6.1 Classifying Organisms

organism: a living system with parts that work together to carry out the processes of life

unicellular organism: an organism made up of only one cell

multicellular organism: an organism that is made up of more than one cell

In Chapter 4, you learned about the characteristics of living things. Living things are often called **organisms**. Organisms are living systems composed of smaller parts working together to carry out the processes of life. Despite its small size, a cell is an organism whose organelles work together to keep the cell alive. An organism that is made up of only one cell is called a **unicellular organism** (Figure 1). Almost all unicellular organisms are so small that they can only be seen using a microscope.

Organisms can also be made up of many cells working together. An organism that is made up of more than one cell is called a **multicellular organism.** Most of the living things that you see every day are multicellular organisms. Humans and dogs, for example, are multicellular organisms made up of trillions of cells.

Scientists classify living things into groups based on their characteristics. Every organism may be classified into one of five smaller groups: plants, animals, fungi, protists, and bacteria.

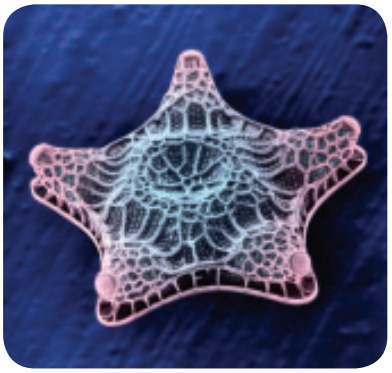

Figure 1 A diatom is an example of a unicellular organism.

Plants

Plants are multicellular organisms. Trees, grasses, flowers, bushes, vines, mosses, and herbs are examples of plants. All plants make their own food by photosynthesis. Plants can live on land or in water. Water lilies and *Elodea* are examples of plants that live in the water.

Animals

vertebrate: an animal with a backbone

invertebrate: an animal without a backbone

Animals are also multicellular organisms. Animals may be further divided into vertebrates and invertebrates. **Vertebrates** are animals with a backbone, such as a moose, salmon, or blue jay (Figure 2). **Invertebrates** are animals without a backbone, such as a spider, shrimp, or snail (Figure 3). In general, there are more types of invertebrates than there are vertebrates.

Figure 2 A blue jay has a backbone and is therefore a vertebrate.

Figure 3 A snail does not have a backbone. It is an invertebrate.

Fungi

Fungi (singular, fungus) are organisms that usually obtain nutrients by absorbing them from dead or decaying matter and cannot carry out photosynthesis. Most fungi are multicellular, though some are unicellular. Field mushrooms and baker's yeast (Figure 4) are both examples of fungi.

fungi: organisms that usually obtain nutrients from dead or decaying matter and cannot carry out photosynthesis; nutrients are usually absorbed

Figure 4 (a) Field mushrooms are multicellular fungi that are used as food by people all over the world. (b) Baker's yeast is a unicellular fungus that is used in the bread-making industry. The yeast produces bubbles of carbon dioxide gas, which cause the bread to rise.

Protists

Protists are a diverse group of organisms that are commonly found in wet or moist environments such as ponds, rivers, and mud. Protists can be unicellular or multicellular and have all of the organelles of a typical animal cell. Some protists, like the *Volvox* shown in Figure 5, are plant-like organisms that have chloroplasts and can perform photosynthesis. Common plant-like protists include diatoms and algae. Other protists are more like animals and cannot perform photosynthesis. They must obtain food from their environment. Common animal-like protists include amoebas and paramecia.

protist: an organism that is neither plant nor animal, but shares many of the same characteristics of both; usually unicellular, but can be multicellular

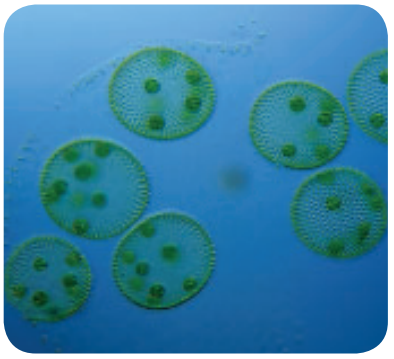

Figure 5 *Volvox* is a common plant-like protist found in ponds.

