CHAPTER 3

PROCESS ESSAYS

OBJECTIVES

To write academic texts, you need to master certain skills.

In this chapter, you will learn to:

- Analyze a process essay
- Identify, plan, and organize the steps of process analysis
- Recognize and correct common sentence problems such as
  - Run-on sentences
  - Comma-spliced sentences
  - Choppy sentences
  - Stringy sentences
- Identify main ideas for writing a summary or abstract
- Write, edit, and revise an essay detailing an experiment

A scientist at work in a laboratory

INTRODUCTION

In the previous chapter, you looked at the observation and classification of behavior. In this chapter, you will focus on analyzing a process. A **process essay** either describes a process or provides instructions for how to do something. In other words, it is a step-by-step explanation of how something works, or how to perform a task. Such an explanation is especially important in describing scientific experiments and summarizing their results. However, process analysis also applies to many other kinds of explanations or instructions. For example, you might describe the digestive process, the rotation of the moon around the earth, or the way a computer communicates with a laser printer. More simply, you might explain how to make chocolate chip cookies, how to connect the surround sound equipment to accompany a new flat screen television, or how to get from the airport to your home. However, this chapter will concentrate on the process essay as it relates to academic writing about science and medicine.

ANALYZING THE MODEL

The model essay describes the process of conducting a scientific experiment.

Read the model. Then answer the questions.

Writing Model

What Scientists Do

1 Human beings are curious. They constantly search for explanations: Why did something happen? How did it happen? They guess at answers to their questions and try to determine if their guesses are correct. In this way, whether they know it or not, they are taking the first step down the road of what scientists refer to as the scientific method. The next steps involve conducting experiments to determine if their guesses are correct, arriving at conclusions, and writing them down in a report. Those actions can take place in a laboratory or in the field. The process of investigation does not stop there, however. Other scientists usually repeat these experiments to verify the results, or conduct further experiments. Their goal is often to answer questions raised by the findings of the original experiments. The scientific method therefore creates a continual, self-correcting cycle of investigation and analysis involving six steps.

2 An example from biology illustrates this process. It would begin with a common sense idea or observation: regular exercise seems to help prevent heart disease and heart attacks. However, can we be sure that the observation is correct? The first step in the scientific method therefore poses a question that an experiment might answer: "Can regular exercise help prevent coronary[1] disease and heart attacks?" Then, scientists could proceed to the second step in the scientific method. They would state a

[1] **coronary:** relating to the heart

prediction, or hypothesis, that experiments or observations either verify or disprove. In this case, the hypothesis would be that regular exercise helps prevent heart disease and heart attacks.

3 The third step requires setting up a controlled experiment to test the hypothesis using animals instead of humans, in this case laboratory mice. As with all experiments, there would be two categories to examine: an experimental group and a control group. These groups are identical in every way except one: the experimental group includes a variable[2] to test—regular exercise—for its effect on coronary disease and heart attacks. Scientists would begin by selecting perhaps 100 specially bred laboratory mice of the same age and with the same genetics. The mice would all have an inherited susceptibility to coronary heart disease or heart attacks. The scientists assign half of the mice to the experimental group and the other half to the control group.

4 Having established the control and experimental groups, the researchers would now move on to the fourth step: conducting the experiment. First, they would have to assign a length of time for the experiment, for example, 120 days. They would also assemble all the materials needed to conduct the experiment: cages, food, water, and tools for monitoring the activities of the mice. They would keep all the conditions for both groups the same: diet, temperature, humidity, waking and sleeping cycles, water availability, and safety from harmful bacteria. However, the cages of the experimental group would be equipped with exercise wheels, while the cages of the control group would not. Then each week the researchers would gather data from the exercise wheels to ensure that the mice in the experimental group had been exercising.

5 At the end of the specified time period, the scientists could move on to the fifth step, analyzing the results. Suppose that the statistics produced by the experiment showed that 25 mice in the control group had heart attacks or developed coronary disease—one half of the total in the group. On the other hand, the disease rate for the mice in the experimental group turned out to be dramatically lower. Only 18 of them exhibited signs of heart disease or had heart attacks, or 36% of the total. In addition, the mice in the experimental group weighed an average of 10% less than the mice in the control group.

