

CHAPTER 21: INSTRUCTIONS

Chapter outline

- Planning
- Organizing
- Testing and revising

Depending on your project, you may need to write instructions for users to build, operate, fix, or maintain your design. For example, a toy designed for children with disabilities might include instructions for assembling, cleaning, storing, and safely using the toy. In addition, you may find it useful to write informal instructions for teammates to help them complete different tasks.

It's wise to draft instructions early because doing so can help you figure out specifications and uncover problems with a design. In addition, you may need to draft instructions for users who will test design mockups.

21.1 PLANNING

As with all technical writing, keep in mind the purpose, audience, and tone when writing instructions.

21.1.1 Purpose

Think of your purpose as defining the task or tasks that users will be able to perform as a result of reading the instructions, and state this purpose in the introduction. For instance, here's the first sentence of a set of instructions: "These instructions will lead you through the process of safely and efficiently setting up the wheelchair ramp for Northshore Opera Company performances."

When instructions explain more than one major task, the introduction should state the multiple purposes. Here's an example from the instructions written to accompany a design for a footrest attachment to a highchair: "In these instructions, you will learn how to attach the footrest safely and securely, adjust it according to the child's height, and detach it for cleaning."

Notice how the multiple purposes are described in grammatically parallel phrases (a series of verbs).

21.1.2 Audience

Before you write your instructions, ask yourself:

- Who is the audience?
 - How experienced are they with this kind of procedure?
 - Are they familiar with the technical terms and equipment referred to in the instructions?
 - What will their attitude be as they begin using the instructions?
- Will the audience use the instructions independently or will they first be trained and then use the instructions as a reference?
- Can the audience use the instructions either spread out on a surface or held in their hand? Will the audience be performing the procedure alone or with the help of someone else?
- Will the instructions be in the form of a hard copy or an electronic document? (In the Apollo XIII project, the instructions had to be delivered orally.)

21.1.3 Tone

You will need to use a variety of tones in different parts of the instructions.

- Use command statements to present the steps: “Insert bolt A into hole 3.”
- Use a neutral, straightforward tone to state the purpose of the instructions or of individual steps. Sometimes these statements are written in third-person: “At this point, the three rods should form an equilateral triangle.” Sometimes, particularly in the introductory sections, instructions address the reader in second person (referring to the reader as “you”): “Depending on the amount of space available, you can store the ramp safely either in an upright or flat position.”
- State warnings using a tone of urgency and explain the reason for the warning. Note: while it is fine to put WARNING or CAUTION in all capital letters, don’t use all caps for text in the warning. Doing so will make your text harder to read. Here is an example of an effective warning:

WARNING: Make sure all four bolts are securely tightened. Failure to do so may result in the ramp collapsing and causing serious injury to someone on or near it.

These guidelines for tone apply to most circumstances, but be prepared to alter the tone to fit your audience. For example, a team designing a device for a child with disabilities used a friendlier, more informal tone than is typically found in instructions.

21.2 ORGANIZING

Organizing instructions might seem simple: you might think that all you need to do is give steps in sequential order. Unfortunately, readers are likely to get lost if they must follow a long list of steps or if there are too many actions in one step. They'll also get lost if they can't visualize the end result of the instructions. Well-organized instructions give the big picture first. Then they group actions into logical units and divide actions into discrete steps.

Here's a typical structure for instructions:

1. title
2. introduction
3. materials and equipment
4. theory of operation
5. directions
6. troubleshooting

Here's what you might include in these sections to make the instructions easy to use.

21.2.1 Title

Use a title that indicates this is a set of instructions for performing a specific process. Instead of "Wheelchair Ramp," write "Setup Instructions for Northshore Opera Company Wheelchair Ramp."