Bacteria

Bacteria (singular, bacterium) are the simplest and most abundant unicellular organisms on Earth. Bacteria do not have a nucleus. Although they are unicellular, some types of bacteria gather into groups called bacterial colonies. The bacterium that causes strep throat is an example of a bacterium that forms colonies. Figure 6 shows a common bacterium, *Escherichia coli* (*E. coli*).

bacteria: the most basic of all unicellular organisms; lacks a nucleus

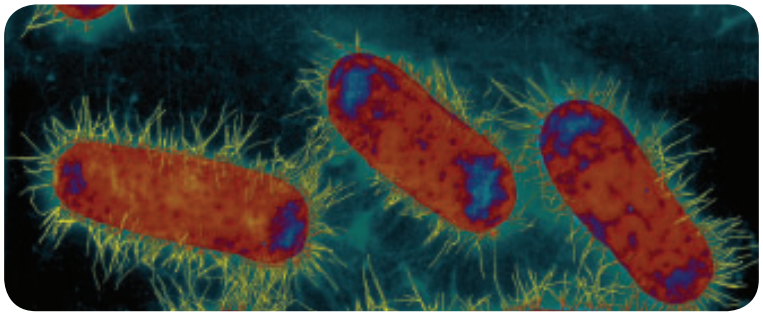

Figure 6 *E. coli* is found in the human digestive system.

The five major groups of organisms are summarized in Figure 7. All living things can be classified into one of these groups based on their characteristics. When you examine the organisms in each group, you see that they have important characteristics in common. This method of classification allows scientists to better understand the diversity of life on Earth.

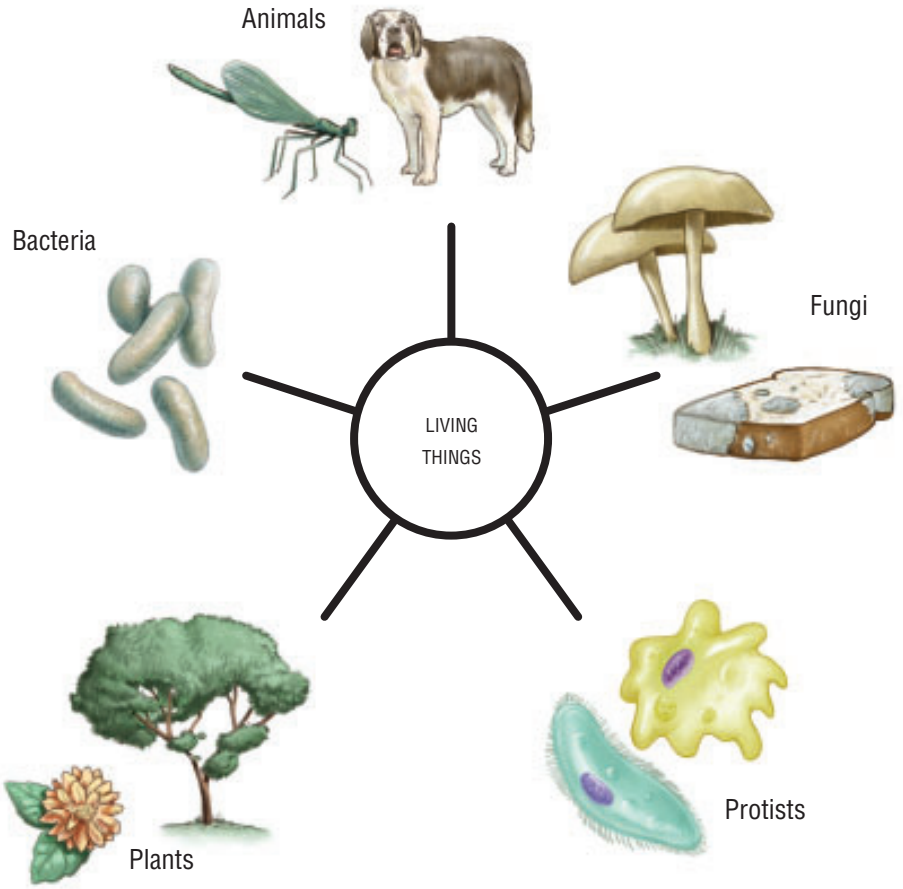

Figure 7 All organisms can be placed into one of these five groups.

Unit Task You will use your knowledge of unicellular and multicellular organisms when completing the Unit Task. What concepts in this section do you think will be especially useful to you?

CHECK YOUR LEARNING

1. Before reading this section, had you ever thought of yourself as a multicellular organism? How has this knowledge changed the way you view yourself and other organisms?
2. Why is it important for scientists to classify organisms?
3. Define "unicellular organism" and "multicellular organism," and give two examples of each.
4. What is the main difference between vertebrates and invertebrates?
5. What are the five groups into which all living things can be classified?
6. Explain how protists can be either plant-like or animal-like using examples from the text.