

**Chapter  
1**
**Biology: The Study of Life, continued**
**Reinforcement and Study Guide**
**Section 1.3 The Nature of Biology**

In your textbook, read about kinds of research.

Complete the chart by checking the more correct column for each example.

Example	Quantitative Research	Qualitative Research
1. Numerical data		
2. Field study of hunting behavior		
3. Thermometer, balance scale, stopwatch		
4. Testable hypothesis		
5. Measurements from controlled laboratory experiments		
6. Purely observational data		
7. Binoculars, tape recorder, camera		

Complete each statement.

8. In order for scientific research to be universally understood, scientists report measurements in the \_\_\_\_\_, a modern form of the metric system.
9. This system of measurement is abbreviated \_\_\_\_\_.
10. This system is a \_\_\_\_\_ system in which measurements are expressed in multiples of \_\_\_\_\_ or \_\_\_\_\_ of a basic unit.

In your textbook, read about science and society.

If the following statement is true, write **true**. If it is not, rewrite the italicized part to make it true.

11. Ideas about the value of knowledge gained through scientific research come from a society's *social*, *ethical*, and *moral* concerns. \_\_\_\_\_
12. Pure science is scientific research carried out *primarily to solve a specific environmental problem*. \_\_\_\_\_
13. *Technology* is the practical application of scientific research to improve human life and the world in which we live. \_\_\_\_\_
14. A technological solution to a human problem can benefit humans but may also *cause a different, possibly serious, problem*. \_\_\_\_\_
15. *Scientists* have the final say about how the results of scientific discoveries are applied. \_\_\_\_\_

*In your textbook, read about characteristics of life.*

Complete the following statements.

Biology is the study of **(1)** \_\_\_\_\_ and the **(2)** \_\_\_\_\_ among them. Biologists use a variety of **(3)** \_\_\_\_\_ methods to study the details of life.

For each item in Column A, write the letter of the matching item in Column B.

**Column A****Column B**

- |   |                                |
|---|--------------------------------|
| _____ 4. The basic unit is the cell.  | <b>a.</b> development          |
| _____ 5. Maintenance of a stable internal environment                         | <b>b.</b> growth               |
| _____ 6. Reaction to a change in the environment                              | <b>c.</b> homeostasis          |
| _____ 7. Cell enlargement and division  | <b>d.</b> organization         |
| _____ 8. Changes in an organism that take place over time                     | <b>e.</b> reproduction         |
| _____ 9. Transmission of heredity information from one generation to the next | <b>f.</b> response to stimulus |

Using what you know about characteristics of life, determine if each of the following describes a living or nonliving thing.

- |                              |                             |
|------------------------------|-----------------------------|
| _____ 10. rust on a bucket   | _____ 13. lightning         |
| _____ 11. an apple on a tree | _____ 14. a dinosaur fossil |
| _____ 12. bacteria           | _____ 15. a wasp            |

In your textbook, read about scientific methods.

Decide if each of the following statements is true. If it is not, rewrite the italicized part to make it true.

16. Scientific methods include observation, *forming a hypothesis*, and experiment.  
\_\_\_\_\_

17. A statement that can be tested and presents a possible solution to a question is a *law*.  
\_\_\_\_\_

18. In a controlled experiment, two groups are tested and all conditions except *two* are kept the same for both groups. \_\_\_\_\_

19. A condition that remains the same for both groups is called the *independent variable*.  
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20. A condition that is changed by the experimenter in one group and not the other is called the *dependent variable*. \_\_\_\_\_

21. A scientific experiment can be conducted *only in a laboratory*. \_\_\_\_\_

22. A theory is a *law* that has been confirmed by many experiments. \_\_\_\_\_

Read each of the following statements. If it is a testable hypothesis, write yes. If it is not a testable hypothesis, write no.

\_\_\_\_\_ 23. If a person exercises, his or her pulse rate will increase.

\_\_\_\_\_ 24. Cats make better pets than dogs.

\_\_\_\_\_ 25. When fertilizer is added to soil, plants grow taller.

