.

The PMBOK® Guide says this stuff is stored in a "corporate knowledge base," but that can be as simple as a file cabinet or a folder on your network.

THESE INPUTS AND OUTPUTS MAKE SENSE WHEN I THINK ABOUT HOW I'D USE THEM ON A PROJECT. ORGANIZATIONAL PROCESS ASSETS ARE JUST THINGS THAT MY ORGANIZATION KEEPS TRACK OF TO HELP ME DO MY JOB, LIKE INFORMATION FROM OLD PROJECTS AND PROCEDURES.

But PMOs are increasingly relying on advanced knowledge management tools, practices, and procedures.

8. Answer: C

One thing to remember about change control is that if you want to make the sponsor and stakeholders happy with the project in the end, sometimes you have to tell them "no" right now. When you're doing Control Scope, the most important tool you use is the change control system. It tells you how to take an approved change and put it in place on a project, and there's no other way that you should ever make a change to any part of the baseline. That means that once everyone has approved the scope statement and WBS, if you want to make any change to them, then you need to get that change approved and put it through the change control system.

9. Answer: C

The requirements traceability matrix is a tool that you use to trace each requirement back to a specific business case, and then forward to the rest of the scope deliverables (like specific WBS work packages), as well as other parts of the project: the product design (like specific levels in *Cows Gone Wild*) or test strategy (like test plans that the Ranch Hand Games testers use to make sure that the game works).

The idea is that you're tracing a deliverable from its initial description all the way through the project to testing, so that you can make sure that every single deliverable meets all of its requirements.

Exam ~~Questions~~ Answers

10. Answer: B

When you're getting the sponsor and stakeholders to formally accept the results of the project, you're doing Validate Scope. This involves an important too: inspection. That means carefully checking the deliverables (in this case, what the workers built on the highway) to make sure they match the WBS.

Answer D is a good idea, but it's not as important as creating a new WBS.

11. Answer: B

This question is a little tricky. The most important thing about a WBS is that if your Scope Management plan says it should be there, then your project absolutely cannot be done without it. And a general rule is that if you ever find that there is no WBS, you should always check the Scope Management plan to find out why.

12. Answer: B

This is another question that is testing you on the definition of a specific document, in this case the Scope Management plan, which is one of the subsidiary plans of the Project Management plan. Think about what you use a Scope Management plan for. It gives you specific procedures for defining the scope, breaking down the work, verifying the deliverables, and **managing scope changes**—which is what this question is asking. All of the other answers don't have anything to do with managing changes.

13. Answer: A

Here's another example of how there are two correct answers but only one BEST one. Answer C is true—you are doing scope definition. But is that really the best way to describe this situation? Alternatives analysis is part of scope definition, and it's a more accurate way to describe what's going on here.

When you look at a few ways to create a deliverable and then decide on the best one, that's alternatives analysis.

14. Answer: A

This question is an example of how you need to rely on more than just common sense to pass the PMP exam. All four of these answers could be good ways to handle a terminated project, but there's only one of those answers that corresponds to what the *PMBOK® Guide* says. When a project is terminated, you still need to complete the Validate Scope process. That way, you can document all of the work that has been completed, and the work that has not been completed.

Exam Questions Answers

15. Answer: B

Are you starting to get the hang of how this change control stuff works? The baseline isn't etched in stone, and you need to be able to change it, but you can't just go ahead and make changes whenever you want. You need to document the change request and then put that request through change control. If it's approved, then you can update the baseline so that it incorporates the change.

You definitely can't just make the change and inform the sponsor later. All changes need to be approved.

16. Answer: A

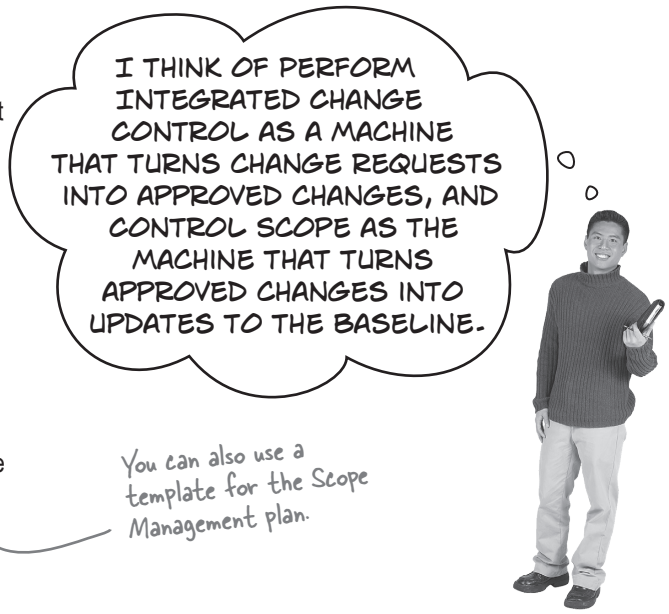
When a question asks you about what a particular document, input, or output contains, be on the lookout for answers that talk about a different document. What document do you know about that gives the project manager authorization to do the work? That's what the project charter is for.