(continued on next page)

[2] **variable:** something that is different

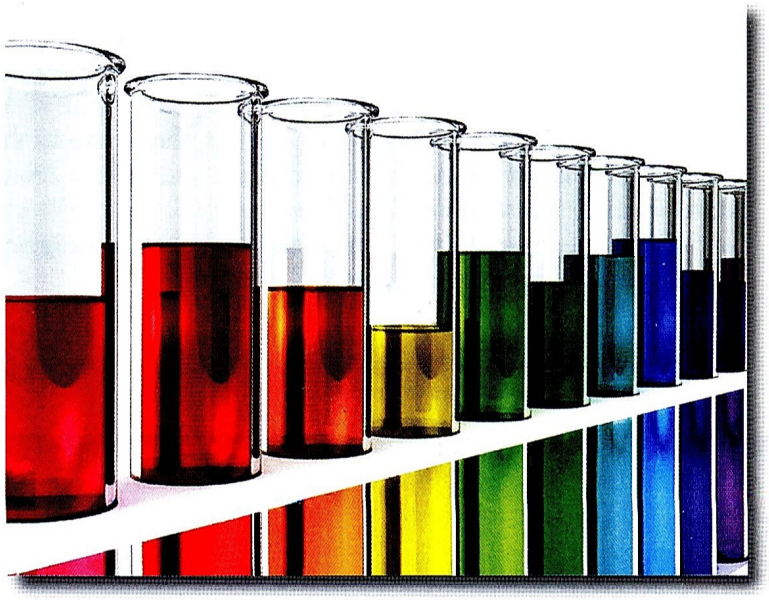
6 The data would not prove the original hypothesis, but once the results had been written up and published—the sixth step in the experiment—the findings would form the basis for repeating the experiment and conducting further experiments. For example, the data might suggest other phenomena to investigate, such as whether the exercise or the weight loss from the exercise caused a decrease in heart disease. Did both contribute to the decrease? Was the weight loss simply an unanticipated result of the experiment?

7 These questions might lead to further experimentation. Other scientists could now conduct a series of related experiments. They might work first with mice, then with larger animals, and, if these revealed similar results, finally with human subjects. The findings of the scientists might vary, but the ongoing experimenting and dialogue would continue, following the same widely agreed upon principles of and steps in the scientific method.

Source: Kalizeka, C.J. and David Pearson. *Using the Scientific Method to Solve Mysteries.*

Questions about the Model

1. Who is the likely audience for this essay—scientists or nonscientists?
2. What is the thesis statement of the introduction? Circle it.
3. How many steps in the scientific method does the essay explain? Underline the topic sentences that identify these steps.
4. In Paragraph 4, what is the function of the phrase, "Having established the control and experimental groups"?
5. The example reports on two findings, one based on the hypothesis and the other not stated in the hypothesis. What kind of experiment would you expect scientists to conduct based on the unpredicted finding?
6. Could you actually conduct the experiment based on the essay's explanation? Why or why not?



Noticing Vocabulary: Irregular Plurals from Latin and Greek

Chapter 2 explained that the plural of the word *criterion* is *criteria*. This is because the word comes from Greek, which has retained its original plural forms for some words. Likewise some words that come from Latin have irregular plural endings; they do not add *-s* endings to the singular form. These words can be placed into four categories, which include many words used in scientific writing.

PRACTICE 1 **Singular and Plural Forms of Irregular Nouns**

A Look at the writing model again. Find irregular nouns for each category in the chart. The beginnings of each word have been included to help you.

Category 1: Nouns from Latin	
Singular (*-um*) Ending	**Plural (*-a*) Ending**
medium	*media*
1. _____	bac_____
2. _____	dat_____
Category 2: Nouns from Greek	
Singular (*-is*) Ending	**Plural (*-es*) Ending**
thesis	*theses*
1. ana_____	
2. hyp_____	_____
3. bas_____	_____
Category 3: Nouns from Greek	
Singular (*-on*) Ending	**Plural (*-a*) Ending**
criterion	*criteria*
1. _____	phe_____
Category 4: Singular Nouns from Greek with No Plural Form	
Singular (*-ics*) ending	
mathematics	
1. gen_____	
2. sta_____	

B Complete the chart with the singular or plural form of each noun, where possible.

ORGANIZATION

A typical process essay usually contains the same elements you have seen in the previous chapters: It consists of an introductory paragraph, body paragraphs, and a concluding paragraph. The content, however, is organized into a specific pattern. A diagram of the organization of a process essay with examples from the writing model looks like this:

Introductory Paragraph

The opening paragraph names the process under discussion, identifies the purpose of the essay, and provides a transition to the body paragraphs.