Identify each of the two italicized items as either an independent or a dependent variable.

26. The *number of red blood cells* in a mouse's blood at *different levels of iron* in its diet  
\_\_\_\_\_

27. The *amount of starch formed* in a plant leaf for *different times* of exposure to light  
\_\_\_\_\_

## Chapter

## 1

**Biology: The Study of Life**

## Reinforcement and Study Guide

## Section 1.1 What is biology?

*In your textbook, read about the science of biology.*

**Answer the following questions.**

1. What is the primary focus of all biological studies?

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2. What is meant by the statement, "Living things do not exist in isolation"?

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*In your textbook, read about why biologists study the diversity of life.*

**For each of the statements below, write true or false.**

- \_\_\_\_\_ 3. People study biology only if they are planning to become biologists.

- \_\_\_\_\_ 4. By studying biology, you can better appreciate the great diversity of species on Earth and the way each species fits into the dynamic pattern of life on the planet.

- \_\_\_\_\_ 5. The study of biology includes the investigation of interactions among species.

*In your textbook, read about the characteristics of living things.*

**Complete each statement.**

6. To be considered \_\_\_\_\_, something must exhibit all of the \_\_\_\_\_ of life.

7. \_\_\_\_\_ is another word for "living thing."

8. Every living thing, from simple, single-celled organisms to complex, multicellular plants and animals, is made up of parts that function together in orderly living \_\_\_\_\_.

**Read each of the following statements. If it describes the process of reproduction, write yes. If not, write no.**

- \_\_\_\_\_ 9. New leaves appear on a tree in spring.

- \_\_\_\_\_ 10. An amoeba divides in half.

- \_\_\_\_\_ 11. A bean plant produces seeds in long pods.

- \_\_\_\_\_ 12. Pollen grains are released from a flower.

- \_\_\_\_\_ 13. A sea star produces a new arm after losing one to a predator.

**Section 1.1 What is biology?**

Circle the letter of the choice that best completes the statement.

- 14.** A species is defined as a group of similar-looking organisms that  
**a.** undergo similar developmental changes.      **b.** can interbreed.  
**c.** can interbreed and produce fertile offspring.      **d.** reproduce in the same way.
- 15.** Every organism begins life as a(n)  
**a.** embryo.      **b.** single cell.      **c.** nucleus.      **d.** fertilized egg.
- 16.** A corn plant producing ears of corn is an example of  
**a.** growth.      **b.** reproduction.      **c.** development.      **d.** all of these.
- 17.** If members of a species fail to reproduce successfully, the species  
**a.** will eventually become extinct.      **b.** will not develop normally.  
**c.** will evolve into a new species.      **d.** will remain unchanged.

Complete the table below by checking the correct column for each example.

<b>Example</b>	<b>Stimulus</b>	<b>Response</b>
<b>18.</b> The recess bell ringing at an elementary school		
<b>19.</b> Your mouth watering at the sight of food on a plate		
<b>20.</b> A sudden drop in air temperature		
<b>21.</b> A flu virus entering your body		
<b>22.</b> Getting butterflies in your stomach before giving a speech		

Answer the following questions.

- 23.** Explain the concept of homeostasis.

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- 24.** What is an adaptation?

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- 25.** What is evolution?

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**Chapter  
1**
**Biology: The Study of Life, *continued***
**Reinforcement and Study Guide**
**Section 1.2 The Methods of Biology**

*In your textbook, read about observing and hypothesizing.*

**Answer the following questions.**

1. What is meant by *scientific methods*? \_\_\_\_\_  
\_\_\_\_\_
2. What is a hypothesis? \_\_\_\_\_  
\_\_\_\_\_
3. How is a hypothesis tested? \_\_\_\_\_