17. Answer: C

Sometimes Control Scope is easiest to think about as a kind of machine that turns approved changes into updates. It sucks in the approved changes and all of the other Scope Management stuff (the Scope Management Plan, Requirements Management Plan, and Scope Baseline), does all the stuff that it needs to do to update those things, and then spits out updates. And sometimes it spits out new requested changes because when you're making changes to the WBS or scope statement you realize that you need to make even more changes.

18. Answer: A

Scope Identification is a made-up process. It didn't appear in this chapter, and even though it sounds real, it's wrong.



19. Answer: B

WBS templates are a great way to speed up creating the WBS, and the easiest way to create a template is to use one from a previous project. It is **not** a good idea to cut out deliverables, skip important outputs like the WBS dictionary, or make the sponsor do your job for you.

You can also use a template for the Scope Management plan.

Exam ~~Questions~~ Answers

20. Answer: C

This question asked you about the Define Scope process, but all of the answers describe various outputs. Which of these outputs matches Define Scope? Well, the main output of Define Scope is the scope statement, and answer C is a good description of the scope statement.

Did you guess "Create WBS" because it was a Scope Management process and the question mentioned decomposing deliverables into work packages?

21. Answer: A

This question asked you where you defined the procedures for doing all of the Scope Management processes. Where do you find those procedures? You find them in the Project Management plan—specifically, the Scope Management subplan. And you build that in the Develop Project Management Plan process.

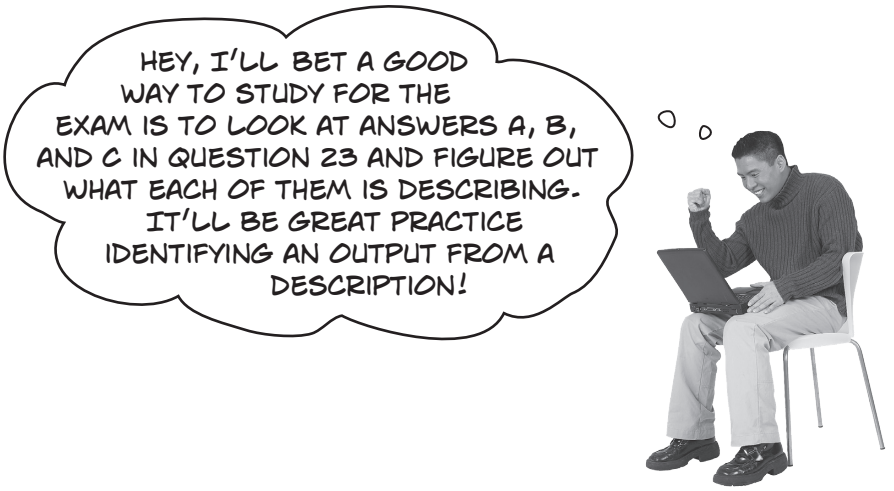
22. Answer: C

There's only one document you've seen that shows you details of individual work packages and contains a control account, a statement of work, and a resource assignment. It's the WBS dictionary.

Did you notice how the question made it sound like the team did a good thing by ignoring Control Scope and making changes that were never approved?

23. Answer: D

When you read the question, it looks like the team really helped the project, right? But think about what happened: the team abandoned the plan, and then they made a change to the project without getting approval from the sponsor or stakeholders. Maybe they discovered a useful shortcut. But isn't it possible that the shortcut the team found was already considered and rejected by the sponsor? That's why change control is so important.



Exam Questions Answers

24. Answer: D

Some questions are just definition questions. When that definition is a which-is-BEST question, there could be an answer that makes some sense, and it's tempting to stop with it. In this case, answer A sounds like it might be right. But if you read answer D, it's much more accurate.

25. Answer: A

The question asked about the tools and techniques for Collect Requirements, and answer A is the only answer that has to do with the Create WBS process. The rest of the answers were descriptions of Collect Requirements tools and techniques: interviews (answer B), prototypes (answer C), and observations (answer D).

