Name _____ Date _____ Class _____

2 MATTER AND CHANGE

SECTION 2.1 PROPERTIES OF MATTER (pages 39–42)

This section helps you distinguish extensive from intensive properties and identify substances by their properties. It teaches you how to differentiate the three states of matter. It also defines a physical property and lists examples of physical properties and physical changes.

▶ Describing Matter (page 39)

1. The mass of an object is a measure of the amount of matter the object contains.
2. How does an extensive property differ from an intensive property?
   An extensive property depends on the amount of matter, while an intensive property depends on the type of matter.

▶ Identifying Substances (page 40)

3. Matter that has a uniform and definite composition is called a substance.
4. Is the following sentence true or false? All samples of a substance have different physical properties. false
5. A physical property is a quality or condition of a substance that can be observed or measured without changing the substance's composition.
6. Circle the letter of the term that is NOT a physical property.
   a. hardness **c.** boiling point
   b. color **d.** melting
7. Look at Table 2.1 on page 40. What is the melting point of bromine? −7°C
8. Look at Table 2.1 on page 40. Circle the letter of the substance that is a yellow solid and melts at 115°C.
   a. sulfur
   b. chlorine
   c. gold
   d. copper

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CHAPTER 2, Matter and Change *(continued)*

9. Is the following sentence true or false? Physical properties can help a chemist identify a substance. true

▶ States of Matter (pages 41–42)

10. Circle the letter of the term that is NOT a physical state of matter.

a. water

b. gas

c. liquid

d. solid

11. Complete the table about properties of three states of matter. Use these terms: *definite, indefinite, easily,* and *not easily.*

Properties of the States of Matter			
Property	**Solid**	**Liquid**	**Gas or Vapor**
Shape	definite	indefinite	indefinite
Volume	definite	definite	indefinite
Can be compressed	not easily	not easily	easily

12. Match each arrangement of the particles in matter with a physical state.

Physical State	**Arrangement**
c gas	**a.** packed tightly together
b liquid	**b.** close, but free to flow
a solid	**c.** spaced relatively far apart

13. Is the following sentence true or false? The words *gas* and *vapor* can be used interchangeably. false

14. The term gas is limited to those substances that exist in the gaseous state at room temperature.

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15. What does *vapor* describe?

Vapor describes the gaseous state of a substance that is generally a liquid or solid at room temperature.

▶ Physical Changes (page 42)

16. A physical change alters a given material without changing its chemical

composition .

17. What are some words that describe physical changes?

boil, freeze, dissolve, melt, condense, break, split, crack, grind, cut, and crush

18. What is true about all physical changes that involve a change of state?

They are all reversible.

SECTION 2.2 MIXTURES (pages 44–47)

This section explains how to classify a mixture as heterogeneous or homogeneous. It also describes ways to separate mixtures.

▶ Classifying Mixtures (pages 44–45)

1. Is the following sentence true or false? Most samples of matter are mixtures.

true

2. What is a mixture?

A mixture is a physical blend of two or more components.

3. Is the following sentence true or false? A heterogeneous mixture is one that has a completely uniform composition. false

4. What is another name for a homogeneous mixture?

a solution

5. Circle the letter of the term that describes a part of a sample with uniform composition and properties.

a. solution

b. mixture

c. state

d. phase

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CHAPTER 2, Matter and Change *(continued)*

6. How many phases exist in these types of mixtures?

a. Homogeneous one

b. Heterogeneous two or more

▶ Separating Mixtures (pages 46–47)

7. In general, what is used to separate mixtures?

differences in physical properties

8. The process that separates a solid from a liquid in a heterogeneous mixture is called filtration .

9. What happens during a distillation?

A liquid is boiled to produce a vapor that is then condensed into a liquid.

Match each term with its location in the diagram.

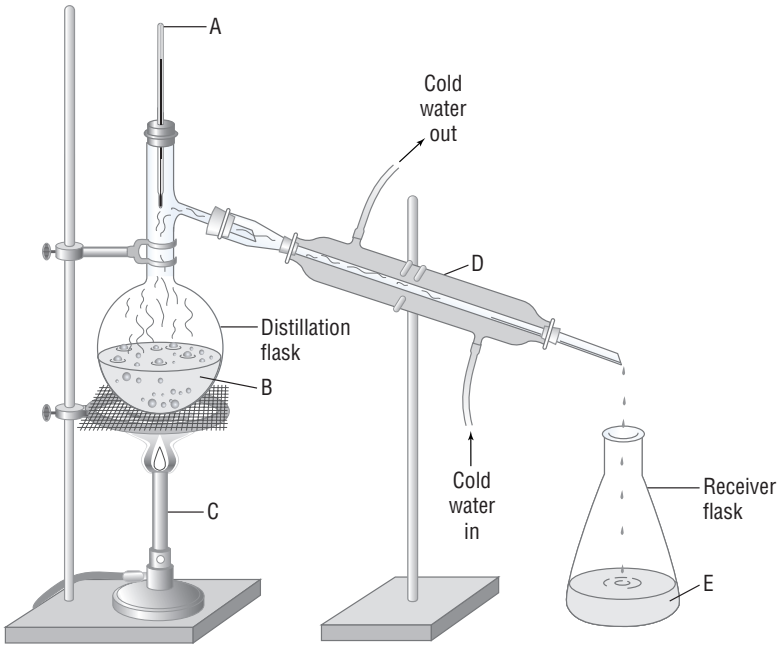
D **15.** condenser

C **16.** heat source

A **17.** thermometer

B **18.** tap water

E **19.** distilled water



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Name _____ Date _____ Class _____

Reading Skill Practice

By looking carefully at photographs and drawings in textbooks, you can better understand what you have read. Look carefully at Figure 2.8 on page 44. What important idea does this drawing communicate?

