

REVIEW

SECTION 2.2

Matter and Energy

1. Identify each of the following as a gas, liquid, or solid.

liquid

a. The particles are closely packed together, but they can still slide past each other.

gas

b. The particles are in a constant state of motion and rarely stick together.

solid

c. The particles are locked in fixed positions.

2. Select the answer that best completes each statement describing the energy transfers taking place as water changes state from solid to liquid, from liquid to gas, and from gas back to liquid.

a. Energy must be added/released (choose one) to separate the water molecules as ice melts. (endothermic)

b. The fastest/slowest (choose one) moving molecules break away from the surface of liquid water to form water vapor.

c. The process described in (b) is called evaporation.

d. During the above process, energy is released/absorbed (choose one).

e. Water molecules speed up/slow down (choose one) as water vapor returns to the liquid water state.

f. The process described in (e) is called Condensation.

g. Energy is released/absorbed (choose one) during the above process. (exothermic)

3. Apply the kinetic theory to describe the motion of particles in a homogeneous mixture of sugar and water as it is boiled.

The sugar molecules will have a lower speed because they are more massive than the water molecules. As temperature increases, the overall speed ^{of molecules} will increase. The water molecules will speed up so much and spread so far apart, they will break their connections & turn to a gas (evaporate).

4. Identify the substance with the greatest viscosity.

a. water

b. cooking oil

c. molasses

d. vinegar

5. Explain how mass and energy are conserved when water evaporates.

Energy - As water particles are heated they speed up (so, heat energy turns into kinetic energy, it is not lost)
Mass - If you took the mass of the water and the mass of the vapor, the mass will be the same before and after.

REVIEW

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SECTION 2.1

What Is Matter?

1. Classify the following as a homogeneous, *O*, or a heterogeneous, *E*, mixture.

<u> E </u>	a. a pail of sand and water	<u> E </u>	d. a banana split
<u> O </u>	b. air	<u> O </u>	e. chocolate syrup
<u> O </u>	c. human blood	<u> O </u>	f. sea water

2. Compare and contrast atoms and molecules.

Atoms are the individual particles of matter that cannot be broken down (under normal circumstances); molecules contain two or more atoms that are bonded

3. Explain the difference between a pure substance and a homogeneous mixture.

The both look the same throughout (or they both look like one substance) but the homogeneous mixture is made of more than one substance

4. Classify each of the following as an element or a compound.

<u> compound </u>	a. benzene, C_6H_6
<u> element </u>	b. aluminum, Al
<u> compound </u>	c. aspirin, $C_9H_8O_4$
<u> element </u>	d. titanium, Ti
<u> compound </u>	e. acetylene, C_2H_2
<u> element </u>	f. zinc, Zn

5. Explain why elements and compounds are pure substances.

The are both pure because the particles that make it up are all the same as opposed to mixtures that contain at least 2 different particles

6. Determine which of the following are pure substances and which are mixtures.

<u> mixture </u>	a. salt water
<u> pure </u>	b. isopropyl alcohol, C_3H_8O
<u> pure </u>	c. mercury, Hg
<u> pure </u>	d. ammonia, NH_3
<u> mixture </u>	e. an egg yolk
<u> mixture </u>	f. honey

REVIEW

2 SECTION 2.3

Properties of Matter

using senses and/or measurements
reacting

1. Classify each of the following as a physical or chemical property of sulfur.

- _____ physical a. Its density is 2.97 g/cm³.
- _____ chemical b. It reacts with hydrogen to form a gas.
- _____ physical c. It is a yellow solid.
- _____ physical d. Its melting point is 112°C.
- _____ chemical e. It combines with oxygen.

2. Classify each of the following as a physical or chemical property of phosphorus.

- _____ physical a. It is a white, waxy solid.
- _____ chemical b. It burns in air.
- _____ physical c. Its melting point is 44.1°C.
- _____ physical d. It has a density of 1.82 g/cm³.
- _____ physical e. Its boiling point is 280.3°C.

3. Categorize each of the following examples as a chemical or physical change.

- _____ physical a. bending a metal rod
- _____ chemical b. burning wood
- _____ physical c. breaking glass
- _____ physical d. painting wood
- _____ chemical e. cooking
- _____ chemical f. burning propane

4. Calculate the mass of a sample of pure silver (density = 10.49 g/cm³) that has a volume of 12.99 cm³.

$$D = \frac{m}{V} \quad 10.49 = \frac{m}{12.99} \quad 10.49 \cdot 12.99 = m \cdot 1$$

5. Compute the density of an 820 g sample of pure silicon occupying a 350 cm³ container.

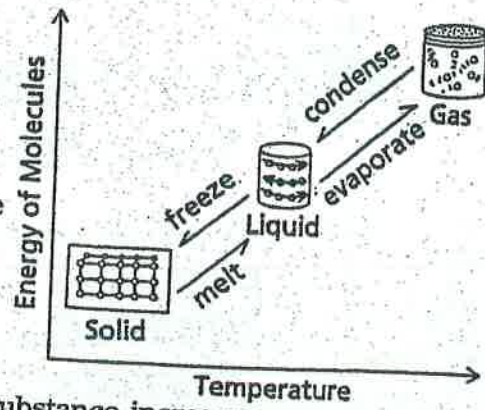
$$D = \frac{m}{V} \quad D = \frac{820g}{350cm^3} \quad g/cm^3$$

6. Explain how mass and energy are conserved when food is digested.

Mass - The mass is still accounted for when you add up the mass of the ^①gases produced ^②the particles that you absorb and ^③the waste produced

Energy - The total energy is the same before and after - energy in food converted to heat & motion (when you move)

A. Directions: Study the graph of phases of matter at different temperatures. Use its information to answer the true/false questions below.



- True 1. Molecules of a gas are free and move quickly.
- False 2. If enough heat is removed from a liquid, it will evaporate.
- True 3. Generally, as the temperature of a substance increases, its molecules move more freely with respect to each other.
- True 4. As heat energy is added to a substance, its volume usually increases.
- False 5. If the lid were removed from the container of gas molecules, they would remain in the container.

B. Directions: Identify the phase of matter represented by the model. Then, on the right, draw a picture of what the matter will look like if heat is removed. Label the phase of matter that your drawing represents.

Phase of matter: <u>Liquid</u>	Phase of matter: <u>Solid</u>