Process: the scientific method

Purpose: to explain each step of the scientific method to the reader

Transition: introduces the six steps that will appear in the body

↓

Body Paragraphs

The body paragraphs present every step of the process under discussion in sequential (chronological) order, providing a clear explanation of each.

Step one: Begin with a common sense idea or observation.

Step two: State a hypothesis to verify or disprove.

Step three: Set up controlled experiment groups.

Step four: Conduct the experiment and gather data.

Step five: Analyze the results.

Step six: Write up and publish the findings.

↓

Concluding Paragraph

The final paragraph summarizes the process and underscores the importance of the process by placing it in a larger context.

INTRODUCTORY PARAGRAPH

The introduction of a process essay should contain a thesis statement that names the process under discussion and indicates the structure of the body paragraphs. The introduction should also indicate whether the purpose of the essay is **informational** (giving the reader information about the process) or **instructional** (instructing the reader on how to perform the process). The thesis statement from the writing model names the process, indicates the informational purpose of the essay, and sets up the sequential structure of the body paragraphs by informing us that there are six steps.

> The scientific method therefore creates a continual, self-correcting cycle of investigation and analysis involving six steps.

It is possible, however, that your readers may not be very interested in the topic of your essay. Another function of the introductory paragraph is to attract the readers' interest. This can be done in several ways, such as by asking questions or explaining how the process relates to the readers' lives, as in this example from the writing model:

> Human beings are curious. They constantly search for explanations: Why did something happen? How did it happen? They guess at answers to their questions and try to determine if their guesses are correct.

BODY PARAGRAPHS

The body paragraphs guide the reader step-by-step through the process. Each step is presented in sequential order; that is, moving from first to last. The amount of information included in each step depends on what the readers already know about the process. For instance, an explanation of the scientific method for students in a first-year biology class would likely define key terms such as *hypothesis*, *control group*, and *variable* as they are introduced; these would not be explained for readers in the science profession. Likewise, an explanation of how to set up a surround sound system would list the parts needed before it proceeds with the instructions on assembling those parts.

Purpose

The purpose of the essay affects how you address the reader. Informational explanations of how something works, for example, are most often written in the third person: "The third step requires setting up a controlled experiment to test the hypothesis. . . ." In contrast, instructional explanations generally address the audience directly in the second person: "First, you stir the mixture thoroughly before adding milk," or they imply *you* in sentences by using imperatives: "[You] Stir the mixture thoroughly before adding milk."*

CONCLUDING PARAGRAPH

The conclusion either summarizes the process or indicates its implications in a larger context. The model essay, for example, states that scientific experimentation follows well-established principles and leads to ongoing further experimentation.

> The findings of the scientists might vary, but ongoing experimenting and dialogue would continue, following the same widely agreed upon principles of and steps in the scientific method.

* Remember that person is divided into three categories with singular and plural forms: first person (*I, we*), second person (*you, both singular and plural*), and third person (*he, she, it, they*).

OUTLINING

As mentioned in Chapter 1, preparing an outline allows you to list the essay's thesis statement, the topic sentences of the body paragraphs, and the supporting information for each topic sentence.

An outline of a process essay looks like this:

I. Introduction and thesis statement
- **A.** Attracting the interest of your audience
- **B.** Naming the process
- **C.** Stating the goal of the essay: to help readers either *understand* or *perform* the process

II. Body: Steps in the process
- **A.** Step one: explanation and examples
- **B.** Step two: explanation and examples
- **C.** Step three, and so on

III. Conclusion
- **A.** Restatement of the goal of the process, or
- **B.** Summary of the process, or
- **C.** Statement of its role within a larger context

PRACTICE 2 **Outlining the Model**

Look at the writing model on pages 42–44. Use the information to complete the outline.

I. Introduction and thesis: To explain the scientific method through a specific example

A. Naming the process: Repeated experiments to determine if exercise prevents coronary heart disease or heart attacks

B. The goal of the essay: _____

II. Steps in the process

A. _____

Explanation/Examples: _____

B. _____

Explanation/Examples: _____

C. _____

Explanation/Examples: _____

D. _____

Explanation/Examples: _____

_____

E. _____

Explanation/Examples: _____

_____

F. _____

Explanation/Examples: _____

_____

III. Conclusion

A. _____

_____

B. _____

_____

SENTENCE STRUCTURE

In order to ensure that your essays are clear, you must be mindful of their sentence structure. Clear sentence structure depends on establishing where each sentence ends and the next one begins. When editing your work, you must locate and eliminate two common errors: **run-on sentences** and **comma-spliced sentences**.