21.2.2 Introduction

Consider these questions when writing your introduction:

- What precisely will these instructions show readers how to do? People appreciate knowing the purpose first, as illustrated in the example about the wheelchair ramp: "These instructions will lead you through the process of safely and efficiently setting up the wheelchair ramp for Northshore Opera Company performances."
- What major steps will the instructions cover? The wheelchair ramp instructions might include this statement:

The instructions are divided into the following sections:

- Connecting the ramp sections
 - Connecting the handrails
 - Adjusting the supports
 - Checking connections and adjustments
 - Disassembling the ramp
 - Storing the ramp
- What level of experience and background knowledge do the instructions assume readers have? If your instructions assume specialized knowledge or experience, say so in the introduction. For example, instructions for a device to test the physical mobility of stroke victims might include this statement: “These instructions are intended for physicians and physical therapists working with stroke patients.”
 - How should readers go about using the instructions? Instructions often suggest that you read through the entire document before proceeding, but people rarely follow this advice. Therefore, additional, more specific, suggestions are often helpful: “Two people are necessary to assemble the ramp,” or, “After completing steps 1 through 8, you may take a break before proceeding.”
 - How long does the process take? This is especially important if the procedure is lengthy or involves waiting between major steps for components to dry.
 - What general warnings do you need to include to alert users about safety hazards? You will, of course, include warnings in explaining the steps themselves later, putting the warning ahead of the step to which it refers, but you should also highlight hazards at the start if they must be kept in mind throughout the procedure.

21.2.3 Materials and equipment

Before giving directions, list materials and equipment in the order they will be used or according to type (large equipment, electrical tools, fasteners). Be precise: Don't say “a nut,” say “1/8-inch square nut.” If the items in your materials list are not common household items, then you should include a bill of materials (BOM). A description and an example of a BOM are provided in Chapter 10. If the BOM is long, you may include it at the end of your instructions and use just a materials list at the beginning.

21.2.4 Theory of operation

Include a “theory of operation” section if you think readers will benefit from visualizing the end product and understanding how it should work. Theory of operation is not always necessary, especially in instructions for household and other consumer items. Instructions for highly specialized, technical equipment, however, frequently include a theory of operation section.

21.2.5 Directions

The step-by-step directions are the body of your instructions.

1. Present each step clearly and concisely.

- a. Use the command style (also known as the imperative verb form, which we're using in this section) for each step. If you need to add explanations, do so after the command.
- b. Number or letter each step to help readers keep track of where they are in the procedure.
- c. Present one step at a time; don't combine steps in paragraphs, such as the following:

Slide module G into slot 3. Then pivot the module 45 degrees to the right. Lower the stabilizing rod on the module until rod locks into place.

Instead, present instructions like this:

Slide module G into slot 3.

Pivot module 45 degrees to the right.

Lower the stabilizing rod on the module until rod locks into place.

- d. Make steps stand out by skipping a line after each one.

2. Group related steps under main categories. To make a long set of instructions easier to understand, follow these guidelines:

- a. Break long lists of steps into categories that contain fewer steps. In writing this list of guidelines, for instance, we have grouped eleven steps under four numbered categories.
- b. Use headings and highlighting (italics, underlining, boldface) to emphasize main categories. Word the category heading (or introductory sentence) so it gives readers the "big picture" (for instance, *Connecting the ramp sections*).

3. Use illustrations where needed to clarify directions. When using illustrations:

- a. Place the illustration next to or right below the step it refers to. Give the illustration a number and title: "Figure 2: Checking the Settings." Readers do not like to flip back and forth to the end of a document to see the figures.
- b. Refer to the illustration in the appropriate step: "Check that the settings appear as shown in Figure 2."
- c. Avoid cluttered illustrations: Label only the parts that readers need to have identified.

4. Address dangers and problems readers may encounter.
 - a. Put boldfaced Warnings, Dangers, and Cautions, and an explanation, **in front of** the hazard they're intended to prevent. Use "Warning" to label a hazard that might harm a person. Use "Danger" if the harm could be life-threatening. Use "Caution" if harm may come to the equipment.
 - b. Where applicable, explain how to tell if a tricky step was done correctly. For example, instructions on folding a cardboard six times might end with the statement, "The cardboard should look like an inverted pyramid."

21.2.6 Troubleshooting

When necessary, end instructions with a chart that lists common problems and ways to solve them.

21.3 TESTING AND REVISING

Testing is a crucial part of writing instructions. Have users test your instructions and provide feedback to help detect problems in the way they're written and in the design itself. When testing your instructions:

1. Choose users from your target audience.
2. Observe users and take notes on how they follow the instructions. Do not offer help unless a user is too confused to proceed or is about to make a serious error.
3. Interview users to get feedback after they complete the test.

Use the feedback to revise your instructions. Then test the instructions again to make sure you've eliminated the problems and have not created new ones. Revise again as necessary. This rigorous process of testing and revising is necessary to prevent damage and injuries resulting from poorly written instructions.