

CHAPTER

3

DEFINITIONS

3-1 Parts of a Definition

Can you imagine trying to read a science textbook in which none of the scientific terms were defined? It would be like trying to read material in a foreign language. The world of science has its own language. If you do not know what the words mean, you will never be able to understand the concepts that result from scientific discoveries.

You cannot really understand something unless you are able to define it. Many scientific terms are easy to define when you realize where the term originated. One way to create a new word is to combine old, familiar words to form new ideas. For example, take the word *aerospace*. *Aero* refers to the atmosphere that surrounds Earth. You might not recognize by looking at the word that *aero* relates to the air, but saying the word out loud helps you make the connection. *Aero* sounds like the word *air*. *Space* refers to the region beyond Earth's atmosphere. Until recently, the two regions were very different. But with the development of rockets, they became part of one concept. As a result, the United States Air Force invented the term *aerospace*. Can you think of some other words that were created in the same way?

The study of the origins of words is called **etymology**. Just as the origin of the word *aerospace* made the definition clear, knowing where a word comes from can be a useful tool in determining a definition. But how do you define a word whose meaning is not obvious in its origin? Your first instinct is probably to look the word up in a dictionary or glossary. Dictionaries contain **formal definitions** for many words. A formal definition consists of several parts: a *term*, a *class word*, and one or more *limiting features*. We will examine each of these three parts separately.

Term

The **term** is the word that is being defined. Often a term is defined within the text itself. You will frequently see sentences like the following: *A chemical is a substance with a definite composition.* In this sentence, *chemical* is obviously the term being defined. Sometimes a term will be introduced in a sentence, but a definition will not be given. In these cases, you might need to look the term up in a dictionary or in the glossary in the back of your textbook.

Exercise 1 Dissecting Terms

The terms on the following page were created by combining two simpler words. Give the meanings of each part of the term, then try to deduce the meaning of the whole term. Note that some terms contain more than one separate word.

Section 3-1 Parts of a Definition, continued

a. nuclear fusion

nuclear _____

fusion _____

nuclear fusion _____

b. biodegradable

bio _____

degradable _____

biodegradable _____

c. hydroelectricity

hydro _____

electricity _____

hydroelectricity _____

d. exoskeleton

exo _____

skeleton _____

exoskeleton _____

e. activation energy

activation _____

energy _____

activation energy _____

Section 3-1 Parts of a Definition, continued**Class Word**

Once you have determined what term you wish to define, you must determine the general category to which the term belongs. The category (or class) to which a term belongs is called a **class word**. A class word is like a family: it has several members. Take the following sentence for example: *A hammer is a tool*. A hammer is certainly not the only type of tool. Saws, drills, and screwdrivers are also tools. The word *tool* indicates the family to which all of these items belong.

A class word does not always complete a definition. For example, read the following sentence:

Astronomy is a science.

Yes, the sentence tells you something about the definition of the term *astronomy*, but it does not tell you much. The word *science* is a general class word. There are three different types of class words: *general*, *specific*, and *repetitive*. How do you know if a class word is general, specific, or repetitive?

A **general class word** represents something that is hard to visualize, such as *device*, *method*, or *process*. A **specific class word** represents something much more tangible. To decide whether a class word is specific or general, close your eyes and try to get a mental picture of what the word represents. It is much easier to close your eyes and picture a tool, an animal, or a kind of fruit than it is to picture science or a process. **Table 3-1** lists some general and specific class words.

Table 3-1 General and Specific Class Words

General class words		Specific class words	
structure	device	metal	instrument
substance	method	machine	fruit
concept	science	tool	animal
policy	process	furniture	container

In some cases, the class word may be the same as the term, or part of the term, being defined. This type of device is called a **repetitive class word**. Look back at Exercise 1. This exercise showed you how to break a complicated term into understandable parts. Each of these terms could be defined using a repetitive class word because each part of the term is a word that the reader is likely to understand. For instance, *hydroelectricity* can be defined as electricity made by falling water.

Section 3-1 Parts of a Definition, continued

The following sentence gives you another example of a definition in which a repetitive class word is acceptable: *Acid rain is a form of rain that results from certain chemicals in the air.* *Acid rain* is the term to be defined. *Rain* is part of the term, but it is also part of the definition. Therefore, *rain* is a repetitive class word.

