

SCENARIO

You've been working for a new mail order house for four months. The pay isn't great, but the stock options are promising. As part of your executive training program, you've been assigned to working in the returns department. After a few weeks there, you notice something that both troubles and amazes you. About 10 percent of the items are returned without a copy of the invoice. Instead, they come accompanied by handwritten notes that are often illegible and missing key information like addresses, making adjustments difficult, if not impossible.

You read a copy of the instructions that go out with your merchandise. There it is in black and white, clear instructions about returning the invoice with the merchandise: "Complete the return section on the back of the invoice and return in the package with your merchandise."

You take the instructions down to the line where workers sort the returns. Showing them to the supervisor, you ask, "What's wrong with people? Why can't they do a simple thing like return an invoice?"

She smiles. "What's an invoice?" she asks.

"Well, it's an itemized bill that comes with the merchandise," you answer.

"Suppose you didn't know that. What would you return?" she says. "Remember Murphy's law: What can go wrong, will go wrong."

You take her advice to heart. Obviously Murphy's law is in operation here. Your job is to minimize the number of things that "can go wrong."

You think of a solution and get management to try it. You start by ordering invoices printed on blue paper. Then you simplify the instruction a bit: "Fill in the return section on the back of the blue slip that came with your order, and put it in the package with the items you are returning."

After two months of using the blue invoices, you find that only 2 percent of returns do not have an invoice with them—not perfect, but much better. You wonder what else can be done.

If you want more help in defeating Murphy's law while writing instructions, read on in this chapter.

chapter 18

Instructions

Situational Analysis for Instructions

What Is the Purpose of My Instructions?

What Is My Reader's Point of View?
How and Where Will My Reader Use These Instructions?
What Content Does My Reader Really Need and Want?
How Should I Arrange My Content?
Possible Components of Instructions
Introduction
Theory or Principles of Operation
List of Equipment and Materials Needed
Description of the Mechanism
Warnings
How-To Instructions
Tips and Troubleshooting Procedures
Glossary
Accessible Format
Reader Checks

Instructing others to follow some procedure is a common task on the job. Sometimes the instructions are given orally. When the procedure is done by many people or is done repeatedly, however, written instructions are a better choice. Instructions may be quite simple—as in FIGURE 18-1—or exceedingly complex—comprising a shelfful of manuals. They may be highly technical—dealing with operating machinery or programming computers, for example. Or they may be executive- or business-oriented—for example, explaining how to complete a form or how to route memorandums through a company. The task of writing instructions is not to be taken lightly. A Shakespearean scholar who had also served in the British Army wrote the following:

The most effective elementary training [in writing] I ever received was not from masters at school but in composing daily orders and instructions as staff captain in charge of the administration of seventy-two miscellaneous military units. It is far easier to discuss Hamlet's complexes than to write orders which ensure that five working parties from five different units arrive at the right place at the right time equipped with the proper tools for the job. One soon learns that the most seemingly simple statement can bear two meanings and that when instructions are misunderstood the fault usually lies with the original order.¹

To help you write instructions, we discuss the following in this chapter: situational analysis for instructions, the possible components of instructions, creating an accessible format, and checking with your readers.

SITUATIONAL ANALYSIS FOR INSTRUCTIONS

In preparing to write instructions, follow the situational analysis we describe on pages 15–20 in Chapter 2, Composing. In addition, pay particular attention to the answers to these questions.²

What Is the Purpose of My Instructions?

Be quite specific about the purpose of your instructions. Keep your purpose in mind because it will guide you in choosing your content and in arranging and formatting that content. State your purpose in writing, like this:

To instruct the plant managers, the corporate treasurer, and the plant accountant in the steps they need to follow to establish a petty cash fund.

What Is My Reader's Point of View?

Don't be satisfied with a general description of a reader as "the average consumer" or "a typical car owner." You'll achieve more accurate insights if you put yourself in the place of someone you know who fits that general description. For example, if I were my mother, what would be my point of view if I had to follow these instructions on how to complete this form? What questions and problems might I have? In what order might these questions and problems arise? Are there terms and concepts involved that I might not understand? What information do I really need? What information would be irrelevant? And so forth.

How and Where Will My Reader Use These Instructions?

