

With a parallel hybrid electric vehicle, both the engine and the electric motor generate the power that drives the wheels. The addition of computer controls and a transmission allow these components to work together. This is the technology in the Insight, Civic, and Accord hybrids from Honda. Honda calls it their Integrated Motor Assist (IMA) technology. . . . Since the engine is connected directly to the wheels in this setup, it eliminates the inefficiency of converting mechanical power to electricity and back, which makes these hybrids quite efficient on the highway. Yet the same direct connection between the engine and the wheels that increases highway efficiency compared to a series hybrid does reduce, but not eliminate, the city driving efficiency benefits (i.e., the engine operates inefficiently in stop-and-go driving because it is forced to meet the associated widely varying power demands).

#### **Series/Parallel Drivetrains**

This drivetrain merges the advantages and complications of the parallel and series drivetrains. By combining the two designs, the engine can both drive the wheels directly (as in the parallel drivetrain) and be effectively disconnected from the wheels so that only the electric motor powers the wheels (as in the series drivetrain). The Toyota Prius has made this concept popular, and a similar technology is also in the new Ford Escape Hybrid. As a result of this dual drivetrain, the engine operates at near optimum efficiency more often. . . .

#### **Conclusion**

Knowing what's under the hood of hybrid electric vehicles will help you evaluate the available choices in the market. Considering most major auto manufacturers plan to release HEVs in the next few years, you'll be ready to choose the right one for you. Enjoy driving into the future.

**FIGURE 20.4**  
(continued)

This section of the description ends with a brief conclusion.

**FIGURE 20.4** Excerpt from a Mechanism Description (continued)

## Writing Instructions

This section discusses *instructions*, which are process descriptions written to help readers perform a specific task—for instance, installing a water heater in a house.

Although written instructions are still produced today, the growth of social media has radically changed how organizations instruct people on how to use their products and services. Now that technology has made it easy for people to participate in writing instructions and to view and make videos, most organizations try to present instructional material not only as formal written instructions but also through discussion boards, wikis, and videos. And users do not rely exclusively on the organizations themselves to create and present instructions. Rather, they create their own text and videos.

Most organizations do not see this participation as a threat. A 2012 survey of more than 500 organizations (Abel, 2013) suggests that organizations are

### FIGURE 20.5 Specifications

Source: Logitech, 2012: [http://logitech-en-amr.custhelp.com/app/answers/detail/a\\_id/33976/~logitech-ue-9000-wireless-headphones-technical-specifications](http://logitech-en-amr.custhelp.com/app/answers/detail/a_id/33976/~logitech-ue-9000-wireless-headphones-technical-specifications). Used with permission of Logitech.

An important kind of description is called a *specification*. A typical specification (or spec) consists of a graphic and a set of statistics about the device and its performance characteristics. Specifications help readers understand the capabilities of an item. You will see specifications on devices as small as transistors and as large as aircraft carriers.

Because this web-based spec sheet accompanies a consumer product, the arrangement of the specs is geared toward the interests of the likely purchasers. The audio specs are presented before the power specs because potential purchasers of high-end headphones will be most interested in the sound quality.

## WRITING DEFINITIONS, DESCRIPTIONS, AND INSTRUCTIONS

### Logitech UE 9000 Wireless Headphones Technical Specifications



#### Logitech UE 9000 Wireless Headphones

	Model Number (MN)	PID - MN - S/N Location
Headphones	A-00041	MN, P/N: On headband behind left ear cup PID: On headband behind right ear cup

NOTE: Information is for reference only and may be subject to change.

General Product Information		[Compliance Certification (CE) Link]
Warranty / Self Help	Please see the product support page for warranty information and frequently asked questions.	
Category	Headphones	
Intended Usage	iPod, iPhone, iPad, Smartphones, Tablet PC, Portable MP3/media players	
Software Support (at release)	No software needed.	

#### Headset/Headphones Specifications

Available Image(s)				
Device Type	Stereo			
Connection Type	Wireless (USB for charging only)			
Headband Design	Over-the-head, Over-the-ear			
Frequency Response	20 Hz to 20 kHz			
Input Impedance	55 Ohms; 2K Ohms (with active noise cancellation enabled)			
Indicator Lights (LED)	Power and battery			
Adjustable Headband	Yes			
Inline Audio Controls	Play/Pause, Volume control, Multi-function			
Earcup Audio Controls	Volume control, Power On/Off, Multi-function, Push to talk			
Battery Details	Rechargeable, Non-accessible Size: Proprietary Quantity: 1 Type: Li-Ion			
Battery Life	Recharge time: 3.5 hours (estimated) Discharge time: Up to 10 hours			
Power Adapter	Yes (5w, 500mA)			
Cable Length	6 feet or 1.8 meters			
Microphone	Yes			
Microphone Specifications				
Microphone Type	Built-in			
Connection Type	Wireless			
Noise Cancelling	No			
Frequency Response	100 Hz to 3.5 kHz			
Input Sensitivity	Not available			