RUN-ON AND COMMA-SPLICED SENTENCES

You probably know that every sentence must have an independent clause, which is a group of words containing a subject and verb that makes a complete statement. You probably also know that many sentences contain two independent clauses. Sometimes a semicolon joins the two clauses.

Far more often, however, a comma and a coordinating conjunction come between them. The seven coordinating conjunctions are *for, and, nor, but, or, yet,* and *so*. The first letters of the conjunctions spell the words *fan boys*, which is a good way to remember them. The comma separates or creates a pause between the clauses. The conjunction joins them and shows their logical relationship. If either the comma or the coordinating conjunction is omitted, or if they both are, common errors occur.

In a run-on sentence, nothing comes between the independent clauses.

RUN-ON Topic sentences are important they introduce the controlling idea of a paragraph.

In a comma-spliced sentence, only a comma comes between the clauses, but the conjunction is missing. In English, commas separate structures; they do not join them.

COMMA-SPLICED Topic sentences are important, they introduce the controlling idea of a paragraph.

If you find any run-on or comma-spliced sentences when editing your work, you can correct them in several ways. How you correct these errors depends on the logical relationship you wish to establish between the clauses.

Correcting Run-On and Comma-Spliced Sentences

RULES	EXAMPLES
1. Insert a coordinating conjunction, or both a comma and coordinating conjunction between the two clauses, depending on what is missing.	Topic sentences are important, for they introduce the controlling idea of a paragraph.
2. Make the less important clause into a **dependent clause*** by beginning it with a **subordinating conjunction**. Most subordinating conjunctions refer to time relationships: *while, when, whenever, as, until, since, before, after,* or *as soon as*. Others establish different logical relationships: *because, if, unless,* and *although*.	Topic sentences are important because they introduce the controlling idea of a paragraph.
3. Rewrite one of the clauses so that it begins with *that, which,* or *who*.	Topic sentences, which introduce the controlling idea of a paragraph, are important.
4. End the first statement with a period.	Topic sentences are important. They introduce the controlling idea of a paragraph.
5. Join the two clauses with a semicolon.	Topic sentences are important; they introduce the controlling idea of a paragraph.

* You may recall that a dependent clause contains both a subject and a verb, but cannot be a sentence by itself. It must be attached to an independent clause.

PRACTICE 3 **Correcting Run-ons and Comma Splices**

A Label each sentence *RO* (run-on), *CS* (comma-spliced), or *C* (correct).

_____ 1. The scientific method involves six steps each is important.

_____ 2. One group in an experiment includes a variable, the other is called the control group.

_____ 3. They must be alike in every other way, otherwise, the results of the experiment will not be valid.

_____ 4. The researchers establish a timeline for the experiment, they then gather data every week from each group.

_____ 5. Data from the experiment are carefully analyzed to determine if the hypothesis is correct or incorrect.

_____ 6. After the data are analyzed, they might suggest other points to investigate.

_____ 7. The results of the experiment are often published, then other scientists can conduct further experiments.

_____ 8. In scientific journals, each article is often preceded by a short summary, which is called an abstract.

B **On a separate sheet of paper, correct and rewrite the sentences with errors. More than one correction is possible. Try to vary your use of conjunctions and punctuation.**

Writing Tip

One way to determine whether a word is a conjunction (which joins two clauses) or a transitional word (which explains their logical relationship) is to try changing the position of words in the second clause. Transitional, or explaining, words can be moved to other locations, while conjunctions cannot. For example:

. . . *however*, it does not join them.

. . . it does not join them, *however*. (The explaining word can be moved.)

. . . *but* it does not join them. (The conjunction cannot be moved.)

CHOPPY AND STRINGY SENTENCES

In a sense, two opposites of run-on and comma-spliced sentences are choppy and stringy sentences.