Will your reader read your instructions carefully from beginning to end? Evidence indicates that he or she will not. Readers most often scan instructions and then begin reading carefully at those points where they need clarification. In other words, typically, they read them as a reference work rather than as an essay or a novel. Where will my reader use these instructions? In a comfortable, well-lighted workshop, well stocked with tools? In a cold, drafty, ill-lighted garage with only those tools hastily grabbed from the workshop? In the cockpit of a boat under emergency conditions, reading by a flashlight? Standing in line in a government office? The answers to such questions will help you organize and format your instructions.

What Content Does My Reader Really Need and Want?

Understanding your purpose and your reader's point of view is essential for answering this question. You can include many kinds of information in a set of instructions: theory, descriptions of mechanisms, troubleshooting advice, and so forth. We discuss such information shortly (see Possible Components of Instructions). You should include everything that is really relevant and nothing that is not relevant. If your reader is someone who has a need or a desire for theory, then furnish it. If theory is not needed or desired, furnishing it would be wasted effort for all concerned. Unneeded material is worse than irrelevant. It may obscure the relevant information so that the reader has difficulty finding it.

How Should I Arrange My Content?

Answers to all the previous questions aid you in arrangement decisions. If a good deal of theory is important and needed, your arrangement should probably include a separate section for it. If only brief explanations of theory are needed for the reader to understand a few steps in the instructions, place the explanations with the steps. For example, you might put the whys and wherefores of using a carpenter's level at that point in the instructions that describes how to use the level.

In order to arrange the actual instructions on how to perform a process, you must, of course, understand the process fully. If you can perform the process, taking notes as you go, do so. If that is not possible or convenient, at least analyze the process in your mind. Break it into its major steps and substeps. Be alert for potential trouble spots for your reader.

POSSIBLE COMPONENTS OF INSTRUCTIONS

Sets of instructions may contain as many as eight components:

- Introduction
- Theory or Principles of Operation
- List of Equipment and Materials Needed
- Description of the Mechanism
- Warnings
- How -To Instructions
- Tips and Troubleshooting Procedures
- Glossary

We do not present this list as a rigid format. For example, you may find that you do not need a theory section, or you may include it as part of your introduction. You may want to vary the order of the sections. You may want to describe or list equipment as the reader needs it while performing the process rather than in a separate section. Often nothing more is needed than the how-to instructions. We describe the components of instructions primarily as a guide to your discovery of the material you will need.

Introduction

At a minimum, introductions to instructions state the purpose of the instructions and preview the contents. The following introduction from a student set of instructions does both, simply and efficiently:

The purpose of these instructions is to provide a training manual as well as a field reference for installing the Hybrid Touch/Sound System for Paskett's visually impaired customers. These instructions cover preparing

the customer's computer, installing the internal and external hardware, installing the software, testing, and cleaning up.³

Frequently, instructions may provide motivation for reading and following the instructions. They may also directly or indirectly indicate who the intended readers are. The following, from a publication concerning cholesterol, does all these things:

Intended audience

High blood cholesterol is a serious problem. Along with high blood pressure and cigarette smoking, it is one of the three major modifiable risk factors for coronary heart disease. Approximately 25 percent of the adult population 20 years of age and older has “high” blood cholesterol levels—levels that are high enough to need intensive medical attention. More than half of all adult Americans have a blood cholesterol level that is higher than “desirable.”

Motivation

Purpose of instructions

Because high blood cholesterol is a risk to your health, you need to take steps to lower your blood cholesterol level. The best way to do this is to make sure you eat foods that are low in saturated fat and cholesterol. The purpose of this brochure is to help you learn how to choose these foods. The brochure will also introduce you to key concepts about blood cholesterol and its relationship to your diet. For example, it includes basic (but very important) information about saturated fat—the dietary component most responsible for raising blood cholesterol—and about dietary cholesterol—the cholesterol contained in food.

Preview of contents

This brochure is divided in three parts. The first part of the brochure gives background information about high blood cholesterol and its relationship to heart disease. The second part introduces key points on diet changes and better food choices to lower blood cholesterol levels.

Finally, in the third part more specific instructions are given for modifying eating patterns to lower your blood cholesterol, choosing low-saturated fat and low-cholesterol foods, and preparing low-fat dishes.

Reference to glossary

The “Glossary” provides easy definitions of new or unfamiliar terms. The appendices that follow the Glossary list the saturated fat and cholesterol content of a variety of foods.⁴

This introduction begins with motivation, stating that high blood cholesterol is a serious problem and providing support for that statement. The audience for the brochure, adult Americans, is indicated in an indirect manner. The purpose is clearly stated: “The purpose of this brochure is to help you learn how to choose these foods [that are low in saturated fat and dietary cholesterol].” Following the statements of motivation and purpose, the introduction previews what is to come in the rest of the brochure and refers to the glossary.