26. Answer: A

The outputs of Collect Requirements are requirements documentation and the requirements traceability matrix. "Requirements Observations" isn't really an output.

The easiest way to make sure you get questions like this right is to think about how each of those outputs is actually used later in the project.

Keep an eye out for questions that describe an input or output and then ask you to name it. Look at each answer and think up your own descriptions for them—one of them will match the question.

6 Project schedule management

Getting it done on time

Project schedule management is what most people think of when they think of project managers. It's where the deadlines are set and met. It starts with **figuring out what work** you need to do, how you will do it, what **resources you'll use**, and how long it will take. From there, it's all about developing and controlling that **schedule**.

Reality sets in for the happy couple

Rob and Rebecca have decided to tie the knot, but they don't have much time to plan their wedding. They want the big day to be unforgettable. They want to invite a lot of people and show them all a great time.

But just thinking about all of the details involved is overwhelming. Somewhere around picking the paper for the invitations, the couple realize they need help…

They've always dreamed of a June wedding, but it's already January.

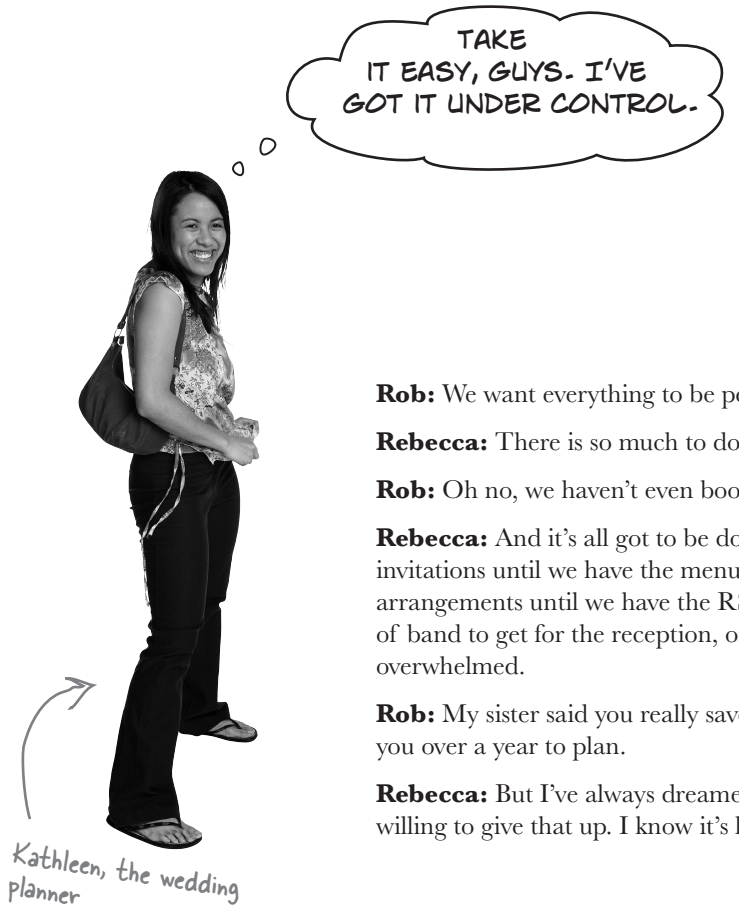
EVERYTHING HAS TO BE PERFECT! BUT IT SEEMS SO HUGE. I DON'T KNOW WHERE TO START.

Rebecca's been dreaming of the big day since she was 12, but it seems like there's so little time to do it all. She needs some help.

She's super-nervous about the wedding plans! Can they find someone to help take the pressure off and make the day perfect?

DON'T WORRY. MY SISTER'S WEDDING PLANNER WAS GREAT. LET ME GIVE HER A CALL.

Meet the wedding planner



Rob: We want everything to be perfect.

Rebecca: There is so much to do! Invitations, food, guests, music…

Rob: Oh no, we haven't even booked the place.

Rebecca: And it's all got to be done right. We can't print the invitations until we have the menu planned. We can't do the seating arrangements until we have the RSVPs. We aren't sure what kind of band to get for the reception, or should it be a DJ? We're just overwhelmed.

Rob: My sister said you really saved her wedding. I know she gave you over a year to plan.

Rebecca: But I've always dreamed of a June wedding, and I'm not willing to give that up. I know it's late, but can you help us?

