20
Technical Definitions

Definitions explain a term or concept that is specialized or unfamiliar to an audience. In many cases, a term may have more than one meaning, and a clearly written definition tells audiences exactly how the term is being used. Unless you are sure that your audience knows the exact meaning you intend, always define a term the first time you use it.

PURPOSE OF TECHNICAL DEFINITIONS

Definitions answer the question *What, exactly, are we talking about?* by spelling out the precise meaning of a term that can be interpreted in different ways; for example, a person buying a new computer needs to understand exactly what "manufacturer's guarantee" or "expandable memory" means in the context of that purchase.

Definitions can also answer the question *What, exactly, is it?* by explaining what makes an item, concept, or process unique; for example, an engineering student needs to understand the distinction between "elasticity" and "ductility." Inside or outside any field, people have to grasp precisely what "makes a thing what it is and distinguishes that thing from all other things" (Corbett 38).

Contracts are detailed (and legally binding) definitions of the specific terms of an agreement. If you lease an apartment or a car, for example, the printed contract will define both the *lessee's* and *lessor's* specific responsibilities. An employment contract will spell out responsibilities for both employer and employee. Many other documents, such as employee handbooks, are considered implied contracts ("Handbooks" 5). In preparing an employee handbook for your company, you would need to define such terms as "acceptable job performance" on the basis of clear objectives that each employee can understand, such as "submitting weekly progress reports, arriving on time for meetings, and so on ("Performance Appraisal" 5–6). Because you are legally responsible for any document you prepare, clear and precise definitions are essential.

Definitions have ethical requirements, too. For example, on January 28, 1986, the space shuttle *Challenger* exploded 73 seconds after launch, killing all seven crew members. (Two rubber O-ring seals in a booster rocket had failed, allowing hot exhaust gases to escape and igniting the adjacent fuel tank.) Hours earlier—despite vehement objections from the engineers—management had decided that going ahead with the launch was a risk worth taking. This definition of

"acceptable risk" was based not on the engineering facts but rather on bureaucratic pressure to launch on schedule. Agreeing on meaning in such cases rarely is easy, but you are ethically bound to convey an accurate interpretation of the facts as you understand them.

Clear and accurate definitions help the general public understand and evaluate complex technical and social issues. For example, we hear and read plenty about the debates over genetic engineering. But as a first step in understanding this debate, we would need at least this basic definition:

> Genetic engineering refers to [an experimental] technique through which genes can be isolated in a laboratory, manipulated, and then inserted stably into another organism. Gene insertion can be accomplished mechanically, chemically, or by using biological vectors such as viruses. (Office of Technology Assessment 20)

Of course, to follow the debate, we would need increasingly more detailed information (about specific procedures, risks, benefits, and so on). But the above definition gets us started, by enabling us to *visualize* the basic concept.

LEVELS OF DETAIL IN A DEFINITION

How much detail will your audience need to grasp your exact meaning? Can you define the term by using a synonym or will you need a full sentence, an entire paragraph, or even several pages?

Parenthetical Definition

Often, you can clarify the meaning of a word by using a more familiar synonym or a clarifying phrase:

> The *leaching field* (sievelike drainage area) requires crushed stone.
>
> The trees on the site are mostly *deciduous* (shedding foliage at season's end).

NOTE *Be sure that the synonym or explanatory phrase will clarify your meaning, not obscure it. Don't say:*

> A tumor is a neoplasm.
>
> A solenoid is an inductance coil that serves as a tractive electromagnet.

(The solenoid definition would be appropriate for an engineering manual, but too specialized for general readers.) Do say:

A tumor is a growth of cells that occurs independently of surrounding tissue
and serves no useful function.

A solenoid is a coil that converts electrical energy to magnetic energy capable of performing mechanical functions.

In an electronic document, such as a Web page or online help system, these types of short definitions can easily be linked to the main word or phrase. The user who clicks on “leaching field,” say, would go to a window that contains the definition and other important information.