Introductions to instructions, then, are often not much different from the introductions we describe for you in Report Format in Appendix B. Short sets of instructions, however, may have very abbreviated introductions or, in some cases, no introduction at all. On the other hand, when introductions are longer than the one we have shown you, it’s usually because the writers have chosen to include theory or principles of operation in the introduction. This is an accepted practice. We tell you how to give such information in the next section.

Theory or Principles of Operation

Many sets of instructions contain a section that deals with the theory or principles of operation that underlie the procedures explained. Sometimes historical background is also included. These sections may be called “Theory” or “Principles of Operation,” or they may have substantive titles such as “Color Dos and Don’ts,” “Purpose and Use of Conditioners,” or “Basic Forage Blower Operation.” Information about theory may be presented for several reasons. Some people have a natural curiosity about the principles behind a procedure. Others may need to know the purpose and use of the procedure. The good TV repair technician wants to know why turning the vertical control knob steadies the picture. Understanding the purposes behind simple adjustments enables the technician to investigate complex problems. What if nothing happens when the vertical control knob is turned? The technician with a theoretical background will know more readily where to look in the TV set to find a malfunction.

Theory sections do not need to be long or complicated. The following, from the student instructions on the Hybrid Touch/Sound System, explains the purpose of the system and outlines how it operates. It does a particularly good job in relating theory to the how-to instructions that will follow:

The Hybrid Touch/Sound System components and software convert a standard system to make that system available to visually impaired users while leaving the system available to sighted users. The system is comprised of separate touch systems and sound systems. Each can be installed without the other and still function. These instructions provide information for installing each system separately as well as together.

The Touch components and software allow a blind user to “see” the contents of the screen via Braille. This is accomplished by converting virtual visual output to a basic format, which is then transmitted to the Braille Board. The Sound components and software allocate the necessary storage space and memory to house and use the reading software. It also reconFIGUREs the sound card to allow the user to give verbal commands to the computer. The software will control the system reconfigurations, and therefore the hardware components must be installed before the software.⁵

Sometimes a graphic can be used to cover theory, as in FIGURE 18-2.

Theory sections can be more complex as well. FIGURE 18-3 presents a portion of the theory section from the cholesterol brochure. It describes the relationship between cholesterol and atherosclerosis—that is, hardening of the arteries. Understanding the theory helps readers understand the guidelines for cholesterol levels set out in the rest of the section and motivates them to follow the guidelines. The entire section is written on a very personal level: What does this theory mean for the reader? Through the use of a simple format, graphics, questions, and plain language, the writers of the brochure make the theory quite accessible for the intended audience.

The theory section shown in FIGURE 18-3 uses some unfamiliar terms, such as *atherosclerosis*, which are defined in the glossary mentioned in the last paragraph of the introduction. However, the authors would have done their readers a kindness by mentioning the glossary again the first time it is needed and giving its page numbers. Remember to direct your readers. Locating a glossary for them is a good example of such direction.

As our excerpts illustrate, many diverse items of information can be placed in a theory or principles section. Remember, however, that the major purpose of the section is to emphasize the principles that underlie the actions later described in the how-to instructions. In this section, you’re telling your readers *why*. Later, you’ll tell them *how*. Theory is important, but don’t get carried away with it. Experts in a process sometimes develop this section at too great a length, burying their readers under information the readers don’t need and obscuring more important information that they do need. Make this section, if you include it at all, only as full and as complex as your analysis of purpose and readers demands.

List of Equipment and Materials Needed

In a list of equipment and materials, you tell your readers what they will need to accomplish the process. A simple example would be the list of cooking utensils and ingredients that precede a recipe. Sometimes if the audience is knowledgeable, the list of equipment is not used. Instead the instructions tell the readers what equipment they need as they need it: “Take a rubber mallet and tap the hubcap to be sure it’s secure.” However, skip the list of equipment only if you

are sure the technicians for whom the instructions are intended are working in a well-equipped shop or routinely carry the necessary tools with them. When a list is used, each item is mentioned by name, perhaps in tabular form. The list from our student instructions in FIGURE 18-4 uses side-by-side boxes of bulleted items to list the equipment and materials the technicians will need. Notice the caution about using demagnetized tools. Such cautions and warnings are common in instructions, and we say more about them later. Sometimes, however, your audience analysis may indicate that more information than a simple list is needed. You may want, for instance, to define and describe the tools and equipment needed, as shown in FIGURE 18-5. If you think your readers are really unfamiliar with the tools or equipment being used, you may even give instruction in its use. If the equipment cannot be obtained easily, you'll do your readers a service by telling them where they can find the hard-to-get items. As always, your audience analysis determines the amount and kind of information presented.

