

# CHAPTER 1 The Scope of Biology

## Summary of Key Concepts

### Concept 1.1 Biology explores life from the global to the microscopic scale. (pp. 4–6)

Biology reaches from the scale of the entire planet down to the scale of cells and molecules. Biologists divide this huge range of scales into different levels of organization. At the global scale is the *biosphere*, which consists of all the parts of the planet that are inhabited by living things. Making up the biosphere are Earth's ecosystems. An *ecosystem* is the community of living things in an area, along with the nonliving features of the environment that support the living community. Examples of ecosystems range from a small backyard pond to a tropical rain forest covering millions of acres. The community of each ecosystem consists of individual living things, called *organisms*. All organisms are made up of one or more *cells*, which are life's basic units of structure and function. The nucleus of each cell contains molecules of *DNA*, the chemical responsible for inheritance. Each DNA molecule includes units of inherited information called *genes*.

1. What makes up the biosphere? \_\_\_\_\_  
\_\_\_\_\_
2. Identify the components of an ecosystem. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
3. How are genes related to DNA? \_\_\_\_\_  
\_\_\_\_\_

### Concept 1.2 Biology explores life in its diverse forms. (pp. 7–10)

A *species* is a distinct form of life. Zebras, monarch butterflies, and human beings are all examples of species. Biologists classify the more than 1.5 million known species by organizing similar species into larger categories. Many biologists call the broadest category a *domain*. There are three domains: Archaea, Bacteria, and Eukarya. Most organisms in the Archaea and Bacteria domains are *unicellular*, meaning that their entire bodies consist of just a single cell. All of the Archaea and Bacteria are *prokaryotic cells*, which are cells without nuclei. The Eukarya domain is divided into four subgroups, or kingdoms: protists, fungi, plants, and animals. All are organisms with *eukaryotic cells*, meaning they contain nuclei. Many protists and some fungi are unicellular. The rest of the Eukarya are *multicellular*, or made of many cells.

4. Which domains consist mainly of unicellular organisms? \_\_\_\_\_  
\_\_\_\_\_
5. How do eukaryotic cells differ from prokaryotic cells? \_\_\_\_\_  
\_\_\_\_\_

6. In which domain should a biologist classify a single-celled organism containing a nucleus? \_\_\_\_\_

**Concept 1.3 Ten themes unify the study of life. (pp. 11–19)**

These ten basic ideas, or themes, can help you connect what you learn as you study biology. **Theme 1:** All levels of life, from the biosphere to the cell, are biological systems. A *system* is a complex organization formed from a combination of parts. **Theme 2:** Cells are the basis of life. All organisms are made of cells. Multicellular organisms depend on the interactions of their many cells. **Theme 3:** Form is related to function. For example, the structure of a bird’s wing allows the bird to fly. **Theme 4:** Inherited information in the form of DNA enables organisms to reproduce their own kind. **Theme 5:** Organisms interact continuously with their environment. **Theme 6:** Life on Earth depends on energy from the sun. *Producers* such as plants use sunlight to make food in a process called *photosynthesis*. *Consumers* such as animals obtain food by eating producers or other consumers. **Theme 7:** Organisms can regulate their internal conditions and maintain *homeostasis*, or a “steady state.” For example, mammals and birds can maintain a constant internal body temperature. **Theme 8:** *Evolution*, or changes in genes from generation to generation, leads to adaptations. *Adaptations* are inherited traits that help an organism survive and reproduce in its particular environment. Evolution occurs at the level of the *population*, which is a group of organisms in a certain area belonging to the same species. Adaptations come about through *natural selection*, the process by which individuals with a helpful inherited trait live longer and produce more offspring than those without the trait. **Theme 9:** Modern biology affects society by changing humans’ everyday lives. **Theme 10:** Biology relies on certain processes of inquiry to find possible answers to questions about life.

7. Explain how a human being is a biological system. \_\_\_\_\_  
\_\_\_\_\_
8. Give an example of form related to function in an organism. \_\_\_\_\_  
\_\_\_\_\_
9. Explain how life on Earth depends on energy from the sun. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

<p><b>Reading Skills Practice</b></p> <p><b>Writing definitions</b> Write definitions for the following terms in your own words: <i>biosphere, organism, and cell.</i></p>
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**Vocabulary Review and Reinforcement**

*In 1–6, fill in the blanks with the appropriate terms from the chapter.*

1. All the parts of the planet that are inhabited by living things make up the \_\_\_\_\_.

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

2. The community of living things in an area, along with the nonliving features of the environment that support the living community, is called a(n) \_\_\_\_\_.
3. The term for an individual living thing is \_\_\_\_\_.
4. The basic unit of structure and function of organisms is the \_\_\_\_\_.
5. The chemical responsible for inheritance is \_\_\_\_\_.
6. A unit of inherited information along a DNA molecule is called a(n) \_\_\_\_\_.