Sentence Definition

More complex terms may require a *sentence definition* (which may be stated in more than one sentence). These definitions follow a fixed pattern: (1) the name of the item to be defined, (2) the class to which the item belongs, and (3) the features that differentiate the item from all others in its class.

ITEM	CLASS	DISTINGUISHING FEATURES
carburetor	a mixing device	in gasoline engines that blends air and fuel into a vapor for combustion within the cylinders
diabetes	a metabolic disease	caused by a disorder of the pituitary gland or pancreas and characterized by excessive urination, persistent thirst, and inability to metabolize sugar
brief	a legal document	containing all the facts and points of law pertinent to a specific case, and filed by an attorney before the case is argued in court
stress	an applied force	that strains or deforms a body
fiber optics	a technology	that uses light energy to transmit voices, video images, and data via hair-thin glass fibers

These elements are combined into one or more complete sentences:

Diabetes is a metabolic disease caused by a disorder of the pituitary gland or pancreas. This disease is characterized by excessive urination, persistent thirst, and inability to metabolize sugar.

Sentence definition is especially useful if you need to stipulate your precise working meaning of a term that has several possible meanings. State your working definitions at the beginning of your document:

Throughout this report, the term “disadvantaged student” means . ...

Brief definitions are fine when the audience requires only a general understanding. For example, the sentence definition on page 482 about the leaching field might be adequate in a

progress report to a client whose house you are building. But a report for the public health department on groundwater contamination from leaching fields would call for an expanded definition.

Expanded Definition

The sentence definition of "solenoid" on page 482 is good for a layperson who simply needs to know what a solenoid is. An instruction manual for mechanics, however, would define solenoid in much greater detail (page 490); mechanics need to know how a solenoid works and how to use and repair it.

The problem with defining an abstract and general word, such as "condominium" or "loan," is different. "Condominium" is a vaguer term than leaching field (leaching field A is pretty much like leaching field B) because the former refers to many types of ownership agreements, and so requires expanded definition for almost any audience.

Depending on audience and purpose, an expanded definition may be a short paragraph or may extend to several pages. For example, Figure 20.1, aimed at a general audience, employs only two paragraphs (aided by visuals) to define the differences between two weapons of mass destruction. However, if a complex device, such as a digital dosimeter (used for measuring radiation exposure), is being introduced to an audience who needs to understand how this instrument works, your definition would require at least several paragraphs, if not pages.

EXPANSION METHODS

How you expand a definition depends on the audience questions you can anticipate (Figure 20.2). Begin with a sentence definition, and then select from the following expansion strategies.

Etymology

Sometimes, a word's origin (its development and changing meanings) can help users understand its meaning. "Biological control" of insects, for example, is derived from the Greek "bio," meaning "life" or "living organism" and the Latin "contra," meaning "against" or "opposite." Biological control, then, is the use of living organisms against insects. College dictionaries contain etymological information, but your best bets are *The Oxford English Dictionary* (or its Web site) and dictionaries of science, technology, and business.

Some technical terms are acronyms, derived from the first letters or parts of several words. *Laser* is an acronym for *light amplification by stimulated emission of radiation.*

Other terms developed as jargon. For instance, “bug” (jargon for “programming error”) comes from an early computer malfunction at Harvard caused by a dead bug blocking the contacts of an electrical relay. Because programmers typically hated to admit mistakes, the term became a euphemism for “error.” And “debugging,” of course, means to eliminate errors in a program.

History and Background

The meaning of specialized terms such as “radar,” “bacteriophage,” “silicon chips,” or “x-ray” can often be clarified through a background discussion: discovery or history of the concept, development, method of production, applications, and so on. Specialized encyclopedias are a good background source.