#### Product Dimensions

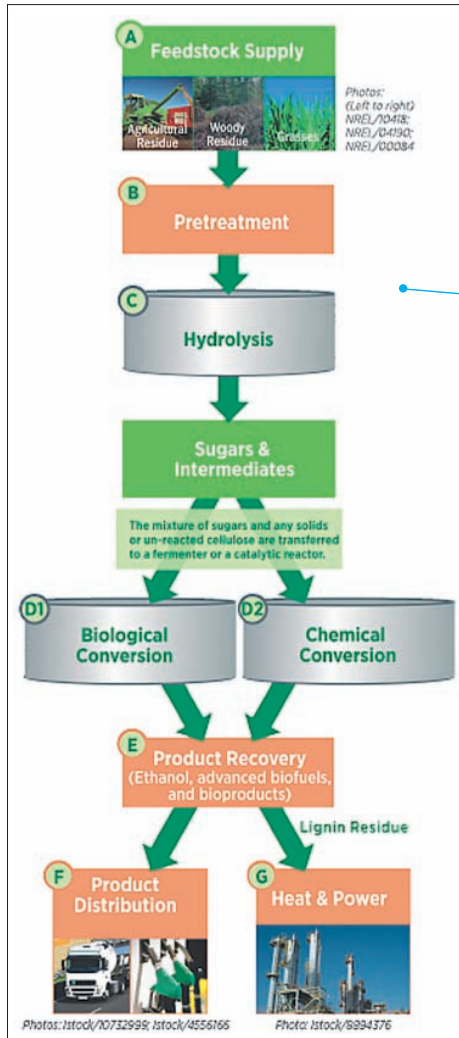
Product component	Width	Depth/Length	Height	Weight
Headphones	170 mm (6.7 inch)	90 mm (3.5 inch)	190 mm (7.5 inch)	330 g (11.6 ounce)

#### Package Contents

Available Image(s)	
What is in the box	Headphones, 3.5mm audio cable, Case, User documentation, 1/4-inch adapter jack, USB AC adapter, Micro-fiber polishing cloth

#### Additional Product Information

- Wireless Bluetooth headphones with microphone.
- Optional 3.5mm connection available with microphone and remote (Apple-specific) included.
- Controls on right ear cup = volume, multi-function, power/bluetooth.
- Controls on left ear cup = push-to-talk, allows user to have face to face conversations without removing headphones using external microphones.
- Control functions designed for Apple products but other devices may have limited functionality.
- Can connect to PC/Mac w/ bluetooth radios.



Biochemical conversion uses biocatalysts, such as enzymes, in addition to heat and other chemicals, to convert the carbohydrate portion of the biomass (hemicellulose and cellulose) into an intermediate sugar stream. These sugars are intermediate building blocks that can then be fermented or chemically catalyzed into ethanol, other advanced biofuels, and value-added chemicals. The overall process can be broken into the following essential steps:

**A. Feedstock Supply:**

Feedstocks for biochemical processes are selected for optimum composition, quality, and size. Feedstock handling systems tailored to biochemical processing are essential to cost-effective, high-yield operations.

**B. Pretreatment:** Biomass is heated (often combined with an acid or base) to break the tough, fibrous cell walls down and make the cellulose easier to hydrolyze (see next step).

**C. Hydrolysis:** Enzymes (or other catalysts) enable the sugars in the pretreated material to be separated and released over a period of several days.

**D1. Biological Conversion:**

Microorganisms are added, which then use the sugars to generate other molecules suitable for use as fuels or building-block chemicals.

**D2. Chemical Conversion:** Alternatively, the sugars can be converted to fuels or an entire suite of other useful products using chemical catalysis.

**E. Product Recovery:** Products are separated from water, solvents, and any residual solids.

**F. Product Distribution:** Fuels are transported to blending facilities, while other products and intermediates may be sent to traditional refineries or processing facilities for use in a diverse slate of consumer products.

**G. Heat & Power:** The remaining lignin solids are mostly lignin, which can be burned for heat and power.

**FIGURE 20.6 An Effective Process Description**

Source: U.S. Department of Energy, 2013: [www1.eere.energy.gov/bioenergy/pdfs/biochemical\\_four\\_pager.pdf](http://www1.eere.energy.gov/bioenergy/pdfs/biochemical_four_pager.pdf).

This description begins with an overview of the process of biochemical conversion: the process of using fermentation and catalysis to make fuels and products.

The description includes a flowchart explaining the major steps in the process. The designers included photographs to add visual interest to the flowchart.

The lettered steps in the flowchart correspond to the textual descriptions of the steps in the process.

Most of the description is written in the passive voice (such as "Feedstocks for biochemical processes are selected . . ."). The passive voice is appropriate because the focus of this process description is on what happens to the materials, not on what a person does. By contrast, in a set of instructions the focus is on what a person does.

**WRITING DEFINITIONS, DESCRIPTIONS, AND INSTRUCTIONS**

trying to take advantage of it. Among the major survey findings are the following four:

- more than half of the respondents provide an online support community based around discussion boards
- 46 percent of respondents provide opportunities for users to share feedback and rank the company's instructional material
- 20 percent of respondents let users create or edit instructions through wikis
- 10 percent of respondents report that their users are creating their own instructions and support forums, without the support of the respondents

Your first job, then, in presenting instructions is to devise a strategy for incorporating user participation in the process and to choose the best mix of media for encouraging that participation. Written instructions (whether presented online or printed and put in the box with the product) will always have a role because they are portable and can include as much detail as necessary for even the most complex tasks and systems. But consider whether your users will also benefit from access to other people's ideas (in a discussion board or wiki) or from watching a video.

**UNDERSTANDING THE ROLE OF INSTRUCTIONAL VIDEOS**

The explosive growth of YouTube and other video-hosting sites has revolutionized how instructions are created and used. Product manufacturers and users alike make videos to help people understand how to perform tasks.