*In your textbook, read about experimenting.*

**For each item in Column A, write the letter of the matching item in Column B.**

**Column A**
**Column B**

- |       |   |                                |
|-------|---|--------------------------------|
| _____ | <b>4.</b> A procedure that tests a hypothesis by collecting information under controlled conditions | <b>a.</b> dependent variable   |
| _____ | <b>5.</b> In an experiment, the group that is the standard against which results are compared       | <b>b.</b> experimental group   |
| _____ | <b>6.</b> In an experiment, the group that is the standard against which results are compared       | <b>c.</b> independent variable |
| _____ | <b>7.</b> The condition that is tested by the experimenter  | <b>d.</b> experiment           |
| _____ | <b>8.</b> The condition being observed or measured in an experiment                                 | <b>e.</b> control group        |

**Use each of the terms below just once to complete the passage.**

**experimental results**

**experiment(s)**

**hypothesis**

**laws**

**scientific journals**

**theory**

**valid**

**verify**

When **(9)** \_\_\_\_\_ are reported in **(10)** \_\_\_\_\_, other scientists may try to **(11)** \_\_\_\_\_ the results by repeating the **(12)** \_\_\_\_\_. Usually when a(n) **(13)** \_\_\_\_\_ is supported by data from several scientists, it is considered **(14)** \_\_\_\_\_. Over time, a hypothesis that is supported by many observations and experiments becomes a **(15)** \_\_\_\_\_. Some well-established facts of nature, such as gravity, are recognized as **(16)** \_\_\_\_\_.

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Complete each statement.