Description of the Mechanism

Instructions devoted to the operation and maintenance of a specific mechanism usually include a section describing the mechanism. Similarly, if a mechanism is central in some process, it is frequently described. In such sections, follow the principles for technical description given on pages 192–194. Break the mechanism into its component parts, and describe how they function.

For example, springs can be developed as domestic water supplies through the use of a mechanism called a spring encasement. The following description, accompanied by the drawing in FIGURE 18-6, breaks a spring encasement into its component parts, describes the function of each part, suggests materials for the parts, and shows how the parts work together:

Spring encasements have six major components:

1. A system of perforated pipes to collect the water. Polyvinylchloride and cast-iron are common choices for all needed pipes.
2. A tank of reinforced concrete to store the collected water.
3. A heavy, cast-iron cover with lock to keep surface drainage and debris out of the storage tank.
4. A drain to clean out and empty the storage tank.
5. A pipe to allow for overflow.
6. A connection to the distribution system.

When spring encasements are built on a slope, upslope from the collection system they should also have a surface-water diversion ditch and a cutoff wall of impermeable clay to control the water table around the tank.⁶

Mechanism descriptions are generally accompanied by numerous illustrations like those in FIGURES 18-6–18-8. Such illustrations show only necessary detail and, to be effective, normally have to be well annotated. Some, like FIGURE 18-8, are exploded views. We hasten to add that in this context *exploded* means that the mechanism is drawn in such a way that its component parts are separated and thus easier to identify. FIGURE 18-8 makes the concept clear.

Warnings

We live in an age of litigation. People who hurt themselves or damage their equipment when following instructions in the use of that equipment frequently sue for damages. If they can prove to a court's satisfaction that they were not sufficiently warned of the dangers involved, they will collect large sums of money. Because of this, warnings have become an increasingly important part of instructions.

How seriously do corporations take this need to warn people of possible dangers? We recently saw a shoe box that contained boating shoes. The box was decorated with an oceanographic chart. On the side of the box was a warning stating that, "this chart is not intended to be used as a navigational aid and is not reliable for that purpose."⁷ FIGURE 18-9 shows that a device as simple to operate as an electric can opener comes with a set of warnings.

If they are extensive enough, the warnings may be put into a separate section, as they are in FIGURE 18-9. But often they are embedded in the how-to instructions. In either case, be sure they are prominently displayed in some manner that makes them obvious to the reader. You may surround them with boxes, print them in type different from and larger than the surrounding text, print them in a striking color, or mark them with a symbol of some sort. Frequently, you will use some combination of these devices.

Not only must you make the warnings stand out typographically, you must use language and, when appropriate, graphics that make the nature, severity, and consequences of the hazards involved absolutely clear. You must clearly state how to avoid the hazards. Any lack of clarity can result in a preventable accident, almost certainly followed by a costly lawsuit against your employer or your client. No terminology is completely agreed upon for warnings. However, three levels of warning have been widely accepted, designated by the words *caution*, *warning*, and *danger*.⁸

Caution Use the word *caution* to alert the reader that not following the instructions exactly may lead to a wrong or inappropriate result. A caution is used when no danger to people or equipment is involved. FIGURE 18-10 shows how a caution might be used to advise a technician to follow the steps of a procedure in proper order. Sometimes, *note* is used for this level of warning.

Warning Use the word *warning* to alert the reader to faulty procedures that might cause minor-to-moderate personal injury or damage to equipment, as in the warning from a compact disc player manual shown in FIGURE 18-11.

The exclamation point inside the triangle in FIGURE 18-11 is a commonly accepted symbol, used to attract the reader's attention and to stress the importance of the message. You will see it used on all three levels of warnings.

Danger Use the word *danger* for the highest level of warning: a warning to prevent major personal injury or death. Obviously, you must make danger messages stand out typographically and write them with utter clarity. FIGURE 18-12 presents a good example.

How-To Instructions

The actual instructions on how to carry out the procedure or operate the mechanism obviously lie at the heart of any set of instructions. The same general principles apply to all how-to instructions.