If you are producing instructional videos on behalf of your company, think about what style of video will be most effective for your audience, purpose, and subject. Companies often use simple, cartoon-style videos for basic conceptual information ("what can you do with a microblog?"), screenshot-based videos for computer-based tasks ("how to use master slides in PowerPoint"), and live-action videos for physical tasks ("how to install a ground-fault interrupter").

Video is particularly useful for communicating about physical tasks that call for subtle physical movements or that involve both sight and sound. For instance, a video would be more effective than written instructions in communicating how a guitarist uses the tremolo bar to create different sonic effects. The viewer can focus on the way the guitarist holds his or her hand on the tremolo and on the range of movement that he or she uses. In addition, the viewer can hear how these physical actions change the sound.

Although there are many software tools available for making videos, making professional-quality videos calls for professional skills, experience, and tools. If you are going to be making many videos, it makes sense to learn the process and acquire professional tools and equipment; otherwise, consult your company's media department or consider hiring freelance video producers. They can help you create videos that reflect positively on your organization.

Instructional videos tend to be brief. Whereas a reader of a document can navigate easily among various parts or steps, viewers of a video can only

hit play, pause, and stop. For this reason, you should break long tasks into a series of brief videos: ideally 2–3 minutes, but no more than 12–15 minutes. Give each one a clear, specific title so viewers can easily tell whether they want to view it.

Similarly, you should make your instructional videos simple and uncluttered. Software makes it easy to add a lot of cinematic effects, but less is often more. Your purpose is not to win an Academy Award; it is to help your audience learn how to carry out a task. The fewer distractions in the video, the easier it will be for viewers to see what to do. And remember that video is a warm medium. Connect with the viewer by being friendly, informal, and direct. Don't say, "Next, the right mouse button is pushed." Say, "Press the right mouse button." But do not confuse being warm and informal with not needing to prepare. You *do* need to plan, write a script, and rehearse.

Be sure to build in the time and resources to revise the video. As discussed in Chapter 13, good technical communication calls for reviewing, revising, and testing. This concept applies to video. Start testing even before production. Make sure your script and visuals are right for your audience and purpose. And repeat the process after you have created the rough cut of the video and after each major revision.

Use other sources responsibly. You need to obtain written permission to use any copyrighted text, images, videos, or music that will appear in your video. Because this process can be lengthy, difficult, and expensive, many organizations have a simple standing rule: do not use any copyrighted material. Instead, they generate their own images and text, and even their own music.

## DESIGNING A SET OF WRITTEN INSTRUCTIONS

As you plan to write instructions, think about how readers will use them. Analyzing your audience and purpose and gathering and organizing your information will help you decide whether you should write a one-page set of instructions or a longer document that needs to be bound. You might realize that the information would work better as a web-based document that can include videos, be updated periodically, and provide readers with links to the information they need. Or you might decide to write several versions of the information: a brief paper-based set of instructions and a longer, web-based document with links.

As always in technical communication, imagining how readers will use what you write will help you plan your document. For example, having decided that your audience, purpose, and subject call for a printed set of instructions of perhaps 1,000 words and a dozen drawings and photographs, you can start to design the document. You will need to consider your resources, especially your budget: long documents cost more than short ones; color costs more than black and white; heavy paper costs more than light paper; secure bindings cost more than staples.

*For more about usability testing, see Ch. 13, p. 348.*

*For more about planning, see Ch. 3.*



## WRITING DEFINITIONS, DESCRIPTIONS, AND INSTRUCTIONS

Designing a set of instructions is much like designing any other kind of technical document. As discussed in Chapter 11, you want to create a document that is attractive and easy to use. When you design a set of instructions, you need to consider a number of issues related to document design and page design:

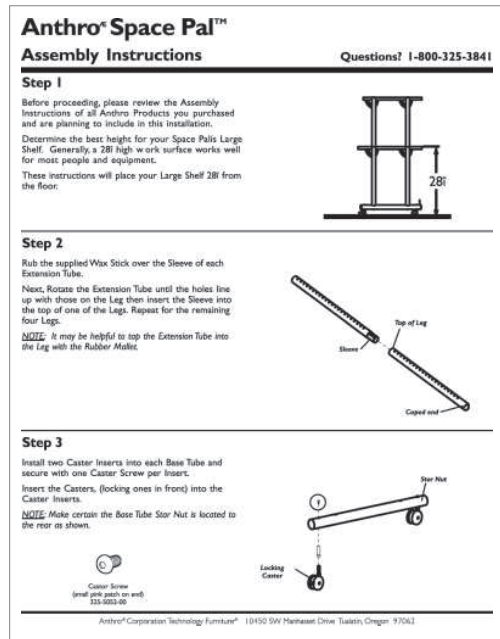
- **What are your readers' expectations?** For a simple, inexpensive product, such as a light switch, readers will expect to find instructions written on the back of the package or printed in black and white on a small sheet of paper folded inside the package. For an expensive consumer product, such as a high-definition TV, readers will expect to find instructions in a more sophisticated full-color document printed on high-quality paper.
- **Do you need to create more than one set of instructions for different audiences?** If you are writing about a complex device such as an electronic thermostat, you might decide to create one set of instructions for electricians (who will install and maintain the device) and one set for homeowners (who will operate the device). In addition to producing paper copies of the documents, you might want to post them on the Internet, along with a brief video of the tasks you describe.
- **What languages should you use?** In most countries, several languages are spoken. You might decide to include instructions in two or more languages. Doing so will help you communicate better with more people, and it can help you avoid legal problems. In liability cases, U.S. courts sometimes find that if a company knows that many of its customers speak only Spanish, for example, the instructions should appear in Spanish as well as in English. You have two choices for presenting information in multiple languages: simultaneous presentation or sequential presentation. In a *simultaneous design*, you might use a multi-column page on which one column presents the graphics, another presents the text in English, and another presents the text in Spanish. Obviously, this won't work if you need to present information in more than two or three languages. But it is efficient because you present each graphic only once. In a *sequential design*, you present all the information in English (say, on pages 1–8), then all the information in Spanish (on pages 9–16). The sequential design is easier for readers to use because they are not distracted by text in other languages, but you will have to present the graphics more than once, which will make the instructions longer.
- **Will readers be anxious about the information?** If readers will find the information intimidating, make the design unintimidating. For instance, if you are writing for general readers about how to set up a wireless network for home computers, create open pages with a lot of white space and graphics. Use large type and narrow text columns so that each page contains a relatively small amount of information. Figure 20.7 illustrates the advantages of an open design.
- **Will the environment in which the instructions are read affect the document design?** If people will be using the instructions outdoors, you will need to use a coated paper that can tolerate moisture or dirt. If people will be reading the instructions while sitting in a small, enclosed area, you might