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**Chapter**

**1**

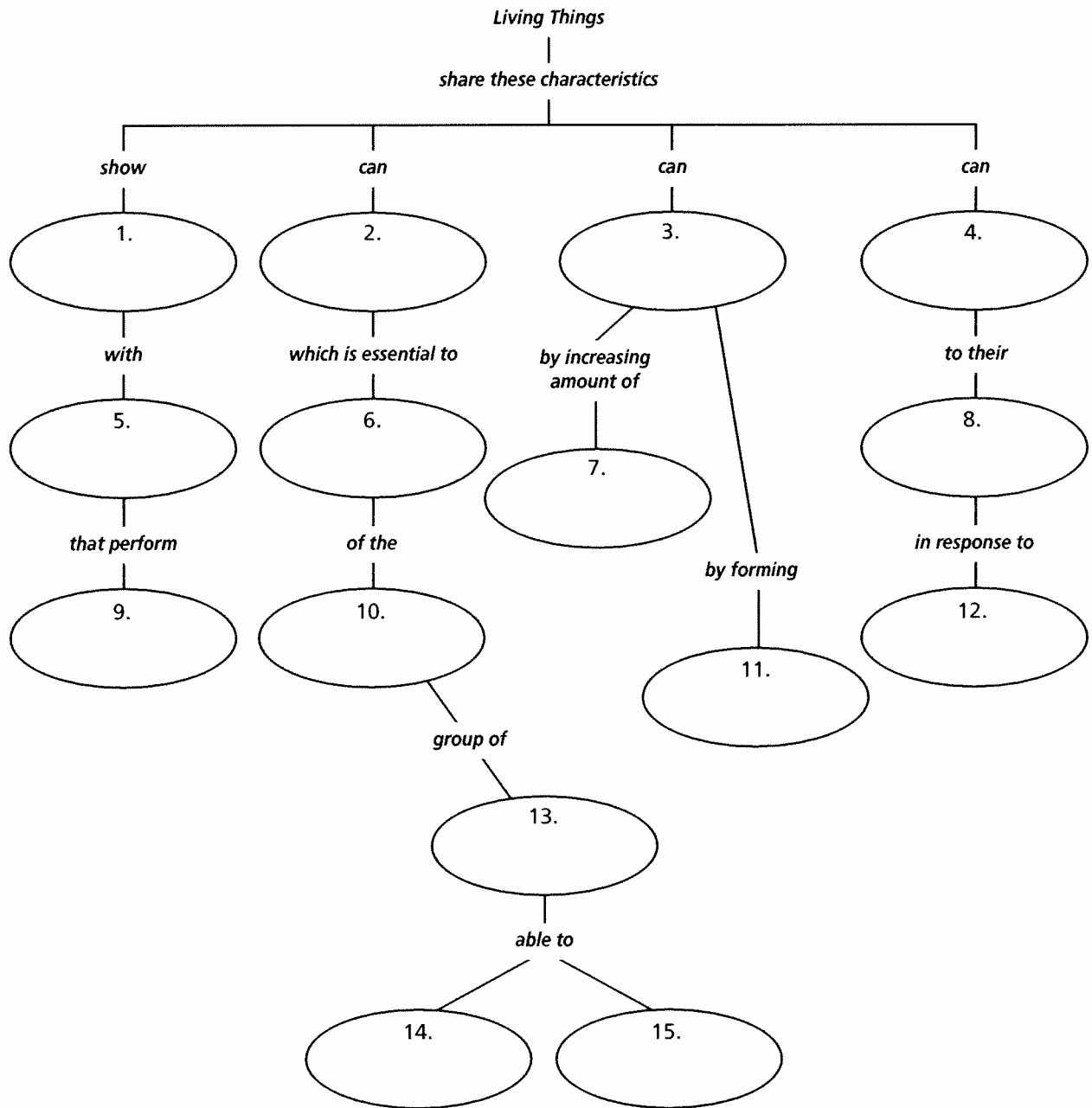
**Biology: The Study of Life**

**Concept Mapping**

Use with Chapter 1, Section 1.1

**Characteristics of Living Things**

Complete the concept map on the characteristics of living things. Use these words or phrases once: *particular functions, grow, stimuli, specialized parts, environment, species, new structures, produce fertile offspring, adjust, continuation, similar organisms, living matter, interbreed, organization, reproduce.*



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# Chapter 1

## Biology: The Study of Life

### Problem Solving

Use with Chapter 1, Section 1.2

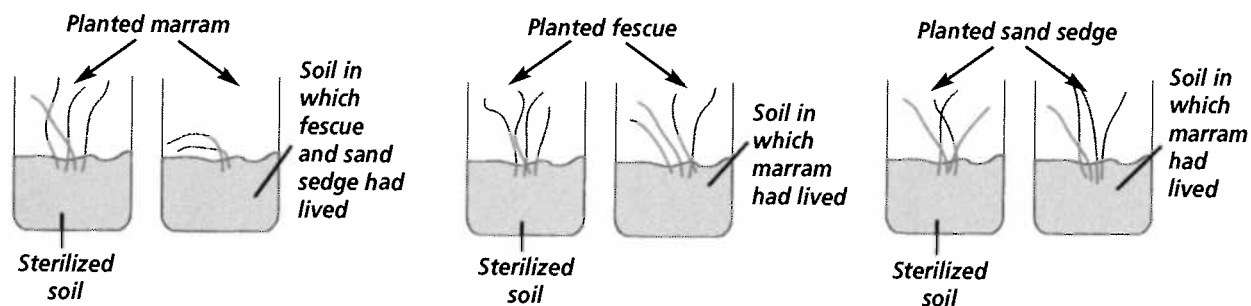
### Using Scientific Methods

**S**cientists have long known that no plant community remains stable. Over time, existing populations of plants in an environment will be succeeded by whole new populations. Sometimes as these changes occur, it is difficult for the existing plant populations to continue to survive. What causes the older plants to die off?

**A Testable Hypothesis** A group of researchers, led by Dr. Wim Van der Putten of the Center for Terrestrial Ecology in the Netherlands, developed the following hypothesis. The changing plant populations in an area are controlled by disease-causing

microorganisms that develop in the soil itself. These soil-borne diseases specifically target the existing plant inhabitants. New species that invade the area are, however, unaffected by the microorganisms.

**An Experimental Design** The researchers knew that marram grass, which is found along European coastal areas, is regularly replaced by two other species of grasses—fescue and sand sedge. To test their hypothesis, the scientists designed an experiment, which is represented in the following diagram.



Refer to the diagram to answer the following questions about the experiment.

1. What were the independent variable or variables in the experiment? Which factor was the dependent variable?

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2. What control was used?

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3. According to their hypothesis, what predictions would the researchers make about the outcome of the experiment?