Choppy Sentences

In English, a good writer uses a variety of sentence types that vary in length. A single short sentence can be effective in emphasizing a point, especially after several long sentences, as in this example:

> Because of efforts by First Lady Michelle Obama to encourage better eating habits and changes in the school lunch requirements from the United States Department of Agriculture, the food served in schools is more nutritious and healthier than ever. Schools are offering fruit drinks in place of sugar-sweetened sodas, vegetables instead of potato chips or French fries, and sliced turkey instead of hamburgers.
>
> Kids, however, aren't happy.

The sixty-three words of the first two sentences are followed by one sentence of just four words, set off in a separate paragraph for dramatic effect.

However, continually using too many short simple sentences is considered poor style because it interrupts the flow of the text. This overuse of short sentences is referred to as **choppy sentences**. Each choppy sentence contains only one idea, so it cannot express complex thoughts; therefore, a series of choppy sentences may sound childish and even annoying:

> My sentences are short. They are simple. Each contains only one idea. They cannot express complex thoughts. They sound immature. I had better stop. You will be glad to finish reading this.

You can correct choppy sentences easily by combining two or more into a single compound or complex sentence through the use of coordination or subordination.

If the sentences express equal ideas, use coordinators to combine them.

CHOPPY My sentences are short. They are simple.

IMPROVED My sentences are short **and** simple.

If the sentences express unequal ideas, use subordinators to combine them.

CHOPPY They sound immature. They can't express complex thoughts.

IMPROVED They sound immature **because** they can't express complex thoughts.

PRACTICE 4 Combining Choppy Sentences

Improve the choppy sentences by combining them. If the ideas are equally important, write a compound sentence. If the ideas are unequal, write a complex sentence.

1. Many scientists work in a laboratory. They also work in the field.

   Combined: Scientists work in a laboratory, but they also work in the field.

2. Many American children eat unhealthy food. They do not get enough exercise.

   Combined: _____

3. Many children won't eat healthy food. They don't like the way it tastes.

   Combined: _____

4. People watch too much television. They spend too much time on computers and cell phones. They don't get enough exercise. *Combined:* _____

5. Too many Americans get diabetes. Too many Americans die of heart attacks. These may be related to their diets. They may also be related to lack of exercise.

Combined: _____

_____

_____

6. People have stressful lives. They tend to overeat. They do not get enough exercise. They smoke. They develop heart disease. *Combined:* _____

_____

_____

Stringy Sentences

Whereas a choppy sentence is too short, a **stringy sentence** is too long. It contains too many clauses, usually connected by *and, so, but,* or *because*. It sounds like a long rambling monologue in which too many ideas are expressed in an unorganized manner with no clear relationship between the ideas, unlike mature, carefully edited writing. To correct a stringy sentence, divide it into logical thought groups by rephrasing parts of it, or recombining the clauses through subordination.

STRINGY SENTENCE I write like I talk, so I string together too many ideas in the same sentence, **and** I don't use subordination, **but** this has to stop **because** I need to write in a more academic style.

IMPROVED **Because** I write like I talk, I string together too many ideas in the same sentence without subordination**. However,** this practice must stop **so that** I can develop a more academic writing style.

PRACTICE 5 **Improve Stringy Sentences**

Revise and rewrite each stringy sentence.

1. Children don't like the food in school cafeterias, so they go to vending machines to buy candy and potato chips, but they get hungry later because the junk food doesn't fill them up.

Revised: Because kids don't like the food in school cafeterias, they buy candy or potato chips at vending machines. However, this junk food is not filling, so the children are soon hungry again.

(continued on next page)

2. The United States has the highest rate of obesity in the world, and more and more children are becoming obese, and they are developing diseases such as diabetes because they are consuming too much sugar and starch.

Revised: _____

_____

_____

3. Many people eat too much, and they watch too much television, and they don't get enough exercise, so they tend to get fat.

Revised: _____

_____

_____

4. In many poor neighborhoods in the United States, there aren't a lot of supermarkets, and food is expensive, so people tend to buy junk food and candy at the corner store, and these practices lead to obesity.

Revised: _____

_____

_____

5. Exercise plays an important role in staying healthy, so people should try to walk, run, or do some sort of physical activity every day for at least twenty minutes, but it's better to work out for longer than that if your schedule allows you to.

Revised: _____

_____

_____

6. Heart disease is the most deadly illness in the United States, and it results from a narrowing of the small blood vessels that connect to the heart, which happens when a waxy material called plaque builds up in them and sticks to their lining, and this condition is also known as hardening of the arteries.