> The idea of lasers ... dates back as far as 212 B.C., when Archimedes used a [magnifying] glass to set fire to Roman ships during the siege of Syracuse. (Gartaganis 22)

> The early researchers in fiber optic communications were hampered by two principal difficulties—the lack of a sufficiently intense source of light and the absence of a medium which could transmit this light free from interference
> and with a minimum signal loss. Lasers emit a narrow beam of intense light,
> so their invention in 1960 solved the first problem. The development of a
> means to convey this signal was longer in coming, but scientists succeeded
> in developing the first communications-grade optical fiber of almost pure silica glass in 1970. (Stanton 28)

For students and researchers who want in-depth information, history and background is appropriate. However, for users trying to perform a task, history and background can be cumbersome and unnecessary. If you wanted to install a new modem, for example, you might be interested in a quick sentence explaining that “modem” stands for “modulator-demodulator.” But you would not really care about the history of how modems were developed.

Negation

Some definitions can be clarified by an explanation of what the term *does not* mean:

> Raw data is not “information”; data only becomes information after it has
> been evaluated, interpreted, and applied.

Operating Principle

Anyone who wants to use a product correctly will need to know how it operates:

> A clinical thermometer works on the principle of heat expansion: As the temperature of the bulb increases, the mercury inside expands, forcing a mercury thread up into the hollow stem.
>
> Air-to-air solar heating involves circulating cool air, from inside the home, across a collector plate (heated by sunlight) on the roof. This warmed air is then circulated back into the home.
>
> Basically, a laser [uses electrical energy to produce] coherent light, light in which all the waves are in phase with each other, making the light hotter and more intense. (Gartaganis 23)

Even abstract concepts or processes can be explained on the basis of their operating principle:

> Economic inflation is governed by the principle of supply and demand: If an item or service is in short supply, its price increases in proportion to its demand.

Analysis of Parts

When users need to understand a complex item or concept, be sure to explain each part or element:

> The standard frame of a pitched-roof wooden dwelling consists of floor joists, wall studs, roof rafters, and collar ties.
>
> Psychoanalysis is an analytic and therapeutic technique consisting of four parts: (1) free association, (2) dream interpretation, (3) analysis of repression and resistance, and (4) analysis of transference.

In discussing each part, of course, you would further define specialized terms such as “floor joists” and “repression.”

Analysis of parts is particularly useful for helping laypersons understand a technical subject. This next analysis helps explain the physics of lasing by dividing the process into three discrete parts:

> 1. [Lasers require] a source of energy, [such as] electric currents or even other lasers.
> 2. A resonant circuit ... contains the lasing medium and has one fully reflecting end and one partially reflecting end. The medium—which can
> be a solid, liquid, or gas—absorbs the energy and releases it as a stream of photons [electromagnetic particles that emit light]. The photons ... vibrate between the fully and partially reflecting ends of the resonant circuit, constantly accumulating energy—that is, they are amplified. After attaining
> a prescribed level of energy, the photons can pass through the partially reflecting surface as a beam of coherent light and encounter the optical elements.
> 3. Optical elements—lenses, prisms, and mirrors—modify size, shape, and other characteristics of the laser beam and direct it to its target. (Gartaganis 23)

Figure 1 shows the three parts of a laser.

Visuals

Well-labeled visuals (such as the laser drawing) help clarify definitions. Always introduce your visual and explain it. If your visual is borrowed, credit the source. Unless the visual takes up one whole page or more, do not place it on a separate page. Include the visual near its discussion.

Comparison and Contrast

By comparing or contrasting new information to information your audience already understands, you help build a bridge between their current knowledge and the new ideas. For example, for a group of nonexperts, you could explain how earthquakes start by using this *analogy* (a type of comparison, discussed on page 273):

> Imagine an enormous block of gelatin with a vertical knife slit through the middle of its lower half. Gigantic hands are slowly pushing the right side forward and pulling the left side back along the slit, creating a strain on the upper half of the block that eventually splits it. When the split reaches the upper surface, the two halves of the block spring apart and jiggle back and forth before settling into a new alignment. ("Earthquake Hazard Analysis" 8)

> The average diameter of an optical cable is around two-thousandths of an inch, making it about as fine as a hair on a baby's head (Stanton 29–30).