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4. Suppose that fescue and sand sedge thrived in the soil in which the marram had previously grown. In order for researchers to rule out the possibility that nutrients, or chemicals such as salt or calcium chloride, favorably affected the new plant growth, what other observation would researchers have to make?

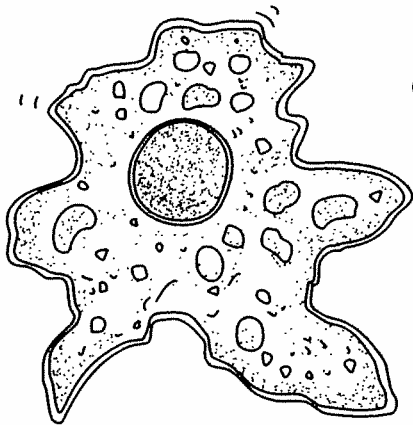
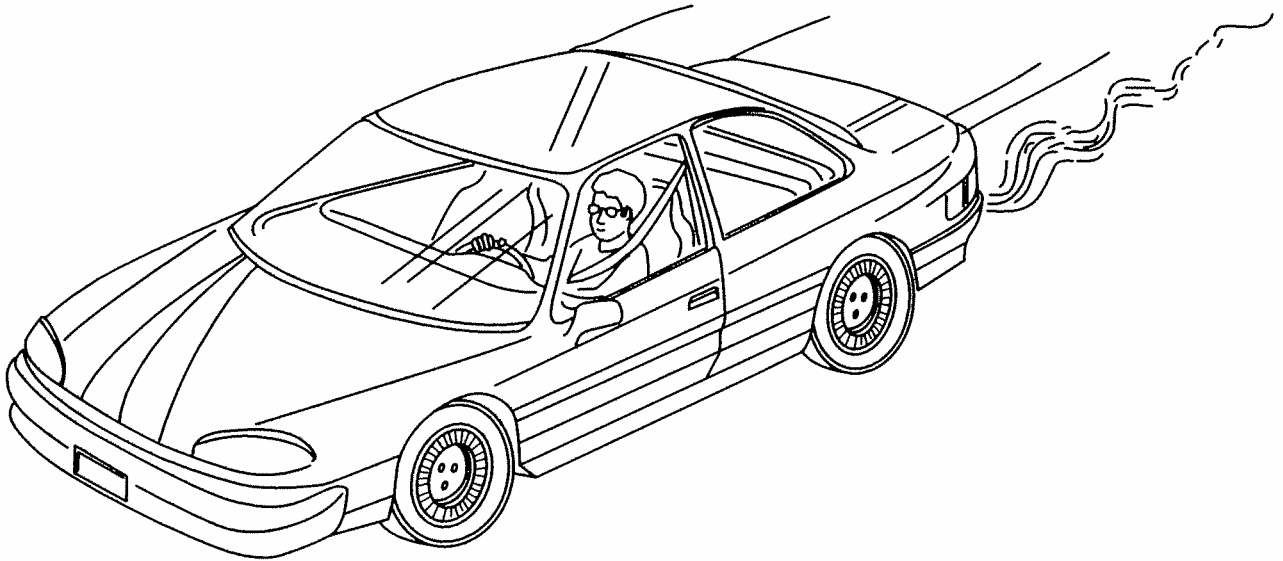
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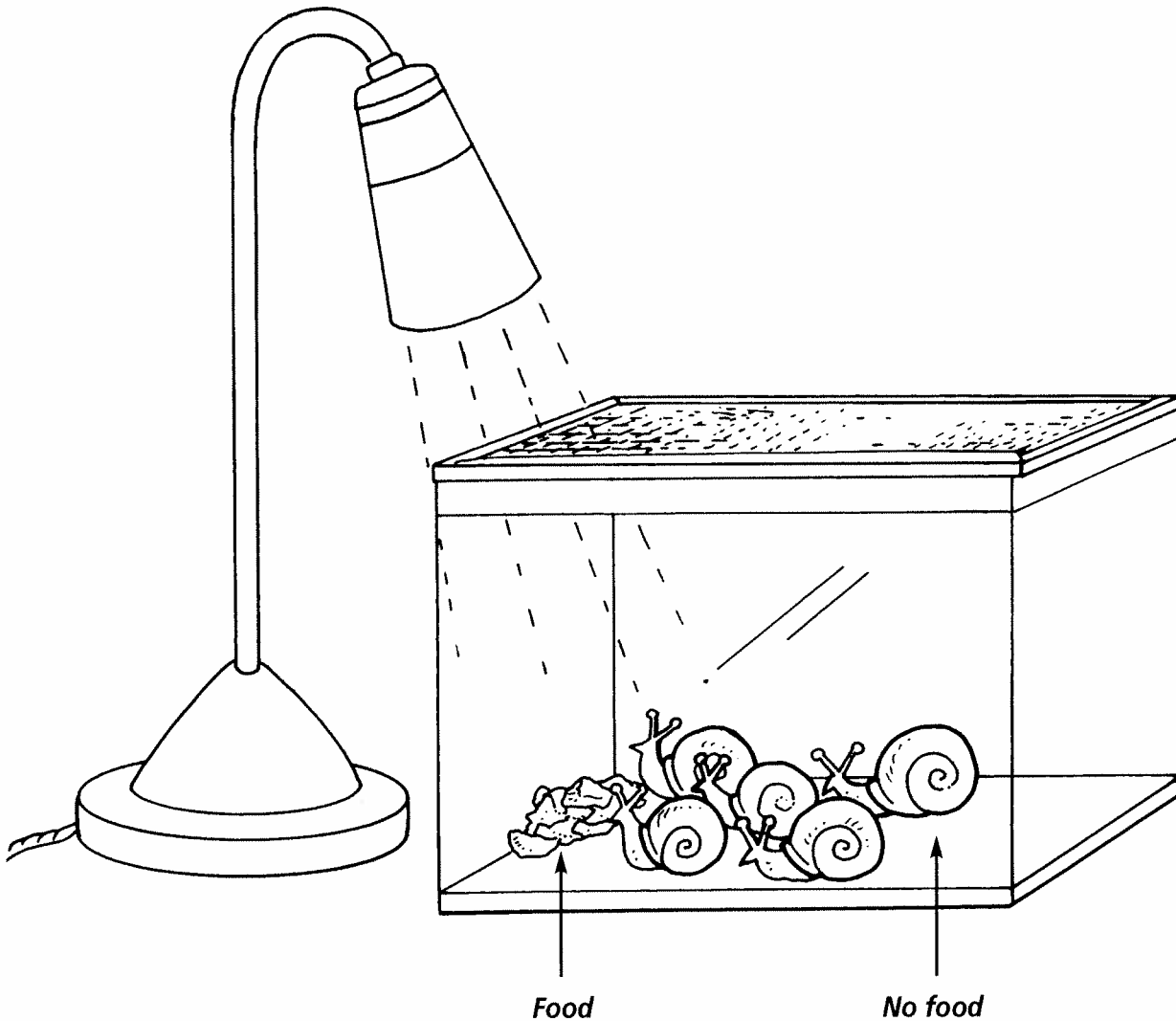
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## Master