Revised: _____

_____

_____

PREPARATION FOR WRITING

As you have seen in Chapters 1 and 2, every essay you write must be clearly organized, and that is especially true when you are explaining a process. If you omit a step in the explanation, your reader may be lost. For instance, imagine a poor friend trying to drive to your home from the airport, who has ended up on the other side of town because you left out a key instruction. Likewise, if you forget to mention some of the materials needed to assemble a stereo sound system, your friend may have to return to the appliance store to buy missing parts. Indeed, a careless explanation of some processes (in laboratory science, for example) can, in fact, lead to danger or harm.

PRACTICE 6 Generating and Organizing Steps in Process Analysis

A **Brainstorm a list of steps for each thesis statement. Number the steps in a logical order.**

B **Work with a partner or in a small group. Compare your lists and decide on the best set of steps. Write your revised lists below.**

1. *Thesis Statement:* There are _____ steps involved in registering for classes at this institution.

_____

_____

_____

_____

_____

Revised List:

_____

_____

_____

_____

_____

(continued on next page)

2. *Thesis Statement:* The best way to study for an important examination involves _____ steps.

Revised List:

MAKING TRANSITIONS BETWEEN STEPS IN A PROCESS

In Chapter 2, you studied how transitions establish unity and coherence in a classification essay. Here is a list of transition signals that will be useful in introducing the steps in a process essay. Note that some of the transition signals are followed by a comma but others are not.

Transition Signals to Explain Steps in a Process

Rules	Examples	
1. Use these transition signals when you want to introduce the beginning of a process.	First, The first step	To begin,
2. Use these transition signals when you want to demonstrate the continuation of a process.	Next, Afterward, Second, third, and so on	Then The next step
3. Use these transition signals when you want to introduce the end of a process.	Finally, The final step	Last,

For more information on using transitions, see Appendix B on page 200.

PRACTICE 7 **Adding Transitions**

Rewrite the sentences into two paragraphs. Add transitions and combine sentences as needed to establish unity and coherence.

PARAGRAPH 1

To determine your resting pulse rate (the number of times your heart beats per minute), rest one arm on a flat surface.

Place two fingertips from your other hand over the artery just below your wrist.

Look at your watch for fifteen seconds.

Count the number of beats you feel.

Multiply that number by four to get the number of beats per minute.

Record it on a piece of paper.

PARAGRAPH 2

Determine your pulse rate after activity.

Jog in place for five minutes if you are in good health. Retake your pulse rate and again record it on a piece of paper.

In two-minute intervals, retake your pulse rate until it returns to the resting rate. Record the total time elapsed.

The shorter the recovery time, the better your cardiac condition is.

For writing guides to help you describe a process, see Appendix A, page 190.

WRITING A SUMMARY AND AN ABSTRACT

When preparing an analysis of a process, it can be useful to summarize the steps involved. Of course, a **summary**, a short restatement of the thesis and main supporting points of a longer work, plays an important role in any kind of writing. The length of a summary usually depends on the length of the original material. A summary of a single paragraph may require only one sentence, whereas a summary of an article or essay may need a short paragraph, and a summary of a longer article or essay may call for a longer paragraph.*

A specialized kind of one-paragraph summary, called an **abstract**, often precedes reports published in professional journals. Abstracts provide a quick way for biologists, teachers, doctors, lawyers, and so on to determine the content of a report or article before deciding whether or not to read further. An abstract of a research report contains the extent, purpose, results, and conclusions that can be drawn from the research. An abstract of an article on literature usually contains the thesis, background, and conclusion of the story, novel, poem, or play.

In later chapters of this book, you will write summaries of essays, articles, or books, based on your own research.

PROCEDURE FOR SUMMARIZING AN ARTICLE

Here is a useful method for writing the summary of an article with many people or facts.

1. Make sure you understand the specifics of the topic. Read the title and subtitle of the original, for they often state or indicate the topic. Then read the whole work. As you read, decide what the author's position on the topic is, and what are the most important points made by the author. Underline or highlight these points. Look for the topic sentences of each paragraph (underline or highlight these as well), and pay special attention to their controlling ideas and claims. Take note of the introductory and concluding paragraphs of the work. Also, underline or highlight frequently repeated key words or phrases, as they probably represent main ideas of the work.
2. On a separate sheet of paper, organize the information in a chart. Include the title and author of the work (if these are provided), and write its thesis statement in your own words. Then present the main supporting points. You can write the controlling idea of each paragraph and some important supporting details in your chart:

Paragraph	Controlling idea	Support
Paragraph 1	Title, author, and thesis	
Paragraph 2	Controlling idea or claim	(Optional) Some supporting details
Paragraph 3	Central claim or point	(Optional) Some supporting details
And so on . . .		

