Name _____ Date _____ Class _____

16 Note-taking Worksheet

Solids, Liquids, and Gases

Section 1 Kinetic Theory

A. _____ of matter—solid, liquid, gas

1. _____ **theory**—explains how particles in matter behave
   a. All matter is composed of small _____.
   b. Particles are in constant, random _____.
   c. Particles _____ with each other and walls of their containers.
2. _____—total energy of a material's particles; causes particles to vibrate in place
3. Average kinetic energy—_____ of the substance, or how fast the particles are moving; the lower the temperature, the slower the particle motion
4. _____ state—particles are closely packed together in a specific type of geometric arrangement.
5. _____ state—a solid begins to liquefy at the **melting point** as the particles gain enough energy to overcome their ordered arrangement.
   a. Energy required to reach the melting point is called the **heat of** _____.
   b. Liquid particles have more space between them, allowing them to flow and take the shape of their container.
6. _____ state—a liquid's particles have enough energy to escape the attractive forces of the other particles in the liquid
   a. **Heat of** _____ is the energy required for a liquid to change to a gas.
   b. At the _____, the pressure of a liquid's vapor is equal to the pressure of the atmosphere, and the liquid becomes a gas.
   c. Gas particles spread evenly throughout their container in the process of _____.
7. Heating curve of a liquid—as a solid melts and a liquid vaporizes, the temperature remains _____; the temperature will increase after the attractive forces of the earlier state have been overcome.
8. _____—state of matter consisting of high-temperature gas with balanced positively and negatively charged particles.

Meeting Individual Needs

Note-taking Worksheet (continued)

B. _____ **expansion**—increase in the size of a substance when the temperature increases

1. The size of a substance will then _____ when the temperature decreases.
2. Expansion and contraction occur in _____ solids, liquids, and gases.
3. _____ is an exception because it expands as it becomes a solid.

C. Some substances do not react as _____ when changing states.

1. _____ solids—lack the tightly ordered structure found in crystals
   a. Do not have definite temperature at which they change from solid to liquid
   b. Glass, plastic
2. _____ crystals do not lose their ordered arrangement completely upon melting; used in liquid crystal _____ in watches, clocks, calculators, and some notebook computers.

Section 2 Properties of Fluids

A. _____—ability of a fluid (liquid or gas) to exert an upward force on an object immersed in it

1. An object in a fluid will _____ if its weight is less than the buoyant force acting on it from the fluid.
2. An object in a fluid will _____ if its weight is more than the buoyant force acting on it from the fluid.
3. _____ principle—buoyant force on an object is equal to the weight of the fluid displaced by the object.
4. An object will float if its _____ is less than the density of the fluid it is placed in.

B. _____ principle—pressure applied to a fluid is transmitted throughout the fluid

1. **Pressure** is _____ exerted per unit area.
2. _____ machines use this principle to lift heavy loads.

C. _____ principle—as the velocity of a fluid increases, the pressure exerted by the fluid decreases; airplanes use this principle to fly.

Note-taking Worksheet (continued)

D. _____—a liquid's resistance to flow

1. Molecular _____ determines a fluid's viscosity.
2. Increased _____ will lower viscosity.

Section 3 Behavior of Gases

A. _____ is measured in a unit called a **pascal** (Pa).

1. _____ of particles in air result in atmospheric pressure.
2. Moving particles colliding with the inside walls of a container result in _____ pressure.

B. _____ Law—relates pressure and volume

1. Volume decreases as _____ increases.
2. Pressure decreases as _____ increases.
3. Pressure multiplied by volume is always equal to a _____ if the temperature is constant.

C. _____ Law—relates volume and temperature

1. At a constant pressure, _____ increases as temperature increases.
2. At a constant pressure, volume decreases as _____ decreases.

D. _____ Law—relates pressure and temperature; at a constant volume, as temperature increases, pressure increases

Meeting Individual Needs

Name _____ Date _____ Class _____

Note-taking Worksheet

Classification of Matter

Section 1 Composition of Matter

A. _____—either an element or a compound

1. When all the atoms in a substance are alike, the substance is an _____.
2. A _____ is a substance with two or more elements combined in a fixed proportion.

B. Two or more substances that can be easily separated by physical means form a _____.

1. _____ **mixture**—mixture of different and easily distinguishable materials
2. _____ mixture—contains two or more gaseous, liquid, or solid substances blended evenly; also called a solution
3. _____—heterogeneous mixture with larger particles that never settle; colloids scatter light in the Tyndall effect
4. A heterogeneous mixture containing a liquid in which visible particles settle is called a _____.

Section 2 Properties of Matter

A. _____—characteristics of a material which can be observed without changing the identity of the substances in the material; examples include color, shape, size, melting point, and boiling point

1. _____—physical description of a substance
2. _____—how a substance acts; for example, magnetism, viscosity, ductility
3. Physical properties such as size and magnetism can be used to _____ mixtures.

B. _____—change in a substance's size, shape, or state of matter

1. Substance does not change _____ when it undergoes a physical change
2. _____ is a process for separating a mixture by evaporating a liquid and condensing its vapor.

Meeting Individual Needs

Note-taking Worksheet (continued)

C. _____ property—characteristics of a substance indicating that it can change chemically; for example, flammability or light sensitivity of a substance

D. When one substance changes to another substance, a _____ has occurred.

1. Some chemical changes are indicated by _____ change, smell, or bubble formation.
2. Other chemical changes occur very slowly, such as the formation of _____.
3. Chemical changes can be used to _____ substances such as metals from their ores.

E. _____ of Earth's surface involves both physical and chemical changes.

1. _____—big rocks split into smaller ones; streams carry rock particles from one location to another
2. _____—Chemical changes can occur in rocks when calcium carbonate in limestone changes to calcium hydrogen carbonate due to acid rain.

F. Law of _____—Mass of all substances present before a chemical change equals the mass of all substances after the change.