select a small paper size and a binding that allows the reader to fold the pages over to save space. If people have a lot of room, you might decide to create poster-size instructions that can be taped to the wall and that are easy to read from across the room.



**a. Cluttered design**

*This page is cluttered, containing far too much information. In addition, the page is not chunked effectively. As a result, the reader's eyes don't know where to focus. Would you look forward to using these instructions to assemble a cabinet?*  
Reprinted by permission of Slide-Lok.



**b. Attractive design**

*This page is well designed, containing an appropriate amount of information presented in a simple two-column format. Notice the effective use of white space and the horizontal rules separating the steps.*  
Reprinted by permission of Anthro Corporation.

**FIGURE 20.7**  
**Cluttered and Attractive Page Designs in a Set of Instructions**

**GUIDELINES Designing Clear, Attractive Pages**

To design pages that are clear and attractive, follow these two guidelines:

- ▶ **Create an open, airy design.** Do not squeeze too much information onto the page. Build in space for wide margins and effective line spacing, use large type, and chunk the information effectively.
- ▶ **Clearly relate the graphics to the text.** In the step-by-step portion of a set of instructions, present graphics to accompany every step or almost every step. Create a design that makes it clear which graphics go with each text passage. One easy way to do this is to use a table, with the graphics in one column and the text in the other. A horizontal rule or extra line spacing separates the text and graphics for one step from the text and graphics for the next step.

*For more about chunking, see Ch. 11, p. 260.*

## PLANNING FOR SAFETY

If the subject you are writing about involves safety risks, your most important responsibility is to do everything you can to ensure your readers' safety.

### ETHICS NOTE

#### ENSURING YOUR READERS' SAFETY

To a large extent, the best way to keep your readers safe is to be honest and write clearly. If readers will encounter safety risks, explain what those risks are and how to minimize them. Doing so is a question of rights. Readers have a right to the best information they can get.

Ensuring your readers' safety is also a question of law. People who get hurt can sue the company that made the product or provided the service. As discussed in Chapter 2, this field of law is called *liability law*. Your company is likely to have legal professionals on staff or on retainer whose job is to ensure that the company is not responsible for putting people at unnecessary risk.

When you write safety information, be clear and concise. Avoid complicated sentences.

**COMPLICATED** It is required that safety glasses be worn when inside this laboratory.

**SIMPLE** You must wear safety glasses in this laboratory.

**SIMPLE** Wear safety glasses in this laboratory.




Sometimes a phrase works better than a sentence: “Safety Glasses Required.”

Because a typical manual or set of instructions can contain dozens of comments—some related to safety and some not—experts have devised *signal words* to indicate the seriousness of the advice. Unfortunately, signal words are not used consistently. For instance, the American National Standards Institute (ANSI) and the U.S. military's MILSPEC publish definitions that differ significantly, and many private companies have their own definitions. Figure 20.8 presents the four most commonly used signal words. The first three signal words are accompanied by symbols showing the color combinations endorsed by ANSI in its standard Z535.4.

Whether safety information is printed in a document or on machinery or equipment, it should be prominent and easy to read. Many organizations use visual symbols to represent levels of danger, but these symbols are not standardized.

Organizations that create products that are used only in the United States design safety information to conform with standards published by ANSI and by the federal Occupational Safety and Health Administration (OSHA). Organizations that create products that are also used outside the United States design safety information to conform with standards published by the International Organization for Standardization (ISO). Figure 20.9 shows a safety label that incorporates both ANSI and ISO standards.



SIGNAL WORD	EXPLANATION	EXAMPLE
<p><i>Danger</i></p> 	<p><i>Danger</i> is used to alert readers about an immediate and serious hazard that will likely be fatal. Writers often use all uppercase letters for danger statements.</p>	<p>DANGER: EXTREMELY HIGH VOLTAGE. STAND BACK.</p>
<p><i>Warning</i></p> 	<p><i>Warning</i> is used to alert readers about the potential for serious injury or death or serious damage to equipment. Writers often use all uppercase letters for warning statements.</p>	<p>WARNING: TO PREVENT SERIOUS INJURY TO YOUR ARMS AND HANDS, YOU MUST MAKE SURE THE ARM RESTRAINTS ARE IN PLACE BEFORE OPERATING THIS MACHINE.</p>
<p><i>Caution</i></p> 	<p><i>Caution</i> is used to alert readers about the potential for anything from moderate injury to serious equipment damage or destruction.</p>	<p>Caution: Do not use nonrechargeable batteries in this charging unit; they could damage the charging unit.</p>
<p><i>Note</i></p>	<p><i>Note</i> is used for a tip or suggestion to help readers carry out a procedure successfully.</p>	<p>Note: Two kinds of washers are provided—regular washers and locking washers. Be sure to use the locking washers here.</p>