*The length also depends on your goal in writing the summary. One type of summary, called a précis, is a single sentence that provides only the main idea of a piece of writing, a play, a movie, a novel, or a speech. A second type of summary, a synopsis, provides the outline of the plot of a novel or play. A synopsis gives the reader or viewer some background information before reading or viewing the performance.

3. Write the summary in your own words. Be objective: report only what the original has to say, and do not state any of your opinions or feelings.
4. Read over your summary and revise it, if necessary. Is it clear? Is it all in your own words, as it should be?

Writing Tip

Before you make the chart, do not look at the material you are going to summarize. Instead, list as many ideas as you can from memory. Then go back to it, see if you have omitted any ideas, and list these without looking at the material. Repeat this process as often as necessary until you have included all the important points.

PRACTICE 8 **Preparing to Write an Abstract**

Read the article. Underline the thesis statement and the topic sentences.

What Is a Heart Attack?

Everyone has heard the term "heart attack," but what exactly is it, and how does it happen? In order to answer these questions, we must first understand some basic physiology of the system that drives the heart. The heart is a muscle responsible for pumping the blood throughout the body. When the heart expands and contracts, blood flows out, carrying oxygen that is essential to the functioning of every muscle. However, since the heart is also a muscle, it too requires a steady supply of blood to its tissues, or the muscle will weaken or die (*World Book* 138).

Oxygen is delivered to the heart through blood vessels called the coronary arteries. Fat, calcium, and dead cells can form a waxy substance called plaque, which sticks to the interior of the arteries. This buildup results in either a narrowing or blockage of the arteries. If the arteries narrow too much, a clot can form, which decreases or shuts off the blood entering the heart. The result is a myocardial infarction or coronary thrombosis—in other words, a heart attack ("Coronary" and *Britannica* 465). However, not all clots affect the heart; a clot can travel to the brain and cause a stroke, which destroys part of the brain.

The main cause of the buildup of plaque is a substance called cholesterol, a waxy substance produced by the liver. Cholesterol cannot travel through the bloodstream by itself, but instead must combine with two types of proteins that carry it along. The first, high density protein or HDL—often called "good cholesterol"—actually removes cholesterol from the veins and arteries and returns it back to the liver, where it can be processed for distribution to the body. The second, low density protein or LDL—often called "bad cholesterol"—tends to stick to the walls of the veins and arteries and thus restricts or blocks the flow of blood (*World Book* 138). Although high amounts of LDL in the bloodstream may be hereditary, a healthy diet and exercise (along with certain kinds of drugs called statins) can lower its presence. Most people these days know that the other contributors to heart disease are obesity, smoking, and excessive consumption of hard drinks.

Sources:

1. Crawford, M.H. (2012) "Heart." *World Book Encyclopedia.*
2. Coronary Artery Disease: The ABCs of CAD. American Heart Association.
3. "Myocardial Infarction." *Encyclopedia Britannica.*

TRY IT OUT! Write a one-paragraph abstract of "What Is a Heart Attack?" and then compare your summary with a partner's. Use a chart to help you. The beginning of the summary is provided for you as an example.

According to "What Is a Heart Attack?", a heart attack is caused by a lack of oxygen reaching the heart muscle.

Applying Vocabulary: Using Irregular Plurals from Latin and Greek

Before you begin your writing assignment, review the irregular nouns you learned about on page 45. The assignment involves writing an essay about science, so you may include some of these nouns in your paper.

PRACTICE 9 **Selecting Singular and Plural Irregular Nouns**

Review the irregular nouns from Latin or Greek in Practice 1. Then complete each of the following sentences with the appropriate singular or plural noun.

1. The first step in the scientific method begins with the observation of a series of _____, or events.
2. A prediction that scientists test in an experiment is called a _____.
3. Scientists establish both a control and a variable group so that they have a _____ for comparing the results.
4. After the experiment is over, the scientists gather the _____.
5. The next step is to conduct one or more _____ of the information.
6. They may classify the information they receive using several _____.