If a class word is going to be helpful, it must be more familiar to the reader than the term that is being defined. On the other hand, it should not be too general. For this reason, you should avoid using class words like *thing*, *something*, or *object*. These words do not increase understanding. A good rule of thumb is to use the most specific class word that you can.

Exercise 2 Class Words

Choose a class word for the topics below. If you need help thinking of class words, you can choose from the following list.

a metal	an organ	a condition
a person	a field	a process
an instrument	a science	an animal
a tool		

- a. Copper is _____
- b. A drill is _____
- c. Chemistry is _____
- d. Aerospace is _____
- e. A computer is _____
- f. An engineer is _____
- g. A carnivore is _____
- h. Drought is _____
- i. Photosynthesis is _____
- j. The heart is _____

Section 3-1 Parts of a Definition, continued

Exercise 3 General or Specific

For each of the sentences in Exercise 2, decide whether the class word is general or specific.

- | | |
|----------|----------|
| a. _____ | f. _____ |
| b. _____ | g. _____ |
| c. _____ | h. _____ |
| d. _____ | i. _____ |
| e. _____ | j. _____ |

Limiting Features

Once you have a class word do you have a complete definition? Take the sentence: *A hammer is a tool.* *Hammer* is the term to be defined, and *tool* is a specific class word. But you still do not know exactly what a hammer is or does. To complete the definition, you need a **limiting feature**. A limiting feature is a word or phrase that distinguishes the term from other members of its class. A hammer is a tool that is used to drive in a nail. *Hammer* is still the term to be defined. *Tool* is still a specific class word, and the phrase *that is used to drive in a nail* is a limiting feature.

You sometimes need several limiting features to define a word. Read the following sentence that defines the term *jaguar*: *A jaguar is a large, spotted cat found in Central and South America.* The word *cat* is a specific class word. There are three limiting features: (1) the cat is large, (2) the cat is spotted, and (3) the cat is found in Central and South America. There are other large spotted cats in different parts of the world, and there are other large cats in Central and South America. Thus, you need all three limiting features to completely define the term *jaguar*.

Exercise 4 Limiting Features

Rewrite the sentences on the next page to form complete definitions. If you need help, choose limiting features from the list below.

- | | |
|--------------------------------------|--------------------------|
| around the earth | striped |
| birdlike | infectious |
| carried by mosquitoes | that runs east and west |
| domestic | large |
| that carries oxygen through the body | that purifies the blood |
| imaginary | with very little water |
| sandy | that may guard the house |
| surrounded on three sides by land | with scaly feathers |

Section 3-1 Parts of a Definition, continued

a. Pterodactyls were reptiles.

b. A tiger is a cat.

c. A dog is an animal.

d. A desert is a region.

e. A bay is a body of water.

f. Latitude is a line.

g. Malaria is a disease.

h. The liver is an organ.

i. The circulatory system is a system.

Section 3-1 Parts of a Definition, continued**Exercise 5 Dissecting a Definition**

For each of the following sentences, list the term being defined, the class word (stating whether it is general, specific, or repetitive), and all of the limiting features. Note that there may be more lines than you need. Refer to Table 3-1 if needed.

- a. A membrane-covered structure that contains all of the materials necessary for life is called a cell.

Term _____

Class word _____

Limiting features

- b. Lymph nodes are small, bean-shaped organs that work like nets to remove particles from the lymph.

Term _____

Class word _____

Limiting features

- c. A hanging valley is a small glacial valley that joins the deeper main valley.

Term _____

Class word _____

Limiting features

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DEFINITIONS

3-2 Ways of Defining

There are two main ways to define a term. The first is the way that you might find a term defined in a dictionary or glossary. When you look up a definition in the dictionary, you expect to see that definition stated very plainly. This definition is a **formal definition**. Formal definitions can also be found within a written text. Sentences that state exactly what a term means include a formal definition. The following three sentences are examples of formal definitions.

