

## Vocabulary Review

Explain the relationship between the vocabulary terms below.

1. geosphere, mantle
2. hydrosphere, atmosphere
3. oceanography, hydrosphere
4. meteorology, atmosphere
5. geology, biosphere

For Questions 6 to 9, fill in the blanks with the correct vocabulary terms from the Study Guide.

6. When conducting experiments, scientists use \_\_\_\_\_ to help guide their processes.
7. The \_\_\_\_\_ is the one factor that can be manipulated by the experimenter.
8. Scientists use a form of shorthand called \_\_\_\_\_ to express very large or very small numbers.
9. Most scientific studies and experiments use a standard system of units called \_\_\_\_\_.

Write a sentence using the following vocabulary terms.

10. scientific theory
11. scientific law
12. scientific model

Fill in the blanks with a vocabulary term from the Study Guide.

13. In the field of \_\_\_\_\_, scientists measure temperature, pressure, and humidity.
14. Their measurements come from features of the \_\_\_\_\_ and hydrosphere, and they look at how weather affects the \_\_\_\_\_ and geosphere.
15. The units of their measurements come from \_\_\_\_\_ and the metric system.
16. The numbers generally are not large, so \_\_\_\_\_ is not used.

## Understand Key Concepts

17. Which one of these is NOT a specialized area of Earth science?
  - A. astronomy
  - B. environmental science
  - C. technology
  - D. oceanography

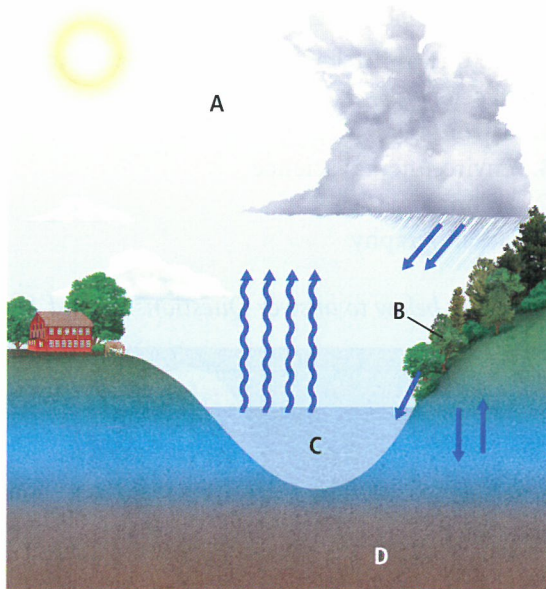
Use the figure below to answer Questions 18 and 19.



18. Which type of scientist is shown above?
  - A. oceanographer
  - B. geologist
  - C. astronomer
  - D. meteorologist
19. Which type of research is this scientist conducting?
  - A. field research
  - B. lab research
  - C. library research
  - D. biological research
20. Which is a sequence of steps a scientist might use to conduct an investigation?
  - A. analysis, test, question, conclude
  - B. test, question, conclude, analysis
  - C. question, test, analysis, conclude
  - D. conclude, test, question, analysis



Use the figure below to answer Questions 21 and 22.



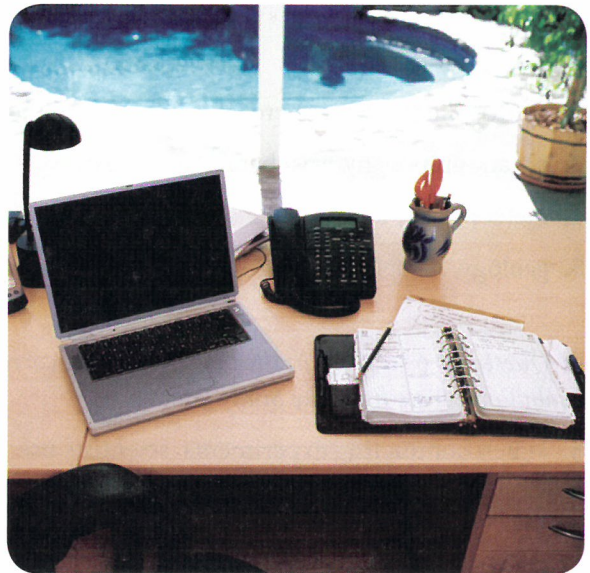
21. Identify the Earth system that is labeled A.
  - A. atmosphere
  - B. biosphere
  - C. hydrosphere
  - D. geosphere
22. Identify the Earth system that is labeled B.
  - A. atmosphere
  - B. biosphere
  - C. hydrosphere
  - D. geosphere
23. Which type makes up 97 percent of Earth's water?
  - A. groundwater
  - B. salt water
  - C. freshwater
  - D. spring water
24. Which is true of scientific models?
  - A. They never change.
  - B. They must be true for at least ten years.
  - C. They will be modified with new observations and data.
  - D. They are generally the work of one scientist.
25. Select the correct scientific notation for 150,000,000 km.
 