**FIGURE 20.8** Signal Words

Part of planning for safety is determining the best location for safety information. This question has no easy answer because you cannot control how your audience reads your document. Be conservative: put safety information wherever you think the reader is likely to see it, and don't be afraid to repeat yourself. A reasonable amount of repetition—such as including the same safety comment at the top of each page—is effective. But don't repeat the same piece of advice in each of 20 steps, because readers will stop paying attention to it. If your company's format for instructions calls for a safety section near the beginning of the document, place the information there and repeat it just before the appropriate step in the step-by-step section.

Figure 20.10 shows one industry association's guidelines for placing safety information on conveyor belts.

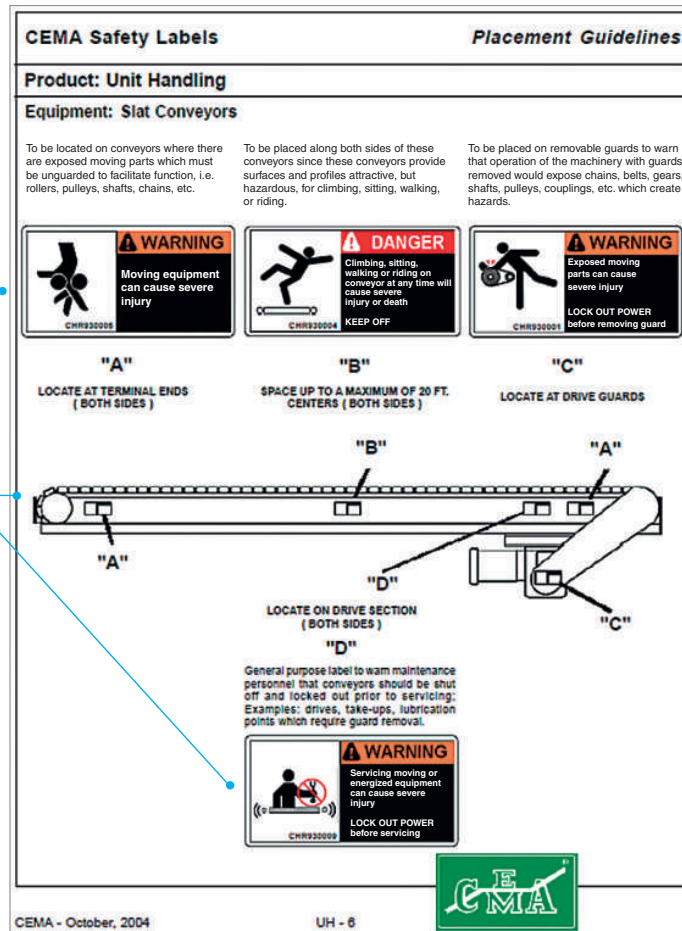


**FIGURE 20.9** A Typical Safety Label

Source: Clarion Safety Systems, 2013: [www.clarionsafety.com/Electrical-Hazard-Safety-Labels](http://www.clarionsafety.com/Electrical-Hazard-Safety-Labels).

The yellow triangle on the left is consistent with the ISO approach. Because ISO creates standards for international use, its safety labels use icons, not words, to represent safety hazards.

The signal word "Danger" and the text are consistent with the ANSI approach. The information is presented in English.



This page shows the four safety labels that the industry association recommends for use on conveyor belts.

The diagram of the conveyor belt shows where the organization recommends placing the safety labels.

**FIGURE 20.10 Placement of Safety Information on Equipment**

Source: Conveyor Equipment Manufacturers Association, 2004. Reprinted by permission of Conveyor Equipment Manufacturers Association.

## DRAFTING EFFECTIVE INSTRUCTIONS

Instructions can be brief (a small sheet of paper) or extensive (20 pages or more). Brief instructions might be produced by a writer, a graphic artist, and a subject-matter expert. Longer instructions might call for the assistance of others, such as marketing and legal personnel.

Regardless of the size of the project, most instructions are organized like process descriptions. The main difference is that the conclusion of a set of instructions is not a summary but an explanation of how readers can make sure they have followed the instructions correctly. Most sets of instructions

contain four elements: a title, a general introduction, step-by-step instructions, and a conclusion.

**Drafting Titles** A good title for instructions is simple and clear. Two forms are common:

- **How-to.** This is the simplest: “How to Install the J112 Shock Absorber.”
- **Gerund.** The gerund form of a verb is the *-ing* form: “Installing the J112 Shock Absorber.”

One form to avoid is the noun string, which is awkward and difficult for readers to understand: “J112 Shock Absorber Installation Instructions.”

*For more about noun strings, see Ch. 10, p. 235.*

**Drafting General Introductions** The general introduction provides the preliminary information that readers will need to follow the instructions safely and easily.