1. Ecology is the study of the complex relationships between living things and their environment. (*from Modern Earth Science*)
2. The transmission of characteristics from parents to their offspring is called heredity. (*from Holt Biology Visualizing Life*)
3. The word *compound* means a pure substance composed of two or more elements that are chemically combined.

Each of the formal definitions above contains the three parts of a definition described in Section 3-1: a term, a class word, and at least one limiting feature. The first sentence directly states what ecology *is*. This type of definition is probably the most common form of a formal definition. The second example tells you what the transmission of characteristics *is called*. In this way, it gives a formal definition of the term *heredity*. The third example tells you what something *means*. Most formal definitions will fit one of these patterns.

When we speak, we usually use **informal definitions**. An informal definition uses the minimum number of words to convey an accurate definition. You will frequently see informal definitions in your textbooks. These definitions are commonly written as parenthetical, or explanatory, phrases following the important term. The sentence below is an example of this type of informal definition.

An energy transfer often leads to an energy conversion, a change from one form of energy into another. (*from Holt Science and Technology: Physical Science*)

Any definition is considered informal if it does not contain all three of the parts described in Section 3-1. Consider the sentence: *Coasting is being able to move without using any energy*. Which part is missing? *Coasting* is the term to be defined. The phrase *being able to move without using any energy* is a limiting feature. There is no class word in the sentence. However, you still understand the full meaning of the term *coasting*.

You should note that the word *when* is frequently misused in informal definitions. As you learned in Chapter 2, *when* is a time marker. Read the following sentence: *Coasting is when you're able to move without using any energy*. The term *coasting* is being defined. There is no time frame in the definition. Therefore, if a definition does not involve time, the word *when* should be avoided.

Section 3-2 Ways of Defining, continued**Exercise 6 Formal or Informal?**

The following passage contains eight terms that are defined within the passage. In the spaces provided, determine whether each definition is formal or informal.

Ecology

Earth scientists primarily study the **geosphere**, the solid Earth; the **hydrosphere**, its water; and the **atmosphere**, the gases surrounding Earth. Other scientists, called **biologists**, study the living world. An area of science in which biology and Earth science are closely linked is called ecology. **Ecology** is the study of the complex relationships between living things and their environment.

Organisms on Earth inhabit many different environments. A community of organisms and the environment they inhabit is called an **ecosystem**. The terms *ecology* and *ecosystem* come from the Greek word *oikos*, meaning "house."

The largest ecosystem is called the **biosphere**. The biosphere encompasses all life on Earth and the physical environment that supports it. The biosphere extends from the ocean depths to the atmosphere a few kilometers above Earth's surface.

A tropical rain forest is one example of a large ecosystem within the biosphere. Plants in the rain forest use sunlight to produce food through a process known as **photosynthesis**.

(from Modern Earth Science)

- a. geosphere _____
- b. hydrosphere _____
- c. atmosphere _____
- d. biologists _____
- e. ecology _____
- f. ecosystem _____
- g. biosphere _____
- h. photosynthesis _____

Section 3-2 Ways of Defining, continued

Exercise 7 Writing Formal Definitions

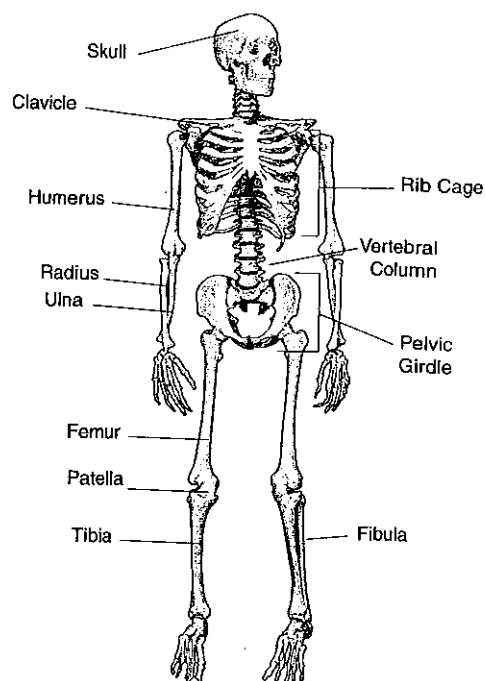
Study the drawing of an adult human and write a paragraph containing formal definitions for the following terms:

skull

clavicle

ribs

patella



Exercise 8 Writing Informal Definitions

Write a paragraph that contains informal definitions for the following terms: duck, egg, duckling, webbed feet

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DEFINITIONS

3-3 Deeper Understanding

You have probably memorized many definitions in your school career. Vocabulary tests are common in most subjects. But did you *really* understand the full meaning of those words whose definitions you memorized? Understanding a word does not mean simply being able to define it. It also means knowing how the word relates to larger topics. Often, knowing how the word relates to larger topics involves putting the word in context.