A. $150 \times 10^6$ km	C. $1.5 \times 10^8$ km
B. $15 \times 10^7$ km	D. $0.15 \times 10^9$ km

## Constructed Response

26. **Explain** how technology relates to science.

Use the photo below to answer Question 27.



27. **Identify** the SI units that would be used to measure each of the above items.
28. **Summarize** each of Earth's systems and explain their relationships to each other.
29. **Compare and contrast** an investigation and an experiment.
30. **Apply** Why might a graph be more helpful in explaining data than just writing the results in words?
31. **Apply** When ice is heated above  $0^{\circ}\text{C}$ , it melts. Is this a theory or a law? Explain.

## Think Critically

32. **CAREERS IN EARTH SCIENCE** Why would a meteorologist need an understanding of Earth's hydrosphere?
33. **Design an Experiment** Suppose you want to find the effect of sunlight on the temperature of a room with the shade up and the shade down. Describe how you would test this hypothesis. What would be your variables? What would you use as a control?



- 34. Propose** An ecologist wants to study the effects of pollution on plant growth. The scientist uses two groups of plants. To the first group, a type of pollutant is added. To the second group, nothing is added. The scientist records plant growth for each plant for two weeks. What is the purpose of the second group in the scientist's study?

Use the table below to answer Question 35.

Some SI Conversions		
1 m	= _____ mm	= _____ km
1 g	= _____ mg	= _____ kg
1 cm <sup>3</sup>	= _____ m <sup>3</sup>	= _____ mL
3.5 km	= _____ m	= _____ cm

- 35. Calculate** Copy the table into your notebook. Complete the table. Once you have made your conversions, express each answer in scientific notation.

### Concept Mapping

- 36.** Use the following terms to make a concept map summarizing the units used to measure each quantity discussed in the chapter: *time, density, temperature, volume, mass, weight, length, area, °C, g/mL, km, s, cm<sup>3</sup>, m<sup>2</sup>, kg, and N.* For help, refer to the *Skillbuilder Handbook*.

### Challenge Question

- 37. Evaluate** A scientist is researching a new cancer drug. Fifty patients have been diagnosed with the type of cancer the drug is designed to treat. If a control is used, the patients might not receive any medication. The patients do not know if they are receiving the placebo or the new medication. For this reason, the patients are allowed to also receive traditional treatment if they choose. How will this impact the research? How should the scientist account for this information in the results? Should the scientists be allowed to discourage patients from receiving additional treatment?