## 1

**Characteristics of Life****Section Focus***Use with Chapter 1, Section 1.1*

- 1 What are some characteristics of living organisms?
- 2 Which of these characteristics does each object have?

**Master  
2****Designing an Experiment****Section Focus***Use with Chapter 1, Section 1.2*

- 1 What is being tested in this experiment?
- 2 How could you improve the experimental setup?

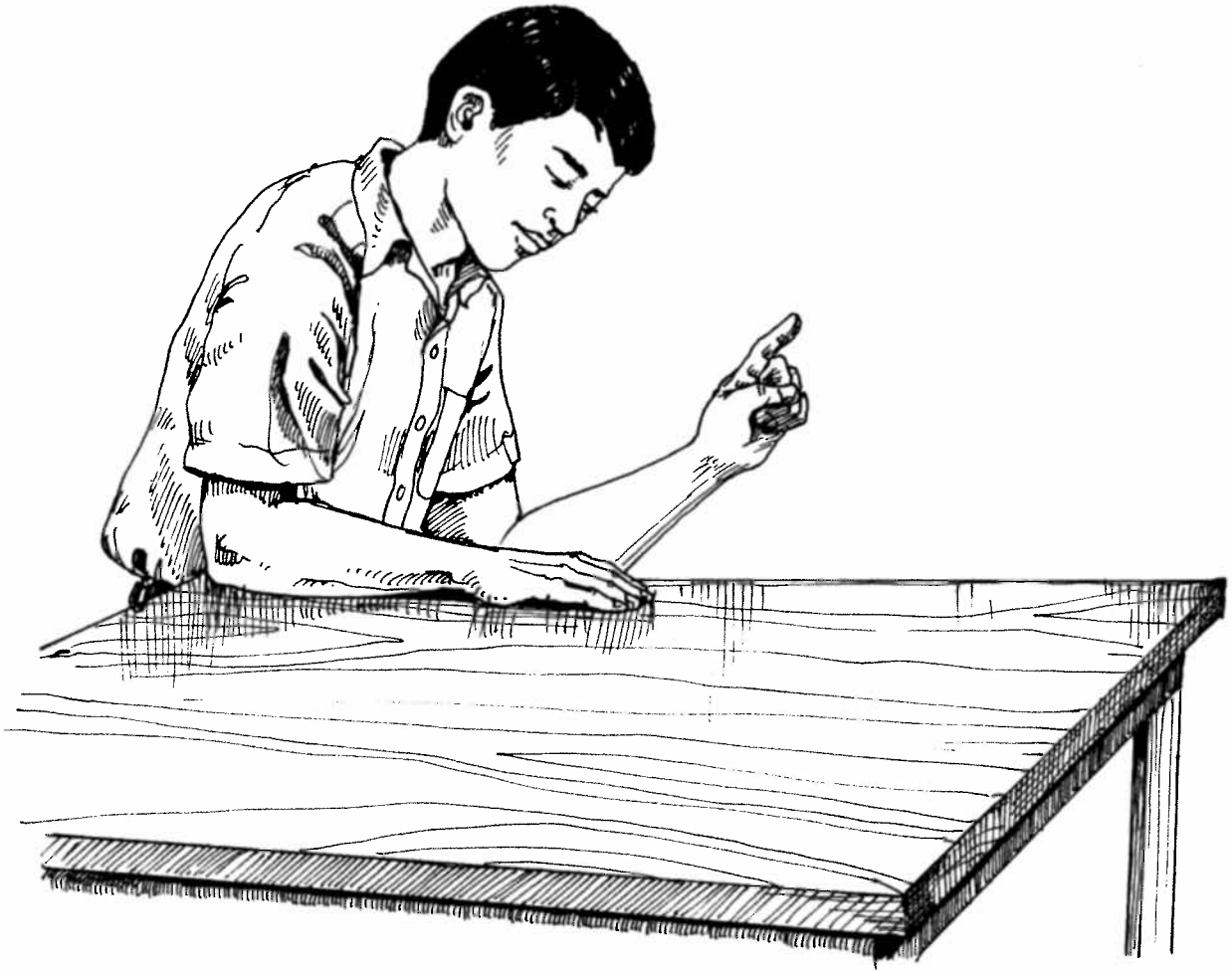
## Master

## 3

## Systems of Measurement

## Section Focus

Use with Chapter 1, Section 1.3



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- 1 The person in the picture is measuring in cubits—an ancient Egyptian measurement that equals the distance from a person’s elbow to the tip of the middle finger. What problems might occur if everyone used this unit?
- 2 What characteristics should a measurement system have to make it accurate and easily understood by everyone?

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**Column A**

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**Column B**

- a.** development
- b.** growth
- c.** homeostasis
- d.** organization
- e.** reproduction
- f.** response to stimulus

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- |                                     |                                    |
|-------------------------------------|------------------------------------|
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