Here is a contrast between optical fiber and conventional copper cable:

> Beams of laser light coursing through optical fibers of the purest glass can transmit many times more information than [conventional] communications systems. ... A pair of optical fibers has the capacity to carry more than 10,000 times as many signals as conventional copper cable. A 1–2-inch optical cable can carry as much information as a copper cable as thick as a person's arm. ...
>
> Not only does fiber optics produce a better signal, [but] the signal travels farther as well. All communications signals experience a loss of power, or attenuation, as they move along a cable. This power loss necessitates placement of repeaters at one- or two-mile intervals of copper cable in order to regenerate the signal. With fiber, repeaters are necessary about every thirty or forty miles, and this distance is increasing with every generation of fiber. (Stanton 27–28)

Here is a combined comparison and contrast:

> Fiber optics technology results from the superior capacity of light waves to carry a communications signal. Sound waves, radio waves, and light waves can all carry signals; their capacity increases with their frequency. Voice frequencies carried by telephone operate at 1000 cycles per second, or hertz. Television signals transmit at about

> 50 million hertz. Light waves, however, operate at frequencies in the hundreds of trillions of hertz. (Stanton 28)

Required Materials or Conditions

Some items or processes need special materials and handling, or they may have other requirements or restrictions. An expanded definition should include this important information.

> Besides training in engineering, physics, or chemistry, careers in laser technology require a strong background in optics (study of the generation, transmission, and manipulation of light).

Abstract concepts might also be defined in terms of special conditions:

> To be held guilty of libel, a person must have defamed someone's character through written or pictorial statements.

Example

Familiar examples showing types or uses of an item can help clarify your definition. This example shows how laser light is used as a heat-generating device:

> Lasers are increasingly used to treat health problems. Thousands of eye operations involving cataracts and detached retinas are performed every
> year by ophthalmologists. ... Dermatologists treat skin problems. ... Gynecologists treat problems of the reproductive system, and neurosurgeons even perform brain surgery—all using lasers transmitted through optical fibers. (Gartaganis 24–25)

The next example shows how laser light is used to carry information:

> The use of lasers in the calculating and memory units of computers, for example, permits storage and rapid manipulation of large amounts of data. And audiodisc players use lasers to improve the quality of the sound they reproduce. The use of optical cable to transmit data also relies on lasers. (Gartaganis 25)

And this final example shows how optical fiber can relay a video signal:

> Acting, in essence, as tiny cameras, optical fibers can be inserted into the body and relay an image to an outside screen. (Stanton 28)

Examples are a powerful communication tool—as long as you tailor the examples to your audience's level of understanding.

Whichever expansion strategies you use, be sure to document your information sources.

NOTE *An increasingly familiar (and user-friendly) format for expanded definition, especially for Web users, is a listing of Frequently Asked Questions (FAQ), which organizes chunks of information as responses to questions users are likely to ask. This question-and-answer format creates a conversational style and conveys to users the sense that their particular concerns are being addressed. Consider using a FAQ list whenever you want to increase user interest and decrease resistance. For a hard copy example, see page 144. For a Web-based example, see Figure 20.4, page 495.*

SITUATIONS REQUIRING DEFINITIONS

The following definitions employ expansion strategies appropriate to their audiences' needs (and labeled in the margin). Each definition, like a good essay, is unified and coherent: Each paragraph is developed around one main idea and logically connected to other paragraphs. Visuals are incorporated. Transitions emphasize the connection between ideas. Each definition is at a level of technicality that connects with the intended audience.

This example is preceded by an audience and use profile based on the worksheet on page 36.

An Expanded Definition for Semitechnical Readers

Audience and Use Profile. The intended users of this material are beginning student mechanics. Before they can repair a solenoid, they will need to know where the term *solenoid* comes from, what a solenoid looks like, how it works, how its parts operate, and how it is used. This definition is designed as an *introduction,* so it offers only a general (but comprehensive) view of the mechanism.