WRITING ASSIGNMENT

In your assignment for this chapter, you will write a process essay that explains the steps in an imaginary experiment and reports on its results. Because you will not gather real data from your experiment, you will have to invent it. Your audience will be your classmates and instructor, not scientists. Assume that the essay you compose in the writing assignment is going to be published in a professional journal. Choose one of the topics and follow the steps in the writing process.

Topics

- Does a vegetarian diet cause tooth decay?
- Is water from one source safer to drink than water from another source?
- What brand of paper towels soaks up the most water?
- What cola is sweeter in a blind taste test?
- Does eating candy in a dark movie theater reduce the number of calories consumed?

STEP 1: Explore your topic, audience, and purpose.

- Brainstorm a list to explore your topic.
- Review the brainstorming list.
- Can you add more details, explanations, or examples? Should you eliminate any that are not relevant or important?
- Consider the audience for the essay. Who would be most interested in the essay's content? What would you expect them to do with the information?

STEP 2: Prewrite to get ideas.

- List any materials needed to complete the process. For example, if you choose to explain the steps in registering for classes, list the locations a student would need to know about.
- Freewrite to generate more ideas; let the words flow quickly as if you were speaking to the audience. Do not stop to revise, but underline sections you want to return to.

STEP 3: Organize your ideas.

- Now do the cutting and pasting from your freewriting.
- Then write a preliminary thesis statement.
- Prepare an outline of the steps involved to ensure that your organization makes sense.

STEP 4: Write the first draft.

- Include a thesis statement in the introduction that outlines or introduces the steps in the process.
- Discuss each step in a separate body paragraph. Use transitions to establish coherence.
- Conclude with a short summary of the process.

STEP 5: Revise the draft.

- Exchange papers with a partner, and give each other feedback on your papers. Use the Chapter 3 Peer Review on page 229 to guide your feedback.
- Carefully consider your partner's feedback. If you agree with it, revise your paper by marking the changes on the first draft.

STEP 6: Edit and proofread.

- Use the Chapter 3 Writer's Self-Check on page 230 to help you find and correct errors in grammar, mechanics, and sentence structure.

STEP 7: Write a new draft.

- Rewrite the draft, incorporating all the changes you made earlier.
- Proofread the draft so that it is error free. Are the sentences clear and complete? Are there no run-on or comma-spliced sentences? Are the irregular nouns used correctly?
- Make sure the draft is legible and follows the format your instructor has provided.
- Then examine your essay carefully and write a one-paragraph abstract of its contents.
- Hand in the essay and the abstract to your instructor.

SELF-ASSESSMENT

In this chapter, you learned to:

- ❍ Analyze a process essay
- ❍ Identify, plan, and organize the steps of process analysis
- ❍ Recognize and correct common sentence problems such as
  - ○ Run-on sentences
  - ○ Comma-spliced sentences
  - ○ Choppy sentences
  - ○ Stringy sentences
- ❍ Identify main ideas for writing a summary or abstract
- ❍ Write, edit, and revise an essay detailing an experiment

Which ones can you do well? Mark them ✓

Which ones do you need to practice more? Mark them ✗

EXPANSION

TIMED WRITING

In this expansion, you will write a one-paragraph summary of the writing model on pages 42–44. Your summary should not be more than five or six sentences. You will have 35 minutes. To complete the expansion, you will need to budget your time accordingly. Follow this procedure.

1. Reread the model essay and underline the main ideas. Look especially at the thesis statements and topic sentences. (10 minutes)
2. Make a quick outline to organize your ideas. (5 minutes)
3. Write a draft of the paragraph. Be sure to include a thesis statement and a good concluding sentence. (10 minutes)
4. Revise your paragraph to be sure your ideas are clear and well organized. (5 minutes)
5. Check your paragraph for errors. Correct any mistakes. (5 minutes)
6. Give your paper to your instructor.

WRITE A SCIENTIFIC PROCESS ESSAY

Return to the brainstorming lists you developed in Practice 6 on page 55. Choose one as the subject for a process essay. Make sure your introduction names the process and includes the goal of the essay, such as helping the reader understand the process or perform the process. In the body paragraphs, be sure to include all the steps in the process in sequential order. Write at least five paragraphs.

After you have finished the essay, write a two- or three-sentence abstract of the experiment and its results.