## GUIDELINES Drafting Introductions for Instructions

Every set of instructions is unique and therefore calls for a different introduction. Consider answering the following six questions, as appropriate:

- ▶ **Who should carry out this task?** Sometimes you need to identify or describe the person or persons who are to carry out a task. Aircraft maintenance, for example, may be performed only by those certified to do it.
- ▶ **Why should the reader carry out this task?** Sometimes the reason is obvious: you don’t need to explain why a backyard barbecue grill should be assembled. But you do need to explain the rationale for many tasks, such as changing anti-freeze in a car’s radiator.
- ▶ **When should the reader carry out this task?** Some tasks, such as rotating tires or planting seeds, need to be performed at particular times or at particular intervals.
- ▶ **What safety measures or other concerns should the reader understand?** In addition to the safety measures that apply to the whole task, mention any tips that will make the job easier:
 

NOTE: For ease of assembly, leave all nuts loose. Give only three or four complete turns on bolt threads.
- ▶ **What items will the reader need?** List necessary tools, materials, and equipment so that readers will not have to interrupt their work to hunt for something. If you think readers might not be able to identify these items easily, include drawings next to the names.
- ▶ **How long will the task take?** Consider stating how long the task will take readers with no experience, some experience, and a lot of experience.

*For more about graphics, see Ch. 12.*

**Drafting Step-by-Step Instructions** The heart of a set of instructions is the step-by-step information.

## GUIDELINES Drafting Steps in Instructions

Follow these six suggestions for writing steps that are easy to understand.

- ▶ **Number the instructions.** For long, complex instructions, use two-level numbering, such as a decimal system:

```

1
  1.1
  1.2
2
  2.1
  2.2
etc.

```

If you need to present a long list of steps, group the steps logically into sets and begin each set with a clear heading. A list of 50 steps, for example, could be divided into 6 sets of 8 or 9 steps each.

- ▶ **Present the right amount of information in each step.** Each step should define a single task the reader can carry out easily, without having to refer back to the instructions.

TOO MUCH INFORMATION

1. Mix one part cement with one part water, using the trowel. When the mixture is a thick consistency without any lumps bigger than a marble, place a strip of the mixture about 1" high and 1" wide along the face of the brick.

TOO LITTLE INFORMATION

1. Pick up the trowel.

RIGHT AMOUNT OF INFORMATION

1. Mix one part cement with one part water, using the trowel, until the mixture is a thick consistency without any lumps bigger than a marble.
2. Place a strip of the mixture about 1" high and 1" wide along the face of the brick.

- ▶ **Use the imperative mood.** The imperative mood expresses a request or a command—for example, "Attach the red wire." The imperative is more direct and economical than the indicative mood ("You should attach the red wire" or "The operator should attach the red wire"). Avoid the passive voice ("The red wire is attached"), because it can be ambiguous: is the red wire already attached?
- ▶ **Do not confuse steps and feedback statements.** A *step* is an action that the reader is to perform. A *feedback statement* describes an event that occurs in response to a step. For instance, a step might read "Insert the disk in the drive." That step's feedback statement might read "The system will now update your user information." Do not present a feedback statement as a numbered step. Present

For more about the imperative mood and the passive voice, see Ch. 10, pp. 230 and 231.

(continued)

it as part of the step to which it refers. Some writers give all feedback statements their own design.

- ▶ **Include graphics.** When appropriate, add a photograph or a drawing to show the reader what to do. Some activities—such as adding two drops of a reagent to a mixture—do not need an illustration, but they might be clarified by a chart or a table.
- ▶ **Do not omit articles (*a, an, the*) to save space.** Omitting articles can make the instructions unclear and hard to read. In the sentence “Locate midpoint and draw line,” for example, the reader cannot tell if “draw line” is a noun (as in “locate the draw line”) or a verb and its object (as in “draw a line”).

**Drafting Conclusions** Instructions often conclude by stating that the reader has now completed the task or by describing what the reader should do next. For example:

Now that you have replaced the glass and applied the glazing compound, let the window sit for at least five days so that the glazing can cure. Then, prime and paint the window.

Some conclusions end with *maintenance tips* or a *troubleshooting guide*. A troubleshooting guide, usually presented as a table, identifies common problems and explains how to solve them.

## REVISING, EDITING, AND PROOFREADING INSTRUCTIONS

You know, of course, to revise, edit, and proofread all the documents you write to make sure they are honest, clear, accurate, comprehensive, accessible, concise, professional in appearance, and correct. When you write instructions, you should be extra careful, for two reasons.

First, your readers rely on your instructions to carry out a task. If they can't complete it—or they do complete it, but they don't achieve the expected outcome—they'll be unhappy. Nobody likes to spend a few hours assembling a garage-door opener, only to find half a dozen parts left over. Second, your readers rely on you to help them complete the task safely. To prevent injuries and liability actions, build time into the budget to revise, edit, and proofread the instructions carefully. Then, if you can, carry out usability testing on the instructions.

*For more about usability testing, see Ch. 13, pp. 348–53.*

## A LOOK AT SEVERAL SAMPLE SETS OF INSTRUCTIONS

Figure 20.11 is an excerpt from a set of instructions. Figure 20.12 on page 565 shows a list of tools and materials from a set of instructions. Figure 20.13 on page 566 is an excerpt from the safety information in a set of instructions. Figure 20.14 on page 567 is a portion of the troubleshooting guide in the instructions for a lawnmower. Figure 20.15 on page 567 is an excerpt from a thread in a discussion board.



This page from the user's manual for a tablet computer used in health-care environments discusses how to use the barcode scanner.

Note that the writer uses a gerund (-ing phrase) in the major heading to describe the action ("Using the barcode scanner").

The writer explains why readers might want to scan barcodes.