Because the users are not engineering students, they do *not* need details about electromagnetic or mechanical theory (e.g., equations or graphs illustrating voltage magnitudes, joules, lines of force).

EXPANDED DEFINITION: SOLENOID

A solenoid is an electrically energized coil that forms an electromagnet capable of performing mechanical functions. The term "solenoid" is derived from the word "sole," which in reference to electrical equipment means "a part of,"

or "contained inside, or with, other electrical equipment." The Greek word *solenoides* means "channel," or "shaped like a pipe."

A simple plunger-type solenoid consists of a coil of wire attached to an electrical source, and an iron rod, or plunger, that passes in and out of the coil along the axis of the spiral. A return spring holds the rod outside the coil when the current is deenergized, as shown in Figure 1.

When the coil receives electric current, it becomes a magnet and thus draws the iron rod inside, along the length of its cylindrical center. With a lever attached to its end, the rod can transform electrical energy into mechanical force. The amount of mechanical force produced is the product of the number of turns in the coil, the strength of the current, and the magnetic conductivity of the rod.

The plunger-type solenoid in Figure 1 is commonly used in the starter-motor of an automobile engine. This type is 4 1–2 inches long and 2 inches in diameter, with a steel casing attached to the casing of the starter-motor. A linkage (pivoting lever) is attached at one end to the iron rod of the solenoid, and at the other end to the drive gear of the starter, as shown in Figure 2. When the ignition key is turned, current from the battery is supplied to the solenoid coil, and the iron rod is drawn inside the coil, thereby shifting the attached linkage. The linkage, in turn, engages the drive gear, activated by the starter-motor, with the flywheel (the main rotating gear of the engine).

Because of the solenoid's many uses, its size varies according to the work it must do. A small solenoid will have a small wire coil, hence a weak magnetic field. The larger the coil, the stronger the magnetic field; in this case, the rod in the solenoid can do harder work. An electronic lock for a standard door would, for instance, require a much smaller solenoid than one for a bank vault.

The audience for the following definition (an entire community) is too diverse to define precisely, so the writer wisely addresses the lowest level of technicality—to ensure that all readers will understand.

An Expanded Definition for Nontechnical Readers

Audience and Use Profile. The following definition is written for members of a community whose water supply (all obtained from wells, because the town has no reservoir) is doubly threatened: (1) by chemical seepage from a recently discovered toxic dump site, and (2) by a two-year drought that has severely depleted the water table. This definition forms part of the introduction to a report that analyzes the severity of the problems and explores possible solutions.

To understand the problems, these users first need to know what a water table is, how it is formed, what conditions affect its level and quality, and how it figures into town planning decisions. The concepts of *recharge* and *permeability* are vital to understanding the problem here, so these terms are defined parenthetically. This audience has no interest in geological or hydrological (study of water resources) theory. They simply need the broadest possible picture.

EXPANDED DEFINITION: WATER TABLE

The water table is the level below the earth's surface at which the ground is saturated with water. Figure 1 shows a typical water table that might be found in the East. Wells driven into such a formation will have a water level identical to that of the water table.

The world's freshwater supply comes almost entirely as precipitation that originates with the evaporation of sea and lake water. This precipitation falls to earth and follows one of three courses: it may fall directly onto bodies of water, such as rivers or lakes, where it is directly used by humans; it may fall onto land, and either evaporate or run over the ground to the rivers or other bodies of water; or it may fall onto land, be contained, and seep into the earth. The latter precipitation makes up the water table.

Similar in contour to the earth's surface above it, the water table generally has a level that reflects such features as hills and valleys. Where the water table intersects the ground surface, a stream or pond results.

A water table's level, however, will vary, depending on the rate of recharge (replacement of water). The recharge rate is affected by rainfall or soil permeability (the ease with which water flows through the soil). A water table therefore is never static; rather, it is the surface of a body of water striving to maintain a balance between the forces which deplete it and those which replenish it. In areas of Florida and some western states where the water table is depleted, the earth caves in, leaving sinkholes.