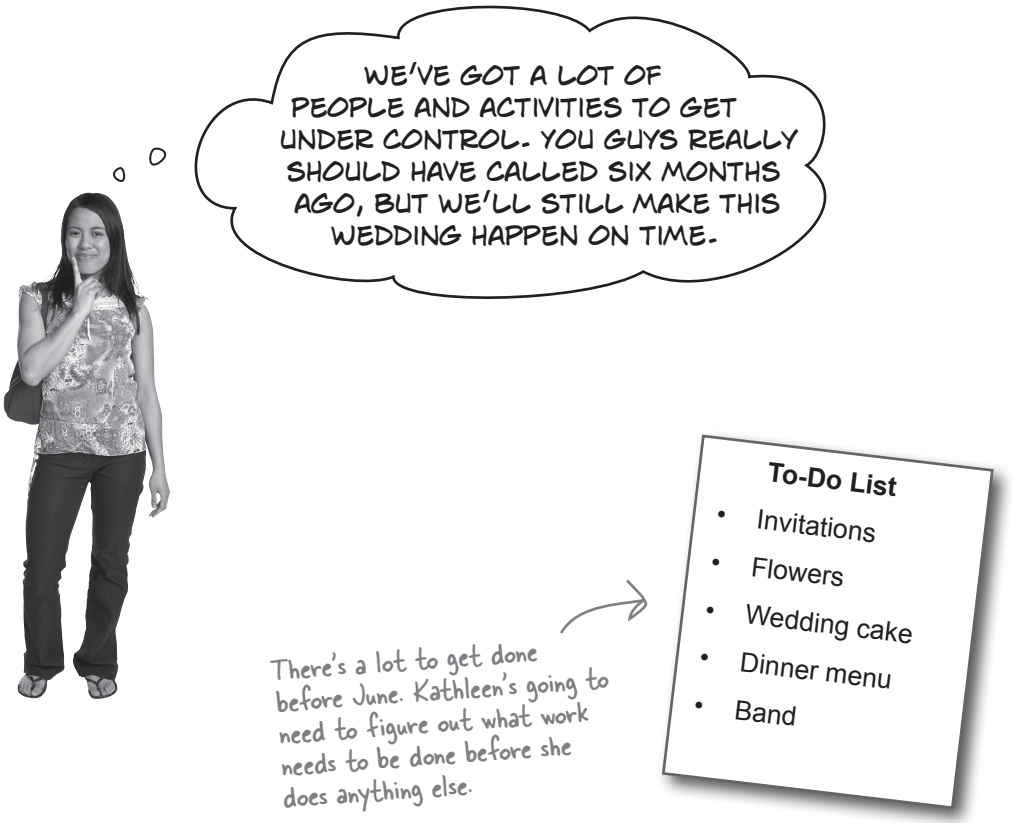
BRAIN POWER

What should Kathleen do first to make sure they have time to get everything done?

Schedule management helps with aggressive timelines

Since there are so many different people involved in making the wedding go smoothly, it takes a lot of planning to make sure that all of the work happens in the right order, gets done by the right people, and doesn't take too long. That's what the **Project Schedule Management** knowledge area is all about.

Initially, Kathleen was worried that she didn't have enough time to make sure everything was done properly. But she knew that she had some powerful time management tools on her side when she took the job, and they'll help her make sure that everything will work out fine.



Project Schedule Management Magnets

You need to know the order of the Project Schedule Management processes for the exam. Luckily, they are pretty intuitive. Can you figure out the order?

1.

2.

3.

4.

5.

6.

Control Schedule

Estimate Activity Durations

Develop Schedule

Sequence Activities

Define Activities

Plan Schedule Management

Project Schedule Management Magnets Solution

Here are the correct order and the main output for each of the Project Schedule Management processes.

1 **Plan Schedule Management**

Schedule Management plan

First you define the processes you'll use to plan and control your schedule.

2 **Define Activities**

Activity list

Next you come up with a list of all of the activities that will need to be completed.

The activity list is the basis for the network diagram that you create in the next process.

3 **Sequence Activities**

Project schedule network diagram

Next, you figure out which activities need to come before others, and put them in the right order. The main output here is a **project schedule network diagram**, a picture of how activities are related.

Knowing the stuff that needs to happen and the sequence is half the battle. Now you need to figure out who will do the work.

4 **Estimate Activity Durations**

Activity duration estimates

…and then estimate the time it will take to do each activity.

You can use lots of different estimation techniques to determine how long the project will take.