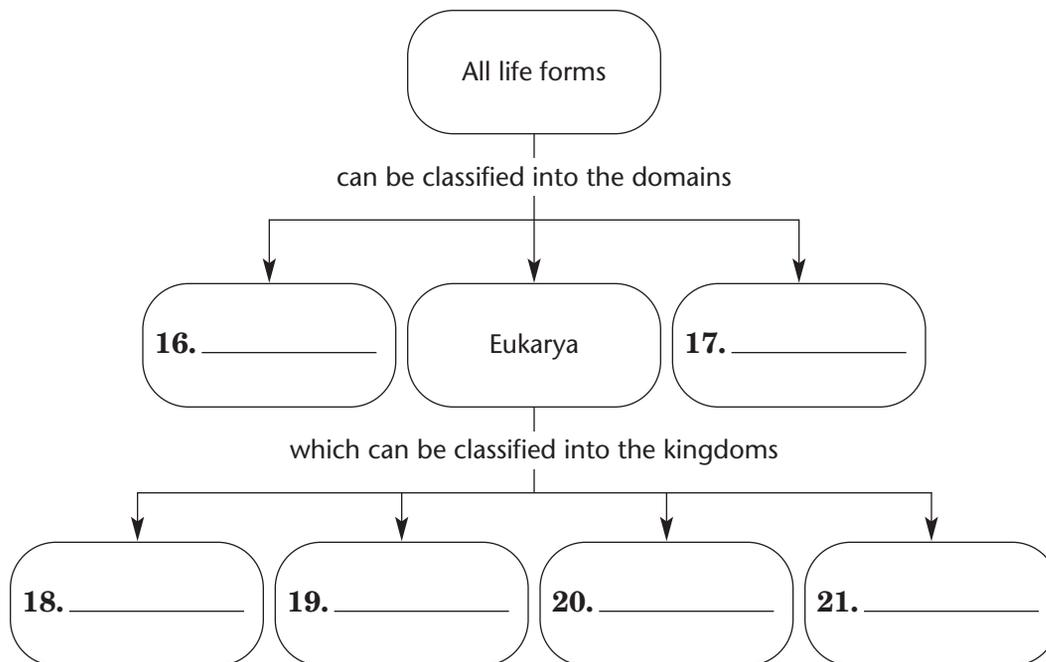
In 7–11, write true if the statement is true. If the statement is false, replace the underlined term with a term that makes the statement true.

- \_\_\_\_\_ 7. A distinct form of life is a(n) species.
- \_\_\_\_\_ 8. Prokaryotic cells contain nuclei.
- \_\_\_\_\_ 9. Multicellular organisms are made of many cells.
- \_\_\_\_\_ 10. The process by which plants use sunlight to make food is called homeostasis.
- \_\_\_\_\_ 11. Animals and other organisms that eat the food in an ecosystem are called producers.

In 12–15 write the letter of the correct definition on the line next to each term.

- |                           |                                                            |
|---------------------------|------------------------------------------------------------|
| _____ 12. eukaryotic cell | a. steady state                                            |
| _____ 13. unicellular     | b. cell that contains a nucleus                            |
| _____ 14. system          | c. complex organization formed from a combination of parts |
| _____ 15. homeostasis     | d. consisting of a single cell                             |

In 16–21, fill in the blanks with the appropriate terms from the chapter.



**WordWise**

Answer the questions by writing the Key Terms in the blanks. Then put the numbered letters in order to find the hidden Key Term. Write a definition for the hidden Key Term.

1. What is life’s basic unit of structure and function?

\_\_\_\_ \_  
1

2. What term means “made of many cells”?

\_\_\_\_ \_  
2

3. What is the broadest category used to classify life forms?

\_\_\_\_ \_  
3

4. What term refers to a distinct form of life?

\_\_\_\_ \_  
4

5. What is a complex organization formed from a combination of parts?

\_\_\_\_ \_  
5

6. What eats the food made by producers?

\_\_\_\_ \_  
6

7. What helps an organism’s ability to survive and reproduce in its environment?

\_\_\_\_ \_  
7

8. What word means “generation-to-generation change in the proportion of different inherited genes in a population”?

\_\_\_\_ \_  
8

9. What term refers to an individual living thing?

\_\_\_\_ \_  
9

**Key Term:** \_\_\_\_\_  
1 2 3 4 5 6 7 8 9

**Definition:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_