Chapter 1 Review

READING TOOLBOX

1. **Hypothesis or Theory?** Write a statement that summarizes the difference between a hypothesis and a theory.
2. **Concept Mapping** Make a concept map that outlines scientific investigations in biology. Try to include the following words: ***biology, observation, communication, hypotheses, predictions, experiments,*** and ***theories.***

Using Key Terms

Use each of the following terms in a separate sentence.

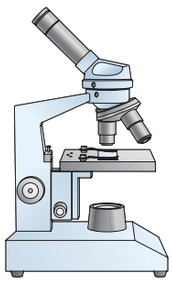
3. *skepticism*
4. *control group*

For each pair of terms, explain how the meanings of the terms differ.

5. *hypothesis* and *theory*
6. *homeostasis* and *metabolism*
7. *reproduction* and *heredity*

Understanding Key Ideas

8. To support claims, scientists require
   - **a.** evidence.
   - **b.** opinions.
   - **c.** technology.
   - **d.** photographs.
9. Though scientists study the world from differing perspectives, what must all scientists take into account?
   - **a.** universal laws
   - **b.** animal behavior
   - **c.** temperature differences
   - **d.** the importance of biology
10. Which of the following observations is qualitative, described in words rather than numbers?
    - **a.** surveying the size of the goose population
    - **b.** observing the nocturnal behavior of coyote populations
    - **c.** recording the date when goose migration begins every year
    - **d.** counting the number of goose nests that are robbed of eggs in an area
11. What is true of all hypotheses?
    - **a.** They are true.
    - **b.** They are false.
    - **c.** They are testable.
    - **d.** They are indisputable.
12. In an experiment, what happens to the control group?
    - **a.** It receives no experimental treatment.
    - **b.** It receives experimental treatment last.
    - **c.** It receives experimental treatment first.
    - **d.** It receives more experimental treatments than the other groups.
13. Which of the following units of measure would be most appropriate for determining the mass of an apple?
    - **a.** gram
    - **b.** kilogram
    - **c.** milligram
    - **d.** centigram
14. How does a microscope help scientists observe objects?
    - **a.** It measures objects.
    - **b.** It magnifies images.
    - **c.** It performs calculations.
    - **d.** It stains transparent objects.



15. Some toads that live in a hot, dry environment bury themselves in the soil during the day. What characteristic of living things does this behavior describe?
    - **a.** heredity
    - **b.** reproduction
    - **c.** metabolism
    - **d.** responsiveness

Explaining Key Ideas

16. **Summarize** the four key steps to practicing good scientific thought.
17. **Explain** why the study of science is important.
18. **Infer** why scientists try to limit the number of independent variables in an experiment.
19. **Identify** 10 things that you can do to stay safe during scientific investigations.

Assignment Guide

Section	Questions
1	3, 8, 9, 16, 17, 20, 21, 22, 23
2	1, 2, 4, 5, 10, 11, 12, 18, 25, 26, 27
3	13, 14, 19, 24, 29

Review

Reading Toolbox

1. A hypothesis is a possible explanation that forms the basis for a scientific investigation; a theory is an explanation for a broad range of data.
2. See previous page for answer to concept map.

Using Key Terms

3. Scientific thought involves having *skepticism* about ideas.
4. A *control group* is a group in an experiment that receives no experimental treatment.
5. A *hypothesis* is a specific, testable prediction for a limited set of conditions. A *theory* is a general explanation for a broad range of data.
6. *Homeostasis* is the ability to maintain a stable internal environment in spite of changes in the external environment. *Metabolism* is the sum total of all the chemical reactions that are carried out in an organism.
7. *Reproduction* is the process by which organisms make more of their own kind from one generation to the next. When an organism reproduces, it passes on its own traits to its offspring in a process known as *heredity.*

Understanding Key Ideas

8. a **9.** a **10.** b **11.** c
12. a **13.** a **14.** b **15.** d

Explaining Key Ideas

16. making detailed observations, making inferences based on evidence, viewing conclusions with skepticism, and being open to change when new discoveries are made
17. Science improves people's lives and helps them think critically about the world around them.
18. Scientists try to limit the number of independent variables so that they can determine the relationship between variables. If there are many independent variables, it is difficult to determine how independent variables affect dependent variables.

19. Wear safety goggles and other safety equipment when working in the lab. Listen carefully to your teacher, and follow all instructions. Do not take shortcuts in your lab procedure. Measure chemicals precisely. Read the lab procedure carefully before beginning an experiment. Think about the consequences of every lab action before doing it. Keep your lab area clean and free from clutter. Make sure equipment sits securely on the lab bench so it will not fall or tip over. Pay attention to where you are walking, be aware of your surroundings. Avoid the poisonous plants and animals that live in the area. When working outdoors, wear sunscreen and a hat that shades your neck and ears.