The writer lists the types of barcodes the tablet can scan and then explains how to enable the tablet to scan additional types. Note that the more conceptual information about the task precedes the instructional information. Why? Because readers want to understand the big picture before getting into the details.

The writer presents the steps. Note that the writer numbers the steps and uses the imperative mood for each one.

The drawing helps readers understand how to hold the tablet and aim it at the barcode. In cases such as this, simple drawings work better than photographs because they do not distract readers with unnecessary detail.

## Using the barcode scanner

Your C5te/F5te is available with an optional integrated 1D and 2D barcode scanner that you can use to retrieve information from barcodes. Many applications use barcodes for asset tracking, identification, and process controls.

### Supported barcode types

The C5te/F5te barcode scanner supports several different types of barcodes—a minimum set of barcodes is enabled at the factory.

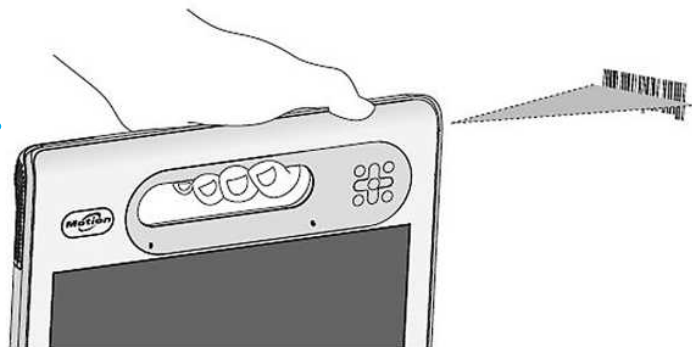
The following symbologies are enabled by default:

- Aztec Code
- EAN-128
- Code 39
- UPC-A
- EAN-8
- Interleaved 2 of 5
- Micro PDF417
- RSS Limited
- Code 128
- EAN-UCC-CC-AB
- DataMatrix
- UPC-E
- EAN-13
- PDF417
- RSS-14

Other barcode types can be enabled by using EasySet® by Intermec. This application can be installed by running **setup**, which is located here: **C:\Motion\Software\EasySet**.

#### To use the barcode scanner:

1. Open the application that you want to receive the barcode data and place the insertion point in the appropriate field.
2. Hold the unit by the handle with the scanner lens in front of you.
3. Aim the scanner lens at the barcode.



**FIGURE 20.11** Excerpt from a Set of Instructions

Source: Motion Computing, 2013: [http://www.motioncomputing.com/downloads/User\\_Docs/C5F5-Series/C5teF5te-UserGuide\\_Win8\\_EN.pdf](http://www.motioncomputing.com/downloads/User_Docs/C5F5-Series/C5teF5te-UserGuide_Win8_EN.pdf). Courtesy Motion Computing.

## Installation Instructions

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### PREPARE TO INSTALL THE RANGE

**FOR YOUR SAFETY:**


All rough-in and spacing dimensions must be met for safe use of your range. Electricity to the range can be disconnected at the outlet without moving the range if the outlet is in the preferred location (remove lower drawer).

To reduce the risk of burns or fire when reaching over hot surface elements, cabinet storage space above the cooktop should be avoided. If cabinet storage space is to be provided above the cooktop, the risk can be reduced by installing a range hood that sticks out at least 5" beyond the front of the cabinets. Cabinets installed above a cooktop must be no deeper than 13".


Be sure your appliance is properly installed and grounded by a qualified technician.

Make sure the cabinets and wall coverings around the range can withstand the temperatures (up to 200°F.) generated by the range.


**MATERIALS YOU MAY NEED**



Tin Snips




Lag Bolts




Anchor Sleeves

(For Anti-Tip Bracket Mounted on Concrete Floors Only)




(UL Approved 40 AMP)  
4-Wire Cord OR 3-Wire Cord  
4' Long 4' Long



Squeeze Connector  
(For Conduit Installations Only)

**PARTS INCLUDED**



Anti-Tip Bracket Kit

**1 REMOVE SHIPPING MATERIALS**

Remove packaging materials. Failure to remove packaging materials could result in damage to the appliance.

**TOOLS YOU WILL NEED**

 Drill with 1/8" Bit	 Safety Glasses
 Adjustable Wrench	 Tape Measure
 Pliers	 Pencil
 1/4" Nut Driver	 Level
 Phillips Screwdriver	 Flat-blade Screwdriver

Drawings of tools, materials, and parts are more effective than lists.

**FIGURE 20.12** List of Tools and Materials

Courtesy of General Electric Corporation.

**FIGURE 20.13** Excerpt from Safety Information

This excerpt from a user manual for a video-game player that displays 3D images describes two of the safety risks associated with playing video games.

Notice that the excerpt uses mandatory language: "You **must** . . ." Although politeness is desirable most of the time, you don't want to sound as if you were making suggestions or asking readers to do you favors. For instance, if a task calls for using safety goggles, do not write "You should consider wearing safety goggles." Instead, write "You must wear safety goggles when operating this equipment."

This set of safety information defines the keywords *warning*, *caution*, and *important*.

The safety information goes on to discuss eyestrain and motion sickness, repetitive motion injuries, and radio frequency interference.

## WRITING DEFINITIONS, DESCRIPTIONS, AND INSTRUCTIONS




### HEALTH AND SAFETY INFORMATION


- You **must** read the following warnings before you set up or use the Orion 35 3D game system. If young children will be using this product, a competent adult **must** read and explain this safety information to them. Otherwise, these children could be injured.

Also, you **must** carefully read the instruction booklet for the game you are playing to learn additional health and safety information.

