

Chapter 1 The Science of Biology

Section 1–1 What Is Science? (pages 3–7)

This section explains what the goal of science is and describes a scientific view of the world.

What Science Is and Is Not (page 3)

1. What is the goal of science? _____

2. What is science? _____

Thinking Like a Scientist (page 4)

3. What is observation? _____

4. The information gathered from observation is called _____.
5. Complete the table about types of data.

TYPES OF DATA

Type	Data Involves . . .	Example
	Numbers	
	Characteristics that cannot be easily measured or counted	

6. What is an inference? _____

Explaining and Interpreting Evidence (page 5)

7. What is a hypothesis? _____

8. In science, a hypothesis is useful only if it can be _____.
9. Is the following sentence true or false? A hypothesis should be stated in such a way that it can never be proved wrong. _____
10. What are three ways from which hypotheses may arise?
 - a. _____
 - b. _____
 - c. _____
11. Circle the letter of each of the following that may be an outcome of testing a hypothesis.
 - a. The hypothesis is partly true but needs to be revised.
 - b. The hypothesis is wrong.
 - c. The hypothesis is supported.
 - d. The hypothesis is of no value.

Science as a Way of Knowing (page 6)

12. What do scientists assume about the universe?

13. What are some qualities that are desirable in a scientist? _____

Science and Human Values (page 7)

14. Is the following sentence true or false? A community must use its shared values to make decisions about scientific issues. _____

Section 1–2 How Scientists Work (pages 8–15)

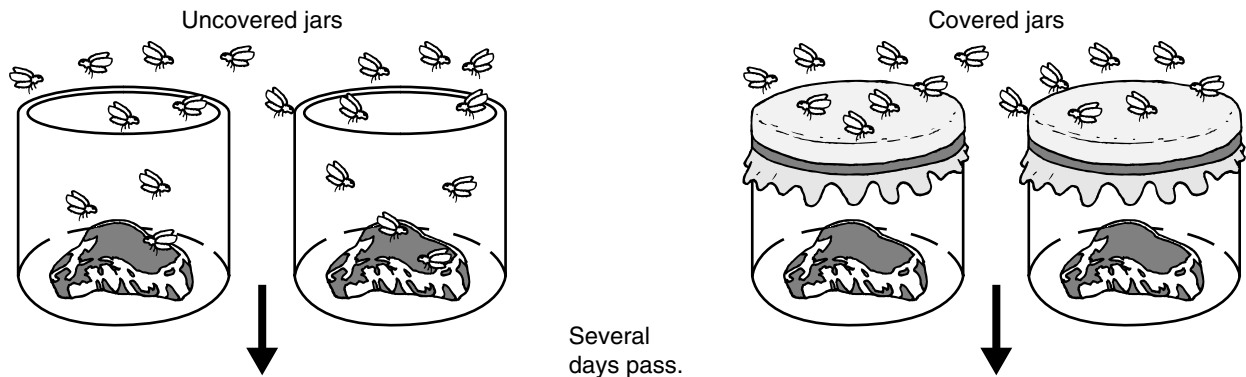
This section explains how scientists test hypotheses. It also describes how a scientific theory develops.

Designing an Experiment (pages 8–10)

1. The idea that life can arise from nonliving matter is called _____.
2. What was Francesco Redi's hypothesis about the appearance of maggots?

3. What are variables in an experiment? _____
4. Ideally, how many variables should an experiment test at a time? _____
5. When a variable is kept unchanged in an experiment, it is said to be _____.
6. What is a controlled experiment? _____
7. The illustration below shows the beginning of Redi's experiment. Complete the illustration by showing the outcome.