Using Science Graphics

20. a **21.** d **22.** c

Critical Thinking

23. Students may describe how the chemical reactions that occur during photosynthesis are an example of the law of conservation of matter. Students could also apply this law to the relationships between producers, consumers, and decomposers in an ecosystem.

24. The development of the microscope enabled scientists to observe very small organisms such as bacteria. When scientists discovered that bacteria are found on any surface, they developed sterilization techniques so that their lab equipment would not be contaminated.

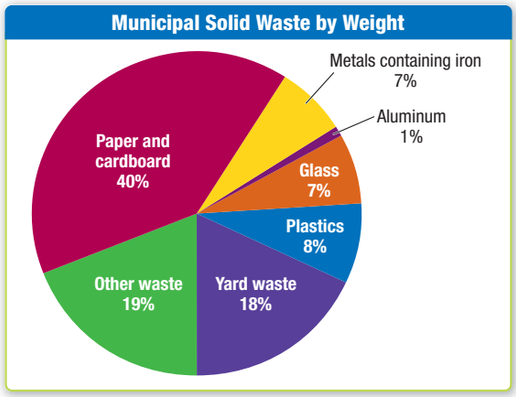
25. Blind peer review eliminates the chance of bias on the part of the reviewers.

Technology Skills

26. Students should demonstrate an understanding of the differences between theories, laws, and hypotheses. In addition, students should be able to describe the scientific value of theories, laws, and hypotheses.

Using Science Graphics

This diagram shows a breakdown of the types of municipal solid waste, by weight, generated in the United States. Use the chart and your knowledge of science to answer the following questions.



20. According to the diagram, which makes up the greatest proportion of waste?
- **a.** paper and cardboard
- **b.** metals containing iron
- **c.** yard waste, glass, and plastics
- **d.** other waste

21. If each type of solid waste were recycled, which type would have the biggest impact on conserving trees?
- **a.** aluminum
- **b.** glass
- **c.** plastics
- **d.** paper and cardboard

22. Which of these types of waste could be turned into compost?
- **a.** glass
- **b.** plastics
- **c.** yard wastes
- **d.** metal containing iron

Critical Thinking

23. Forming Reasoned Opinions The law of conservation of matter states that matter cannot be created or destroyed. How does this universal law relate to biology?

24. Recognizing Relationships The development of science and technology is closely linked. Explain how the invention of the microscope led to the development of the sterile technique. List at least one other technology that most likely resulted from the invention of the microscope.

25. Inferring Relationships The most rigorous form of peer review is blind peer review, in which the scientists reviewing the work do not know the identity of the scientists who authored the work. Why might blind peer review be more rigorous than other forms of peer review?

Technology Skills

26. Computer Presentation Find out more about the differences between theories, laws, and hypotheses. Create a computer presentation that uses examples and illustrations to show the differences between each.

Methods of Science

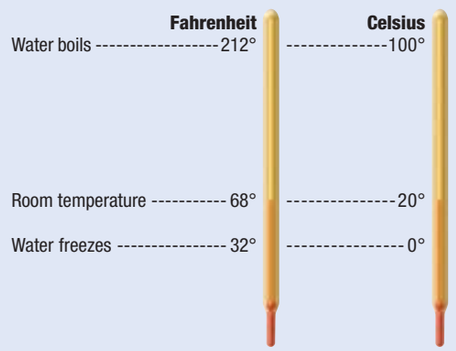
27. Analyzing Methods Scientists collect both quantitative and qualitative data. Quantitative data can be expressed in numbers. Qualitative data must be expressed in words. If you were observing a pride of lions, what are some examples of quantitative and qualitative data that you could collect?

Alternative Assessment

28. Homeostasis Display Research five ways that your body maintains homeostasis. Then, create a poster-board display that illustrates how each of these responses functions.

Math Skills

29. Estimating The diagram below shows the relationship between the Fahrenheit and the Celsius temperature scales. If the air temperature is 60°F, estimate the air temperature in Celsius.



Methods of Science

27. Quantitative data could include how many lions are in the pride, how much they eat, and how many offspring they have. Qualitative data could include a description of their hunting behavior or descriptions of individual appearance.

Alternative Assessment

28. Students could illustrate how any of the organ systems help maintain homeostasis.

Math Skills

29. The air temperature would be about 15°C.