Name _____ Date _____ Class _____

States of Matter

Section 13.1 **Gases**

In your textbook, read about the kinetic-molecular theory.

Complete each statement.

1. The kinetic molecular theory describes the behavior of gases in terms of particles in

_____ .

2. The kinetic-molecular theory makes the following assumptions.

a. In a sample of a gas, the volume of the gas particles themselves is very

_____ compared to the volume of the sample.

b. Because gas particles are far apart, there are no significant attractive or repulsive

_____ between gas particles.

c. Gas particles are in constant and _____ motion.

d. The collisions between gas particles are _____; that is, no

_____ energy is lost.

3. The kinetic energy of a particle is represented by the equation _____ .

4. _____ is a measure of the average kinetic energy of the particles in a
sample of matter.

In your textbook, read about explaining the behavior of gases.

For each statement below, write *true* or *false*.

_____ **5.** Gases are less dense than solids because there is a lot of space between the
particles of a gas.

_____ **6.** The random motion of gas particles causes a gas to expand until it fills its container.

_____ **7.** The density of a gas decreases as it is compressed.

_____ **8.** A gas can flow into a space occupied by another gas.

_____ **9.** The diffusion of a gas is caused by the random motion of the particles of the gas.

_____ **10.** Lighter gas particles diffuse less rapidly than do heavier gas particles.

_____ **11.** During effusion. a gas escapes through a tiny opening into a vacuum.

_____ **12.** Graham's law of effusion states that the rate of effusion for a gas is
directly related to the square root of its molar mass.

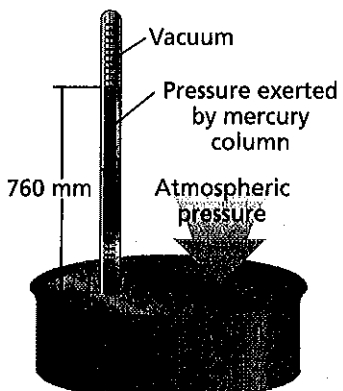**Section 13.1** *continued*

In your textbook, read about gas pressure.

Circle the letter of the choice that best completes the statement or answers the question.

13. Pressure is defined as force per unit

    a. area.   **b.** mass.   **c.** time.   **d.** volume.

14. What is an instrument designed to measure atmospheric pressure?

    a. barometer   **b.** manometer   **c.** sphygmomanometer   **d.** thermometer

15. The height of the liquid in a barometer is affected by all of the following EXCEPT the

    a. altitude.   **c.** density of the liquid in the column.

    b. atmospheric pressure.   **d.** diameter of the column tube.

16. The pressure of the gas in a manometer is directly related to which of the following quantities?

    a. height of the mercury column in the closed-end arm

    b. height of the mercury column in the open-end arm

    c. a + b

    d. a − b

17. One atmosphere is equal to a pressure of

    a. 76 mm Hg.   **b.** 101.3 kPa.   **c.** 147 psi.   **d.** 706 torr.

18. The partial pressure of a gas depends on all of the following EXCEPT the

    a. concentration of the gas.   **c.** size of the container.

    b. identity of the gas.   **d.** temperature of the gas.

19. The pressure of a sample of air in a manometer is 102.3 kPa. What is the partial pressure of nitrogen (N_2) in the sample if the combined partial pressures of the other gases is 22.4 kPa?

    a. 62.4 kPa   **b.** 79.9 kPa   **c.** 102.3 kPa.   **d.** 124.7 kPa

Use the figure to answer the following questions.

20. What instrument is illustrated in the figure? _____

21. Who invented this instrument? _____

22. What are the two opposing forces that control the height of the mercury in the column?

_____

23. What does it mean when the level of mercury rises in the column?

Vacuum

Pressure exerted by mercury column

760 mm

Atmospheric pressure