The water table's depth below ground is vital in water resources engineering and planning. It determines an area's suitability for wastewater disposal, or a building lot's ability to handle sewage. A high water table could become contaminated by a septic system. Also, bacteria and chemicals seeping into a water table can pollute an entire town's water supply. Another consideration in water table depth is the cost of drilling wells. These conditions obviously affect an industry's or homeowner's decision on where to locate.

The rising and falling of the water table give an indication of the pumping rate's effect on a water supply (drawn from wells) and of the sufficiency of the recharge rate in meeting demand. This kind of information helps water resources planners decide when new sources of water must be made available.

PLACEMENT OF DEFINITIONS

Poorly placed definitions interrupt the information flow. Each time an audience encounters an unfamiliar term or concept, it should be defined in the same area on the page or screen. In a printed text, do this by placing a brief, parenthetical definition immediately after the term or in the right margin. On a Web page, use a hypertext link.

More than three or four definitions on one page or screen will be disruptive. For a paper document, rewrite them as sentence definitions and place them in a "Definitions" section of your introduction or in a glossary. For a Web page, provide a link to a separate glossary page, as in Figure 20.3.

Depending on its role in the document, place an expanded definition in one of these locations:

- If the definition is essential to understanding the whole document, place it in the introduction as in Figure 1.1 (page 4).
- When the definition clarifies a major part of your discussion, place it in that section of your document but avoid doing this too often in a paper document. In a hyperlinked document, such as Figure 20.4, users can click on the item, read about it (and possibly explore deeper links), and then return to their place on the original page.
- If the definition serves only as a reference, place it in an appendix.

In online documentation, one option for making definitions available when they are needed is the "pop-up note": The term to be defined is highlighted in the text, to indicate that its definition can be called up and displayed in a small window on the actual text screen (Horton, "Is Hypertext" 25).

EXERCISES

1. Sentence definitions require precise classification and differentiation. Is each of these definitions adequate for a layperson? Rewrite those that seem inadequate. Consult dictionaries and encyclopedias as needed.

   a. A bicycle is a vehicle with two wheels.
   b. A transistor is a device used in transistorized electronic equipment.
   c. Surfing is when one rides a wave to shore while standing on a board specifically designed for buoyancy and balance.
   d. Bubonic plague is caused by an organism known as *Pasteurella pestis.*
   e. Mace is a chemical aerosol spray used by the police.
   f. A Geiger counter measures radioactivity.
   g. A cactus is a succulent.
   h. In law, an indictment is a criminal charge against a defendant.
   i. A prune is a kind of plum.
   j. Friction is a force between two bodies.
   k. Luffing is what happens when one sails into the wind.
   l. A frame is an important part of a bicycle.
   m. Hypoglycemia is a medical term.
   n. An hourglass is a device used for measuring intervals of time.
   o. A computer is a machine that handles information with amazing speed.
   p. A Ferrari is the best car in the world.
   q. To meditate is to exercise mental faculties in thought.

2. Standard dictionaries define for the layperson, whereas specialized reference books define for the specialist. Choose an item in your field and copy the definition (1) from a standard dictionary and (2) from a technical reference book. For the technical definition, label each expansion strategy. Rewrite the specialized definition for a layperson.

3. Using reference books as necessary, write sentence definitions for these terms or for terms from your field.

generator
dewpoint
microprocessor
capitalism
local area network
marsh
artificial intelligence
economic inflation
anorexia nervosa
low-impact camping
hemodialysis
modem
gyroscope
coronary bypass
oil shale
chemotherapy
estuary
Boolean logic
classical conditioning
hypothermia
thermistor
aquaculture
nuclear fission