In this manual, you will see this symbol  followed by WARNING, CAUTION, or IMPORTANT.

Here is what these three words mean:

-  **WARNING** Describes an action that could lead to a serious personal injury or death.
-  **CAUTION** Describes an action that could lead to personal injury or damage to the Orion 35 3D game system, games, or accessories.
-  **IMPORTANT** Describes an action that could lead to damage to the Orion 35 3D game system, games, or accessories.

 **WARNING** The 3D Feature May Be Used Only by Children 7 and Older  
Children age 6 or younger who watch 3D images can suffer vision damage. You must use the Parental Control feature (see page 36) to prevent the system from displaying 3D images when children 6 or younger are using the system.

 **WARNING** Seizures

For a small percentage of people (approximately 1 in 4000), light flashes and patterns can cause seizures or blackouts. TV programs and videos can include these light flashes and patterns.

Anybody who has ever had a seizure, loss of awareness, or any other symptom linked to epilepsy **must** check with a physician before playing any video game.

Always watch your children when they play video games. Stop the game and consult a physician if your child has any of the following symptoms:

- Convulsions
- Eye or muscle twitching
- Loss of awareness
- Altered vision
- Involuntary movements
- Disorientation

To reduce the chance that you or a child will have a seizure while playing video games:

1. Sit or stand as far as possible from the screen.
2. Play the game on the smallest screen that is available.
3. Do not play any video game if you are tired.
4. Keep the room well-lit.
5. Every hour, take a break for 10 or 15 minutes.

PROBLEM	CAUSE	CORRECTION
The mower does not start.	<ol style="list-style-type: none"> <li>1. The mower is out of gas.</li> <li>2. The gas is stale.</li> <li>3. The spark plug wire is disconnected from the spark plug.</li> </ol>	<ol style="list-style-type: none"> <li>1. Fill the gas tank.</li> <li>2. Drain the tank and refill it with fresh gas.</li> <li>3. Connect the wire to the plug.</li> </ol>
The mower loses power.	<ol style="list-style-type: none"> <li>1. The grass is too high.</li> <li>2. The air cleaner is dirty.</li> <li>3. There is a buildup of grass, leaves, or trash in the underside of the mower housing.</li> </ol>	<ol style="list-style-type: none"> <li>1. Set the mower to a "higher cut" position. See page 10.</li> <li>2. Replace the air cleaner. See page 11.</li> <li>3. Disconnect the spark plug wire, attach it to the retainer post, and clean the underside of the mower housing. See page 8.</li> </ol>

**FIGURE 20.14** Excerpt from a Troubleshooting Guide

Original post from a user:  
 I am having difficulty printing TIFF files from a Microsoft program onto 11 x 17 sized paper to my WC 5335 [a Xerox printer]. When I print my file it will print only the 8 1/2 x 11 image on the 11 x 17 paper. I want the image to fill up the whole 11 x 17 page. When I print I select fit to size, but I still get the same thing. Has anyone ever experienced this situation? Does anybody have any tips on how I can resolve this issue? Thanks.

Reply from the Xerox representative monitoring the forum:  
 Thank you for using the Support Forum. Please take a look at this [solution for printing to 11 x 17 sized paper](#) and see if it relates to your issue. If this does not help please consider contacting your [support centre](#) for further assistance.

Thanks.

Response from a second user:  
 Yup indeed, I agree. And I also want to share you some information about TIFF: TIFF, originally called [Tagged Image File Format](#), is a computer file format for storing images, including photographs, line art among graphic artists, the publishing industry, and both amateur and professional photographers in general.

TIFF format is supported widely in industry image processing applications, such as Photoshop (Adobe), GIMP (Jasc), PhotoImpact and Paint Shop Pro (Ulead) and Desktop publishing & Page Layout applications, like QuarkXPress and Adobe InDesign. Other applications, like scanning, faxing, word processing, OCR and more applications also support TIFF format. You can choose a TIFF processing SDK whose way of processing is simple and fast to process TIFF files. I am testing with the related SDKs. I hope we can have some communication later. Good luck.

Response from a third user:  
 Thanks for sharing, that's awesome but somewhat overpriced for me who will just use it only once. Do you have some cheaper or even free versions? Any suggestion will be appreciated!

Response from a fourth user:  
 I suggest you have a look at Gimp; it's open source and free.

This excerpt from a user-support group on the Xerox website shows the way many organizations collaborate with their customers to help solve customer problems.

In the original post, a customer explains a problem he or she is having printing a TIFF file with a Xerox printer.

The Xerox representative, who monitors the user forum, directs the customer to the company's statement that is intended to solve the user's problem.

A second user recommends the Xerox representative's reply and presents additional information about TIFF files. Notice in the last sentence that he or she offers to try to stay in touch with the customer who asked the original question.

A third user, who is experiencing the same problem that the first user wrote about, expresses appreciation for the second user's suggestions but raises a concern about the cost of the alternatives he or she describes.

A fourth user responds by pointing out that GIMP, one of the alternatives listed by the second user, is a free program.

**FIGURE 20.15** Excerpts from a Thread in a Customer-Support Forum

Many companies use customer forums as an efficient and effective way to help their users solve problems. Although the forums can be messy—and sometimes users write nasty things about the company—companies realize that letting users participate greatly increases the chances that they will find solutions to their problems. Source: Xerox Corporation, 2013: <http://forum.support.xerox.com/t5/Printing/TIFF-files/td-p/21986>. Used by permission of Xerox Corporation.