Chapter Review

USING VOCABULARY

For each pair of terms, explain the difference in meaning.

1. solid/liquid
2. Boyle's law/Charles's law
3. evaporation/boiling
4. melting/freezing

UNDERSTANDING CONCEPTS

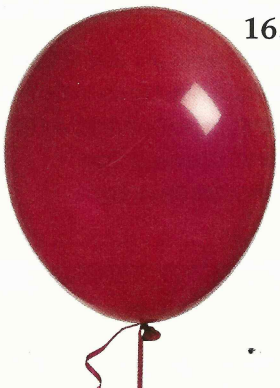
Multiple Choice

5. Which of the following best describes the particles of a liquid?
   a. The particles are far apart and moving fast.
   b. The particles are close together but moving past each other.
   c. The particles are far apart and moving slowly.
   d. The particles are closely packed and vibrate in place.

6. Boiling points and freezing points are examples of
   a. chemical properties. **c.** energy.
   b. physical properties. **d.** matter.

7. During which change of state do atoms or molecules become more ordered?
   a. boiling **c.** melting
   b. condensation **d.** sublimation

8. Which of the following describes what happens as the temperature of a gas in a balloon increases?
   a. The speed of the particles decreases.
   b. The volume of the gas increases and the speed of the particles increases.
   c. The volume decreases.
   d. The pressure decreases.



9. Dew collects on a spider web in the early morning. This is an example of
   a. condensation. **c.** sublimation.
   b. evaporation. **d.** melting.

10. Which of the following changes of state is exothermic?
    a. evaporation **c.** freezing
    b. sublimation **d.** melting

11. What happens to the volume of a gas inside a piston if the temperature does not change but the pressure is reduced?
    a. increases
    b. stays the same
    c. decreases
    d. not enough information

12. The atoms and molecules in matter
    a. are attracted to one another.
    b. are constantly moving.
    c. move faster at higher temperatures.
    d. All of the above

13. Which of the following contains plasma?
    a. dry ice **c.** a fire
    b. steam **d.** a hot iron

Short Answer

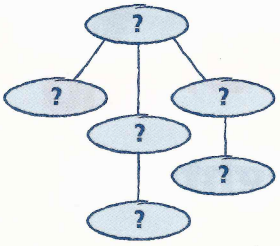
14. Explain why liquid water takes the shape of its container but an ice cube does not.

15. Rank solids, liquids, and gases in order of decreasing particle speed.

16. Compare the density of iron in the solid, liquid, and gaseous states.

Concept Mapping

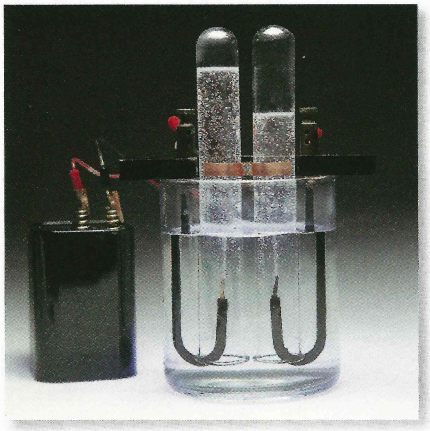
17. Use the following terms to create a concept map: states of matter, solid, liquid, gas, plasma, changes of state, freezing, vaporization, condensation, melting.



CRITICAL THINKING AND PROBLEM SOLVING

18. After taking a shower, you notice that small droplets of water cover the mirror. Explain how this happens. Be sure to describe where the water comes from and the changes it goes through.

19. In the photo below, water is being split to form two new substances, hydrogen and oxygen. Is this a change of state? Explain your answer.



20. To protect their crops during freezing temperatures, orange growers spray water onto the trees and allow it to freeze. In terms of energy lost and energy gained, explain why this practice protects the oranges from damage.

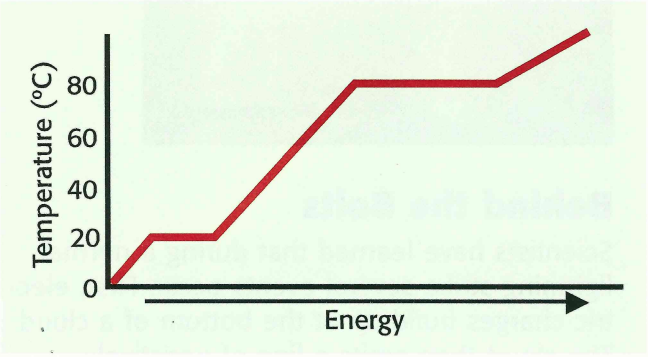
21. At sea level, water boils at 100°C, while methane boils at –161°C. Which of these substances has a stronger force of attraction between its particles? Explain your reasoning.

MATH IN SCIENCE

22. Kate placed 100 mL of water in five different pans, placed the pans on a windowsill for a week, and measured how much water evaporated. Draw a graph of her data, shown below, with surface area on the *x*-axis. Is the graph linear or nonlinear? What does this tell you?

Pan number	1	2	3	4	5
Surface area (cm^2)	44	82	20	30	65
Volume evaporated (mL)	42	79	19	29	62

23. Examine the graph below, and answer the following questions:
    a. What is the boiling point of the substance? What is the melting point?
    b. Which state is present at 30°C?
    c. How will the substance change if energy is added to the liquid at 20°C?



NOW What Do You Think?

Take a minute to review your answers to the ScienceLog questions on page 59. Have your answers changed? If necessary, revise your answers based on what you have learned since you began this chapter.