4. Select an item from the list in Exercise 3 or from an area of interest. Identify an audience and purpose. Complete an audience and use profile sheet (page 36). Begin with a sentence definition of the term. Then write an expanded definition for a first-year student in that field. Next, write the same definition for a layperson (client, patient, or other interested party). Leave a margin at the left side of your page to list expansion strategies. Use at least four expansion strategies in each version, including at least one visual or an *art brief* (page 318) and a rough diagram. In preparing each version, consult no fewer than four outside references. Cite and document each source, using one of the documentation styles discussed in Appendix A. Submit, with your two versions, an explanation of your changes from the first version to the second.
5. Figure 20.5 shows a page from a brochure titled *Cogeneration.* The brochure provides an expanded definition for potential users of fuel conservation systems engineered and packaged by Ewing Power Systems. The intended users are plant engineers and other technical experts unfamiliar with cogeneration.

Another page of the brochure is designed in a question-and-answer (FAQ list) format. Figure 20.6 shows parts of that page.

Identify each expansion strategy in Figures 20.5 and 20.6. Is the definition appropriate for a technical audience? Why, or why not? Be prepared to discuss your analysis and evaluation in class.

COLLABORATIVE PROJECTS

1. Divide into small groups by majors or interests. Appoint one person as group manager. Decide on an item, concept, or process that would require an expanded definition for laypersons.

Examples

From computer science: an algorithm, an applications program, artificial intelligence, binary coding, top-down procedural thinking, or systems analysis.

From nursing: a pacemaker, coronary bypass surgery, or natural childbirth.

Complete an audience and use profile (page 36).

Once your group has decided on the appropriate expansion strategies (etymology, negation, etc.), the group manager will assign each member to work on one or two specific strategies as part of the definition. As a group, edit and incorporate the collected material into an expanded definition,
revising as often as needed.

Your instructor may stipulate a brochure format for your definition, as in Figure 20.7 (For more on this format, refer to "brochures" in this book's Index.)

The group manager will assign one member to present the definition in class, using either opaque or overhead projection, a large-screen monitor, or photocopies.

SERVICE-LEARNING PROJECT

Revise the flyer/fact sheet you prepared for Chapter 3 page 42 to publicize your public service organization. Use all appropriate expansion strategies to show your readers "Who we are" and "What we do."

Hint: To decrease reader resistance and to help people identify with the issue, consider presenting your definition in the form of a FAQ list.

What users of a technical definition want to know
Definitions have legal implications
Definitions have ethical implications
Definitions have societal implications
A general but informative definition
Parenthetical definitions
Elements of sentence definitions
A complete sentence definition
A working definition

FIGURE 20.1 An Expanded Definition.

In this example, two items are defined, to clarify an important distinction for the general public.

Source: From "Weapons of Mass Disruption," text by Michael A. Levi and Henry C. Kelly, illustrations by Sara Chen. Published in Scientific American, *November 2002. Reprinted with permission.*

FIGURE 20.2 Directions in Which a Definition Can Be Expanded

"Where did it come from?"
"How was it perfected?"
"What does this term not mean?"
"How does it work?"
"What are its parts?"
"Does it resemble anything familiar?"
"How does it differ from comparable things?"
"How is it both similar and different?"
"What is needed to make it work (or occur)?"
"How is it used or applied?"
Formal sentence definition
Etymology
Description and analysis of parts
Special conditions and operating principle
Example and analysis of parts
Explanation of visual
Comparison of sizes and applications

Formal sentence definition
Example
Operating principle
Comparison
Operating principle
Example
Special conditions and examples
Special conditions
Where to place
an expanded definition

FIGURE 20.3 A Hyperlinked Glossary Page Links clearly displayed below the site's masthead on each page enable users to access the glossary and then return to any of the main pages in an instant.

Source: U.S. Food and Drug Administration <www.fda.gov/cdrh/lasik/glossary/htm>.

FIGURE 20.4 A Hyperlinked Expanded Definition Embedded within a hyperlinked network, this one-page definition provides forward links to deeper levels (such as *UI Evolution*) as well as backward links to main pages—all without
disrupting the discussion of "Design Concepts."