Style When writing how-to instructions, one of your major goals is to use a clear, understandable style. To write your instructions from the reader's point of view, use the active voice and imperative mood. The imperative mood is normal and acceptable in instructions. It's clear and precise and will not offend the reader. The instructions in FIGURE 18-13 illustrate the style.

By using the format shown in FIGURE 18-14, you can use the imperative mood even when several people with distinct tasks have to carry out the procedure. In the format shown, the headings in the left-hand column identify the responsible actor, allowing the imperative mood to be used in the right-hand column. It's an efficient system. (For more on the active voice and imperative mood, see pages 197–198.)

Most sets of how-to instructions use a list format. The list may use numbers, bullets or simply white space to keep the step distinct. Each step usually contains only one instruction and, at the most, two or three closely related instructions. Besides keeping each step distinct from other steps, listing has several other advantages as well.

- It makes it obvious how many steps there are.
- It makes it easy for readers to find their place on the page.
- It allows the reader to use the how-to instructions as a checklist.

Use familiar, direct language, and avoid jargon. Tell your readers to *check* or *look over* equipment before or during use. Don't tell them to *conduct an investigation*. Tell your readers to use a wrench, not to *utilize* one. Fill your instructions with readily recognized verbs such as *adjust, attach, bend, cap, center, close, drain, install, lock, replace, spin, turn, and wrap*. For more on good style, see Chapter 5, Achieving a Readable Style.

If your how-to instructions call for calculations, include sample calculations to clarify them for the reader. As in this example:

For a pesticide that is diluted with water, proportionally change the quantity of pesticide, the quantity of water, and the area, volume, or number of items treated. For example, one-half pound of pesticide in 1 gallon of water applied to 1,000 square feet is equivalent to 1 pound of pesticide in 2 gallons of water applied to 2,000 square feet.⁹

To further help readers with their calculations, the author provides the table reproduced in FIGURE 18-15.

Graphics Be generous with graphics. Word descriptions and graphics often complement each other. The words tell *what* action is to be done. The graphics show *where* it is to be done, and they often also show *how*. Our samples demonstrate well the relationship between words and graphics. Graphics are often annotated to allow for easy reference to them, as in FIGURE 18-16.

Arrangement When writing performance instructions, arrange the process being described into as many major routines and subroutines as needed. For example, a set of instructions for the overhaul and repair of a piece of machinery might be broken down as follows:

- Disassembly of major components
- Disassembly of components
- Cleaning
- Inspection
- Lubrication
- Repair
- Reassembly of components
- Testing of components
- Reassembly of major components

Notice that the steps are in chronological order as are most how to instructions.

If steps are repeated, it's sometimes a legitimate practice to tell the reader to "repeat steps 2, 3, and 4." But whether you do so depends on your analysis of the reader's situation. Visualize your reader. Maybe he or she will be perched atop a shaky ladder, your instructions in one hand, a tool in the other. Under such circumstances, the reader will not want to be flipping pages around to find the instructions that need to be repeated. You will be wiser and kinder to print, once again, all the instructions of the sequence. But, if the reader will be working in a comfortable place with both feet on the ground, you will probably be safe enough saying, "Repeat steps"

Such reader and situation analysis can help you make many similar decisions. Suppose, for example, that your readers are not expert technicians, and the process you are describing calls for them to use simple test equipment. In such a situation, you should include the instructions for operating the test equipment as part of the routine you're describing. On the other hand, suppose your readers are experienced technicians following your instructions at a comfortable workbench, with a well-stocked library of manuals nearby. Then you can assume that they know how to operate any needed test equipment, or you can refer them to another manual that describes how to operate the test equipment.

For the most part, instructions have no conclusions. They simply end with the last instruction. On occasion, particularly when writing for a general audience, you might wish to close with a summary of the chief steps of the process or, perhaps, a graceful close (see page 632). However, such endings are not general practice.

Tips and Troubleshooting Procedures

Many sets of instructions contain sections that either give the reader helpful tips on how to do a better job or provide guidance when trouble occurs.