Redi's Experiment on Spontaneous Generation



8. Complete the table about variables.

VARIABLES

Type of Variable	Definition
Manipulated variable	
Responding variable	

9. In Redi's experiment, what were the manipulated variable and the responding variable?

10. For what do scientists use the data from a controlled experiment? _____

11. When scientists look for explanations for specific observations, what do they assume about nature? _____

Publishing and Repeating Investigations (pages 10–13)

12. Why do scientists assume that experimental results can be reproduced?

13. What did Anton van Leeuwenhoek discover? _____

14. What did John Needham conclude from his test of Redi's findings? _____

15. What did Spallanzani do to improve upon Redi's and Needham's work? _____

16. How did Pasteur settle the spontaneous generation argument? _____

When Experiments Are Not Possible (page 14)

17. In animal field studies, why do scientists usually try to work without making the animals aware that humans are present? _____

18. When a controlled experiment is not possible, why do scientists try to identify as many relevant variables as possible? _____

How a Theory Develops (pages 14–15)

19. The theory that new organisms come from existing organisms is called _____.
20. In science, what is a theory? _____

21. Is the following sentence true or false? A theory may be revised or replaced by a more useful explanation. _____

Reading Skill Practice

A flowchart can help you remember the order in which a set of events has occurred or should occur. On a separate sheet of paper, create a flowchart that represents the process that Redi carried out in his investigation of spontaneous generation. This process is explained under the heading *Designing an Experiment* on pages 8–10. For more information about flowcharts, see Organizing Information in Appendix A of your textbook.

Section 1–3 Studying Life (pages 16–22)

This section describes the characteristics of living things. It also explains how life can be studied at different levels.

Introduction (page 16)

1. What is biology? _____

Characteristics of Living Things (pages 16–20)

2. What is a cell? _____

3. Circle the letter of each sentence that is true about cells.

- a. A cell is the smallest unit of an organism that can be considered alive.
- b. A multicellular organism may contain trillions of cells.
- c. A living thing that consists of a single cell is a multicellular organism.
- d. Organisms are made up of cells.

4. What are two types of asexual reproduction?

- a. _____
- b. _____

5. Living things are based on a universal _____.

6. Circle the letter of each sentence that is true about living things.

- a. The life cycle of many organisms involves development.
- b. For bacteria, growth is mostly a simple increase in size.
- c. Each type of organism has a distinctive life cycle.
- d. Cells may change in number but never differentiate.

7. Why does an organism need energy and a constant supply of materials?

8. What is metabolism? _____

9. Is the following sentence true or false? All organisms respond to the environment in exactly the same ways. _____

10. What is homeostasis? _____

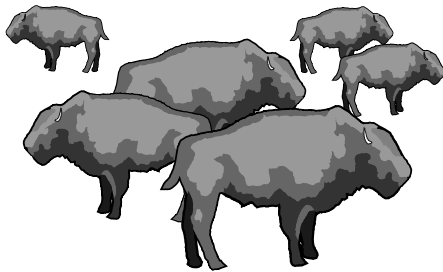
11. A group of organisms that changes over time is said to _____.

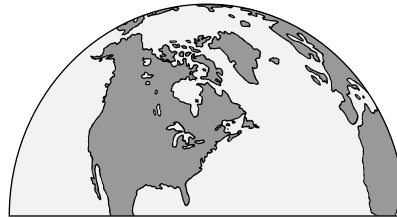
Branches of Biology (pages 20–21)

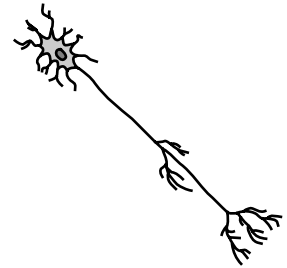
Match the different kinds of biologists with the focus of their study.

Kinds of Biologists	Focus of Study
_____ 12. Zoologist	a. Plants
_____ 13. Botanist	b. Ancient life
_____ 14. Paleontologist	c. Animals

15. Label each of the illustrations below according to the level of study represented.







16. The largest level of biological study is the _____.

Biology in Everyday Life (page 22)

17. What kinds of information can the study of biology provide about matters affecting human society? _____