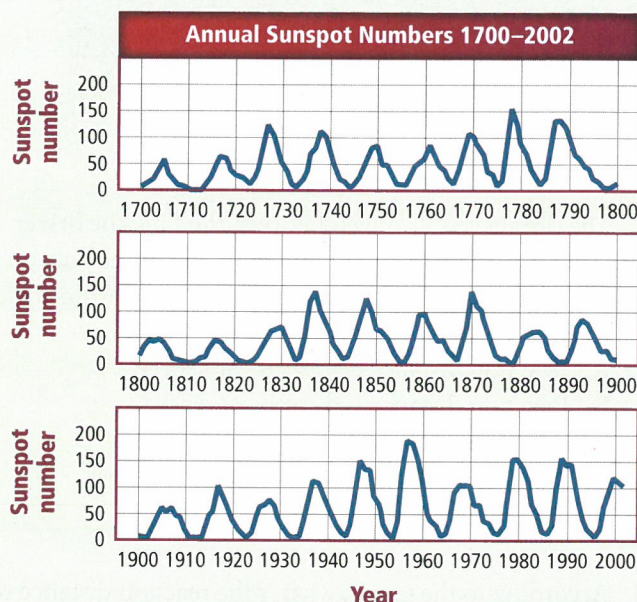
## Additional Assessment

- 38. WRITING in Earth Science** Imagine you are writing an explanation of the scientific methods for someone who has never done a scientific investigation before. Explain what the scientific methods are and why they are so important.

### DBQ Document-Based Questions

Data obtained from: Annual mean sunspot numbers 1700–2002. *National Geophysical Data Center.*

Use the graphs below to answer Questions 39–41.



- 39.** Is there a consistent pattern in the graphs? If so, what is the pattern showing?
- 40.** What do the graphs express regarding the number of sunspots that have been seen and recorded since the 1700s?
- 41.** What would you predict would be the pattern for the years 2000 to 2100?

### Cumulative Review

In Chapters 2–30, Cumulative Review questions will help you review and check your understanding of concepts discussed in previous chapters.

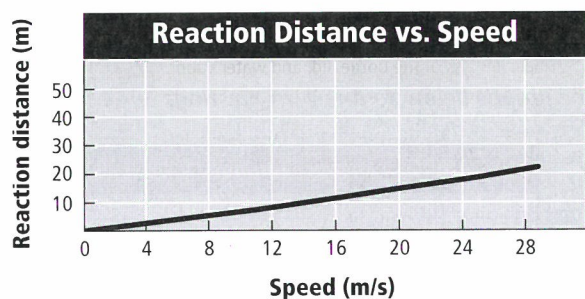


# Standardized Test Practice

## Multiple Choice

1. Identify the type of Earth science that involves the study of the materials that make up Earth.
  - A. astronomy
  - B. meteorology
  - C. geology
  - D. oceanography

Use the graph below to answer Questions 2 and 3.



2. The distance a car travels between the time the driver decides to stop the car and the time the driver puts on the brakes is called the reaction distance. How does the reaction distance change with speed?
  - A. Reaction distance decreases with speed.
  - B. Reaction distance is the same as speed.
  - C. Reaction distance increases with speed.
  - D. There is not enough information to answer the question.
3. According to the graph, what is the reaction distance of the driver traveling 20 m/s?
  - A. 3 m
  - B. 15 m
  - C. 20 m
  - D. 28 m
4. Which lists Earth's layers from the inside out?
  - A. inner core, outer core, mantle, crust
  - B. crust, mantle, outer core, inner core
  - C. crust, inner core, outer core, mantle
  - D. mantle, outer core, inner core, crust
5. A block is 2 cm wide, 5.4 cm deep, and 3.1 cm long. The density of the block is  $8.5 \text{ g/cm}^3$ . What is the mass of the block?
  - A. 33.48 g
  - B. 85.10 g
  - C. 399.3 g
  - D. 284.58 g
6. If a conclusion is supported by data, but does not support an original hypothesis, what should a scientist do?
  - A. The scientist should reevaluate the original hypothesis.
  - B. The scientist should redesign the experiment.
  - C. The scientist should not change anything.
  - D. The scientist should modify the conclusion.

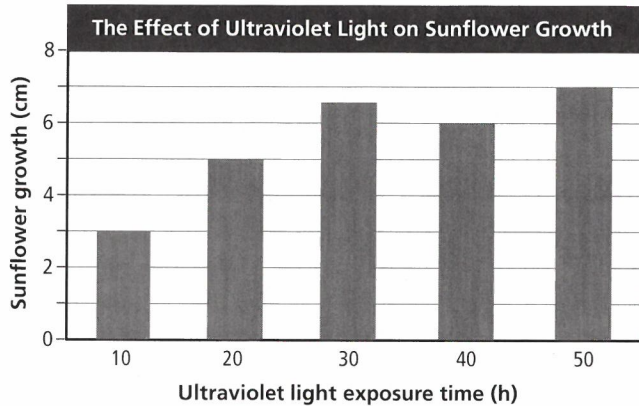
Use the illustration below to answer Questions 7 and 8.