Many basic definitions are given in one sentence, as you have seen throughout the first two parts of this chapter. Sometimes, an author may use several sentences or several paragraphs to fully define a term or a concept. In this case, the definition becomes an **expanded definition**.

Take a look at the following expanded definition of the word *glacier*. Notice that the author gives a simple formal definition in the first sentence. Then the author continues by distinguishing between the two different types of glaciers. The passage places glaciers in the context of their geographic positions. After you have finished reading the passage, you should have a fairly clear mental picture of both types of glaciers.

Glaciers

Glaciers are masses of moving ice. There are two main types of glaciers; they are distinguished by their size and where they are formed. One type of glacier is formed in mountainous areas. As the ice moves down a valley, it produces a *valley glacier*, which is a long, narrow, wedge-shaped mass of ice. Valley glaciers are best developed in the high mountainous regions of the world, such as in coastal Alaska, the Himalayas, the Andes, the Alps, and New Zealand.

The other type of glacier covers large land areas. These masses of ice, called *continental ice sheets*, occupy millions of square kilometers. Today, continental ice sheets are found only in Greenland and Antarctica.

(from *Modern Earth Science*).

Think back to Chapter 1 of this text. The author uses many of the descriptive strategies mentioned in Chapter 1 to describe glaciers. Definitions are basically descriptions of terms. Spatial patterns and figurative language will help you write expanded definitions.

Read the following passage. While you read, think about all of the descriptive strategies used by the author to define the term *fog*.

Section 3-3 Deeper Understanding, continued**Fog**

Fog, like clouds, is the result of the condensation of water vapor in the air. The chief difference between fog and clouds is that fog forms very near the surface of Earth when air close to the ground is cooled. For example, you may be familiar with one type of fog that results from the nightly cooling of Earth. This type of fog is called *ground fog*. Ground fog usually forms on calm, clear nights. It is thickest in valleys and low-lying places because the dense, cold air in which it forms sinks to the lower elevations.

Two other types of fog often form inland. An *upslope fog* is formed by the lifting and cooling of air as it rises along land slopes. Upslope fog is really a kind of cloud formation at ground level. A type of fog known as *steam fog* usually forms over inland rivers and lakes. Steam fog is a shallow layer of fog formed when cool air moves over a warm body of water.

(from *Modern Earth Science*)

The author's main strategy in defining *fog* is to compare fog to something similar, in this case clouds. Notice that each type of fog is placed in the context of where it forms. This second strategy uses spatial relationships described in Chapter 1. The third type of description used in this expanded definition discusses how the three varieties of fog form. In other words, it classifies fog into three different types. Exercise 9 gives you more practice finding description strategies in an expanded definition. Then, Exercise 10 will give you the opportunity to write some expanded definitions.

Exercise 9 Expanded Definitions

Read the following passage, and discuss the strategies that the author uses to expand the definition of the term *meteoroid*.

Shooting Stars

A meteoroid is a small, rocky body orbiting the sun. Meteoroids are similar to asteroids, but they are much smaller. In fact, most meteoroids probably come from asteroids. When a meteoroid falls into Earth's atmosphere, it is usually traveling at such a high speed that its surface heats up and melts. As it burns up, the meteoroid glows and gives off an enormous amount of light and heat. From the ground, we see a spectacular streak of light, or a shooting star.

(from *Holt Science and Technology: Physical Science*)

Section 3-3 Deeper Understanding, continued

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Exercise 10 Writing Expanded Definitions

Write an expanded definition of each of the following words. If you like, make one or two comparisons.

a. soccer

Section 3-3 Deeper Understanding, continued

b. moon