Tips You may present tips in a separate section, as illustrated in FIGURE 18-17. Or, just as likely, you may incorporate them into the how-to instructions, as in the following excerpt on setting flexible tile. In the excerpt, the last sentences in instructions 1, 2, 3, and 5 give the reader tips that should make the tasks go more easily:

1. Remove loose or damaged tile. A warm iron will help soften the adhesive.
2. Scrape off the old adhesive from the floor or wall. Also from the tile if you're to use it again.
3. Fit tiles carefully. Some tile can be cut with a knife or shears, others with a saw. Tile is less apt to break if it's warm.
4. Spread adhesive on the floor or wall with a paint brush or putty knife.
5. Wait until adhesive begins to set before placing the tile. Press tile on firmly. A rolling pin works well.¹⁰

Troubleshooting Procedures You may incorporate troubleshooting procedures into your how-to instructions, as in this excerpt:

Tighten screws in the hinges. If screws are not holding, replace them one at a time with a longer screw. Or insert a matchstick in the hole and put the old screw back.¹¹

Perhaps more often, troubleshooting procedures will be in a section of their own, as in FIGURE 18-18, which illustrates a typical format, a three-column chart with headings such as "Problem," "Probable Cause," and "Solution." The solutions are given as instructions in the active voice, imperative mood.

Glossary

If your audience analysis tells you that your reader may not comprehend all the terminology you plan to use in your instructions, you'll need to provide definitions. If you need only a few definitions, you can define terms as you use them.

If you must provide many definitions, you'll probably want to provide a glossary as a separate section. See pages 185–188, where we discuss definitions, and page 188, where we discuss glossaries.

ACCESSIBLE FORMAT

Your major goal in setting up your format in instructions should be to make the information accessible for your readers.

The theory section shown in FIGURE 18-3 demonstrates excellent accessibility. The type is large and readable, and the format is especially helpful for those readers who may scan the document. The headings standing apart to the left of the print allow the reader to scan quickly, looking for points of interest. Also, headings phrased as questions are more likely to arrest the attention of scanning readers and draw them into reading the text. Curiosity is put to work—they may want to know the answers to the questions.

In FIGURE 18-3, the graphic of the narrowed artery and the table showing cholesterol levels highlight the two key points in the section. The scanning reader who stops only long enough to absorb the information in the two graphics will at least learn the principal danger of high cholesterol and what a desirable cholesterol level is.

Look now at FIGURE 18-19, a government document intended to instruct readers in how to file a form to establish their relationship with “alien relatives” who may wish to immigrate to the United States. The document is an example of inaccessible format: Both the headings and the print are small. The page is cluttered and intimidating. The headings are not worded in a way that leads readers to the information they seek. Terms such as *Eligibility*, *Documents previously submitted*, and *Documents in general*, while meaningful to the person who wrote them, probably would not be helpful to the typical reader of these instructions. The format violates most of the principles discussed in Chapter 11, Document Design. Furthermore, the style of the instructions violates most of the principles discussed in Chapter 5, Achieving a Readable Style.

Now look at FIGURE 18-20, which is the same document after it has been revised and given a new format to make it accessible. Certain things are immediately obvious. The print is bigger, and there is more white space. The headings are more meaningful and informative. They are phrased from the reader’s point of view and are stated as questions that someone approaching this process might reasonably ask: “Who can file?” and “For whom can you file?” have replaced “Eligibility.” Such new headings lead and inform readers rather than confusing them. The format and style of the instructions are now readable, showing a knowledge and application of the principles discussed in Chapters 5 and 11. The result is a readable document.

Finally, when a set of instructions runs more than several pages, you should furnish a table of contents (TOC) to help your readers find their way and to provide an overview of the instructions. The headings in the TOC should duplicate those in the instructions. (See pages 614–615.)

READER CHECKS

When you’re writing instructions, check frequently with the people who are going to use them. Bring them a sample of your theory section and discuss it with them.

See if they understand it. Does it contain too much theory, or too little? Submit your how-to instructions to the acid test. Let members of the audience for whom the instructions are intended—but who are not familiar with the process—attempt to perform the process by following your instructions. Encourage them to tell you where your instructions are confusing. A procedure called protocol analysis can be a help at this point. In protocol analysis, you ask the person following your instructions to speak into a tape recorder, giving his or her observations about the instructions while attempting to follow them. Here is an excerpt from a set of such observations made by someone trying to use a computer manual and on-line help to aid him in a word processing exercise:

Somehow I've got the caps locked in here. I can't get to the lower case. OK, I'm struggling with trying to come off those capitals. I'm not having any luck. So, what do I need to do? I could press help. See if that gets me anything. Using the keyboard. I'll try that. 2.0. I can't do that because it's in this mode. I'm getting upper case on the numbers, so I can't type in the help numbers. So I'll reset to get rid of that. Big problem. Try reset. Merging text, formatting, setting margins, fixing problems. I can't enter a section number because I can't get this thing off lock. Escape. Nothing helps. Well, I'm having trouble here.¹²

Such information pinpoints troublesome areas in instructions. If you were writing instructions that were to be used by many people, it would be a worthwhile investment of time and money to conduct a protocol analysis. In any case, regardless of whether you use protocol analysis, if your readers can't follow your instructions, don't blame them. Rather, examine the instructions to see where you have failed. Often, you will find you have left out some vital link in the process or assumed knowledge on the part of your readers that they do not possess.