**WARNING:**  
Goggles and Aprons Must  
Be Worn at All Times

7. This sign was found at the entrance to a chemistry laboratory. Why is this an important sign?
  - A. Goggles help chemists see better.
  - B. Chemicals can seriously damage eyes and skin.
  - C. Accidents rarely happen in laboratories.
  - D. Chemists will be fined if they do not obey the rules.
8. Why are safety rules posted, like this sign, or stated when conducting experiments?
  - A. Safety rules are used to scare students.
  - B. The goal of safety rules is to make an experiment boring.
  - C. Safety rules are just suggestions as to how to behave during an experiment.
  - D. The safety rules are given for scientists' protection.
9. What should you always do when conducting an experiment?
  - A. You should clean up broken glass yourself.
  - B. You should unplug cords by pulling on the cord, not the plug.
  - C. You should report spills immediately.
  - D. You should flush your eyes at the eyewash station.
10. Which of the following are Sir Isaac Newton's ideas on motion considered to be?
  - A. scientific law
  - B. scientific theory
  - C. scientific model
  - D. hypothesis

## Short Answer

Use the graph below to answer Questions 11–13.



- According to the graph, what was the greatest growth observed?
- What type of graph is this? Why is this the best way to represent the data?
- What are some variables that might affect the outcome of the experiment?
- Describe the difference between the terms *astronomy* and *meteorology*.
- Analyze the idea that technology is transferable. How is this beneficial?
- Explain the importance of making a hypothesis before conducting an experiment.
- Justine wants to measure how far an ant moves across a table in 1-min intervals. What would be the independent variable in this example?

## Reading for Comprehension

### Investigation Steps

Michael conducted an experiment to test if matter is conserved after a phase change. He filled an empty bottle with 50 mL of water and placed it in a sunny window until the liquid water changed to water vapor. The steps of the activity are listed in the table below but might not be in the correct order.

Investigation Steps	
1	Find the mass of the bottle, lid, and water vapor.
2	Pour 50 mL of water into an empty bottle.
3	Find the mass of the bottle, lid, and 50 mL of water.
4	Place a lid on the opening of the bottle to tightly seal it.

- Which shows the investigation steps in the correct order?
  - 1, 2, 3, 4
  - 2, 4, 3, 1
  - 4, 2, 1, 3
  - 2, 4, 1, 3
- According to the text, what scientific idea is Michael testing?
  - the rate of evaporation
  - the conservation of energy
  - the conservation of matter
  - the equilibrium of a system
- Why does Michael put a lid on the bottle?
  - to prevent water vapor from leaving the system
  - to make the water evaporate faster
  - to prevent bacterial growth in the system
  - to establish equilibrium

### NEED EXTRA HELP?

If You Missed Question . . .	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Review Section . . .	1.1	1.3	1.3	1.1	1.2	1.3	1.2	1.2	1.2	1.3	1.3	1.3	1.3	1.1	1.1	1.2	1.2



## Mapping Our World

**BIG Idea** Earth scientists use mapping technologies to investigate and describe the world.

### 2.1 Latitude and Longitude

**MAIN Idea** Lines of latitude and longitude are used to locate places on Earth.

### 2.2 Types of Maps

**MAIN Idea** Maps are flat projections that come in many different forms.

### 2.3 Remote Sensing

**MAIN Idea** New technologies have changed the appearance and use of maps.

## GeoFacts

- Maps predate written history. The earliest known map was created as a cave painting in ancient Turkey.
- China spans five international time zones; however, the entire country operates on only one standard time.
- Global Positioning System (GPS) satellites were originally designed for strategic defense and navigation purposes.