Source: From <www.ibm.com/easy/eou_ext.nsf/Publish/568>, © IBM Corporation, 1999. Reprinted with permission. All rights reserved.

GUIDELINES for Defining Clearly and Precisely

1. *Decide on the level of detail.* Definitions vary greatly in length and detail; from a few words in parentheses to a multipage document. How much does this audience need in order to follow your explanation or grasp your point?
2. *Classify the item precisely.* The narrower your class, the clearer your meaning. *Stress* is classified as an applied force; to say that stress "is what..." or "takes place when..." fails to denote a specific classification. Diabetes is precisely classified as a *metabolic disease,* not as a *medical term.*
3. *Differentiate the item accurately.* If the distinguishing features are too broad, they will apply to more than this one item. A definition of *brief* as a "legal document used in court" fails to differentiate brief from all other legal documents (*wills, affidavits,* and the like). On the other hand, a narrow differentiation of "carburetor" as "a mixing device used in boat engines" would be ignoring the carburetor's use in other gasoline engines.
4. *Avoid circular definitions.* Do not repeat, as part of the distinguishing feature, the word you are defining. "Stress is an applied force that places stress on a body" is a circular definition.
5. *Expand your definition selectively.* Begin with a sentence definition and select the best combination of development strategies for your audience and purpose.
6. *Use visuals to clarify your meaning.* No matter how clearly you explain, as the saying goes, a picture can be worth a thousand words—even more so when used with readable, accurate writing.
7. *Know "how much is enough."* Don't insult people's intelligence by giving needless details or spelling out the obvious.
8. *Consider the legal implications of your definition.* What does an "unsatisfactory job performance" mean in an evaluation of a company employee: that the employee could be fired, required to attend a training

program, given one or more chances to improve, or what ("Performance Appraisal 3–4)? Failure to spell out your meaning invites a lawsuit.

9. *Consider the ethical implications of your definition.* Be sure your definition of a fuzzy or ambiguous term such as "safe levels of exposure" or "conservative investment" or "acceptable risk" is based on technical fact and not on social pressure. Consider, for example, a recent U.S. cigarette company's claim that cigarette smoking in the Czech Republic promoted "fiscal benefits," defined, in this case, by the fact that smokers die young, thus eliminating pension and health care costs for the elderly!
10. *Place your definition in an appropriate location.* Allow users to access the definition and then return to the main text with as little disruption as possible.

CHECKLIST for Usability of Definitions

(Numbers in parentheses refer to the first page of discussion.)

Content

- Is the type of definition (parenthetical, sentence, expanded), suited to its purpose and user's needs? (482)
- Does the definition adequately classify the item? (496)
- Does the definition clarify, rather than obscure, the meaning? (482)
- Is the expanded definition adequately developed? (484)
- Are all data sources documented? (489)
- Are visuals employed adequately and appropriately? (488)
- Does the sentence definition describe features that distinguish the item from all other items in the same class? (482)

Arrangement

- Is the expanded definition unified and coherent (like an essay)? (490)
- Are transitions adequate? (490)
- Does the definition appear in the appropriate location? (493)

Style and Page Design

- Is the definition in plain English? (265)
- Will the level of technicality connect with the audience? (30)
- Are sentences clear, concise, and fluent? (244)
- Is word choice precise? (264)
- Is the definition grammatical? (Appendix C)
- Is the definition ethically and legally acceptable? (481)
- Is page design inviting and accessible? (366)

For more exercises, visit
<www.ablongman.com/lannon>

FIGURE 20.5 Expanded Definition in a Technical Brochure
Source: Courtesy of Ewing Power Systems, So. Deerfield, MA 01373.
FIGURE 20.6 Expanded Definition in a FAQ List Format
Source: Courtesy of Ewing Power Systems, So. Deerfield, MA 01373.
FIGURE 20.7 A Definition for Laypersons, Designed as a Two-Column Brochure
Source: U.S. Department of Health and Human Services. Food and Drug Administration.