PLANNING AND REVISION CHECKLISTS

You will find the planning and revision checklists that follow Chapter 2, Composing, and Chapter 4, Writing for Your Readers, valuable in planning and revising any presentation of technical information. The following questions specifically apply to instructions. They summarize the key points in this chapter and provide a checklist for planning and revising.

Planning

- What is the purpose of your instructions?
- What is your reader's point of view?
- How and where will your readers use these instructions?
- What content does your reader really need and want?

- How should you arrange your content? Which of the following components should you include as a separate section? Which should you omit or include within another component (for example, theory in the introduction)?

Introduction

Theory or principles of operation: How much theory do your readers really need or want?

List of equipment and materials needed: Are your readers familiar with all the needed equipment and material? Do they need additional information?

Description of the mechanism: Does some mechanism play a significant role in these instructions?

Warnings: Are there expected outcomes that will be affected by improper procedure? Are there places in the instructions where improper procedure will cause damage to equipment or injury or death to people?

How-to instructions: Can your instructions be divided into routines and subroutines? What is the proper sequence of events for your how-to instructions?

Tips and troubleshooting procedures: Are there helpful hints you can pass on to the reader? What troubles may come up? How can they be corrected?

Glossary: Do you have to define enough terms to justify a glossary?

- What graphics will help your instructions? Do you have them available, or can you produce them?

Revision

- Have you made the purpose of your instructions clear to your readers?
- Can your readers scan your instructions easily and find what they need?
- Do you have sufficient headings? Do your headings stand out? Are they meaningful to your readers? Would it help to cast some as questions?
- Is all terminology that may be unfamiliar to the reader defined somewhere?
- Is your print size large enough for your readers to read comfortably, given their likely location?
- Is all your content relevant? Do your readers need or want it? Have you made it easy for your readers to skim and to skip parts not relevant to them?
- Have you covered any needed theory adequately?
- Do your readers know what equipment and material they will need? Do they know how to use the equipment needed? If not, have you provided necessary explanations?
- Have you provided any necessary descriptions of mechanisms?
- Are your caution, warning, and danger messages easy to see and clear in their meaning? Are you sure you have alerted your readers to every situation in which they might injure themselves or damage their equipment?
- Have you broken your how-to instructions into as many routines and subroutines as necessary?

- Are your steps in chronological order, with no steps out of sequence?
- Are your how-to instructions written in the active voice, imperative mood?
- Have you used a list format, with short entries for each step of the instructions?
- Have you used simple, direct language and avoided jargon?
- If necessary, have you provided sample calculations?
- Have you used graphics whenever they would be helpful? Are they sufficiently annotated?
- Have you provided tips that may help your readers to do the task more efficiently?
- Have you anticipated trouble and provided troubleshooting procedures?
- If troubleshooting procedures appear in a separate section, is the section laid out in a way that clearly distinguishes problem, cause, and remedy?
- Do you have enough definitions to warrant a glossary?
- Are your instructions long enough to warrant a table of contents?
- Have you checked with your readers? Have you asked a typical reader to attempt to carry out the procedure using your instructions? Have you corrected any difficulties that such a check revealed?
- Have you checked thoroughly to eliminate any misspellings and mechanical errors?

EXERCISES

1. Writing instructions offers a wide range of possible papers. Short papers might consist of nothing more than an introduction and a set of how-to instructions. Examples—good and bad—of such short instructions can be found in hobby kits and accompanying such things as toys, tents, and furniture that must be put together. Textbook laboratory procedures frequently exemplify short sets of instructions. Using the Planning and Revision Checklists for this chapter, write a short set of instructions. Here are some possible subjects:
 - Developing film
 - Drawing a blood sample
 - Applying fertilizer
 - Setting a bicycle gear
 - Completing a form
 - Accomplishing some do-it-yourself task around a house
 - Replacing a part in an automobile or some other mechanism
 - Cleaning a carpet
 - Balancing a checkbook
 - Writing or following a computer program
2. Using the Planning and Revision Checklists for this chapter, write a set of instructions that includes at least six of the eight possible components listed on page 506. The components do not have to be in separate sections, but

they must be clearly recognizable for what they are. Here are some suggested topics:

- Testing electronic equipment
 - Setting up an accounting procedure for a small business
 - Conducting an agronomy field test
 - Checking blood pressure
 - Painting an automobile
 - Setting up a Web site
3. The instructions for emergency disinfection in FIGURE 18-21 are usable in their current form, but they could be greatly improved. In a collaborative group, examine and discuss the instructions. Using the Revision Checklist for this chapter, decide on ways to improve them. At the end of the discussion, each member of the group should individually prepare a revision. Provide some typographical variation to make the instructions more accessible.
 4. Divide the class into groups of five to seven. The instructor will supply each group with a toy building set, such as Lincoln Logs, Legos, Power Pack Motor Sets, Command-A-Bot, or Robot World. Using the set provided, each group will design and build a working mechanism and then write instructions for operating the device to perform some function. The instructions must include at least six of the eight components listed on page 506. The components do not have to be in separate sections, but they must be clearly recognizable for what they are.¹³

FIGURE 18-1 • Simple Instructions

Source: Reprinted with permission of Block Drug Company, Inc. © Block Drug Company, Inc., 1990.

FIGURE 18-2 • Theory in a Graphic

Source: Department of Energy, *Emf in the Workplace* (Washington, DC: DOE, 1996), 7.

FIGURE 18-3 • Theory Section

Source: U.S. Department of Health and Human Services, *Eating to Lower Your Blood Cholesterol* (Washington, DC: GPO, 1989), 2–3.

FIGURE 18-4 • Equipment and Materials List

Source: Dwayne Isbell, *Hybrid Touch/Sound System Installation*. Reprinted by permission of the author.

FIGURE 18-5 • List of Tools

Source: U.S. Department of Agriculture, *Simple Home Repairs: Outside* (Washington, DC: GPO, 1986), 4.

FIGURE 18-6 • Spring Encasement

Source: Environmental Protection Agency, *Manual of Individual and Non-Public Water Supply Systems* (Washington, DC: GPO, 1991), 70.

FIGURE 18-7 • Pumphouse

Source: U.S. Environmental Protection Agency, *Manual of Individual and Non-Public Water Supply Systems* (Washington, DC: GPO, 1991), 121.

FIGURE 18-8 • Exploded View of Submersible Pump

Source: U.S. Environment Protection Agency, *Manual of Individual and Non-Public Water Supply Systems* (Washington, DC: GPO, 1991), 101.

FIGURE 18-9 • Warning Section

Source: Reprinted by permission of Underwriters Laboratories, Northbrook, IL.

FIGURE 18-10 • A Caution Message

FIGURE 18-11 • A Warning Message

FIGURE 18-12 • A Danger Message

Source: Dwayne Isbell, *Hybrid Touch/Sound System Installation*. Reprinted by permission of the author.

FIGURE 18-13 • Imperative Mood Instructions

Source: Dwayne Isbell, *Hybrid Touch/Sound System Installation*. Reprinted by permission of the author.

FIGURE 18-14 • Standard Operating Procedures

Source: Reprinted by permission of Deluxe Check Printers, Inc.

FIGURE 18-15 • Table to Assist Calculations

Source: U.S. Environmental Protection Agency, *Citizen's Guide to Pesticides* (Washington, D.C.: GPO, 1991), 8.

FIGURE 18-16 • An Annotated Graphic

Source: Department of Energy, *Solar Water Heating* (Washington, DC: DOE, 1996), 3.

FIGURE 18-17 • Tips

Source: U.S. Department of Health and Human Services, *Eating to Lower Your Cholesterol* (Washington, DC: GPO, 1989), 23–24.

FIGURE 18-18 • Troubleshooting Chart

Source: Dwayne Isbell, *Hybrid Touch/Sound System Installation*. Reprinted by permission of the author.

FIGURE 18-19 • Government Instructions before Revision

FIGURE 18-20 • Revised Government Instructions

FIGURE 18-21 • Instructions for Emergency Procedures

Source: U.S. Environmental Protection Agency, *Manual of Individual and Non-Public Water Supply Systems* (Washington, DC: GPO, 1991), 173–74.