This drawing shows that the components of a mixture can be separated based on differences in their physical properties.

SECTION 2.3 ELEMENTS AND COMPOUNDS (pages 48–52)

This section explains a key difference between an element and a compound, and describes how chemical symbols and formulas are used to represent elements and compounds. It also summarizes the process for classifying substances and mixtures.

▶ Distinguishing Elements and Compounds (pages 48–49)

1. All living and nonliving things are made up of building blocks called elements.

2. What are the two groups into which substances can be classified?

Substances can be classified are elements and compounds.

3. Is the following sentence true or false? Elements can be easily separated into simpler substances. false

4. Compounds are substances that can be separated into simpler substances only by chemical means.

5. Is the following sentence true or false? The properties of compounds are different from those of their component elements. true

6. Complete this sentence.

Sodium chloride (table salt) is a compound of sodium, which is a soft metal, and chlorine, which is a pale yellow gas.

▶ Distinguishing Substances and Mixtures (page 50)

7. Describe one way to decide whether a sample of matter is a substance or a mixture.

If the composition of a sample is fixed, the sample is a substance. If the composition of a sample may vary, the sample is a mixture.

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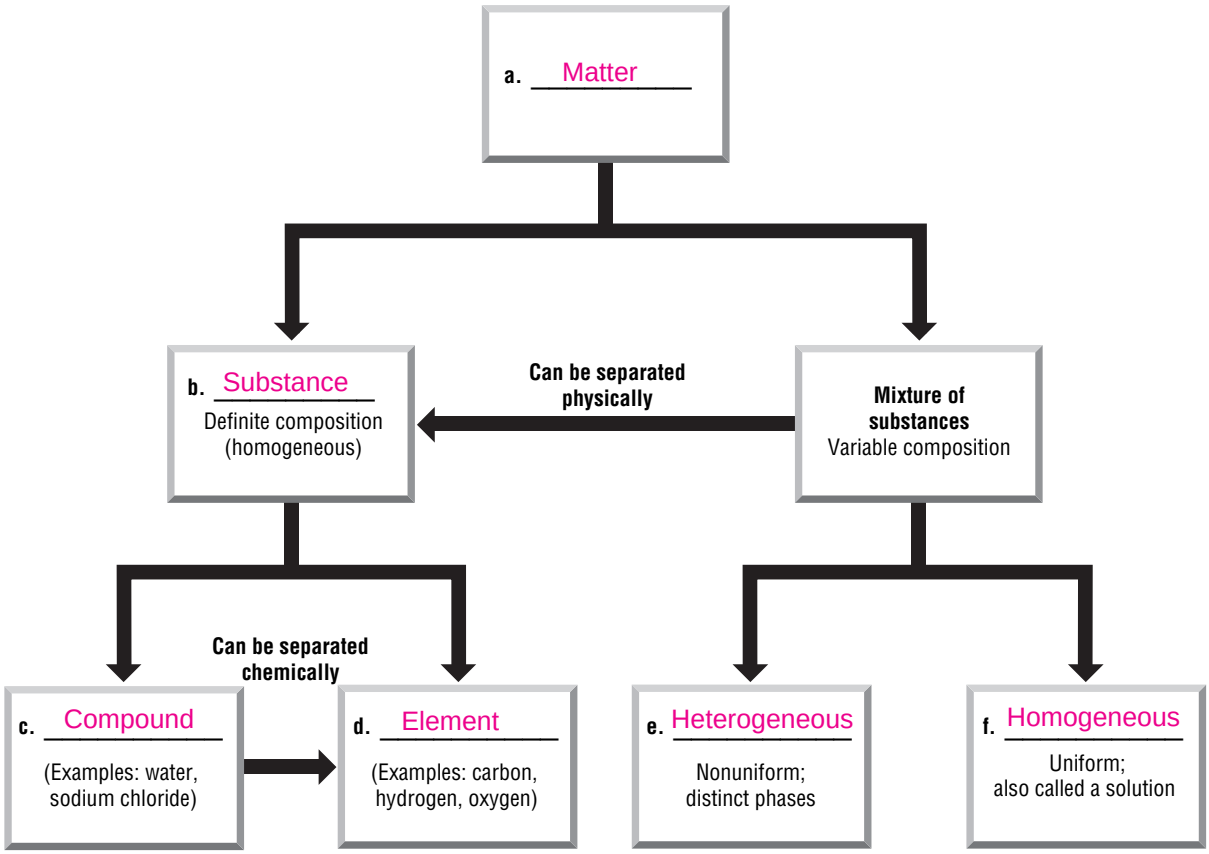
CHAPTER 2, Matter and Change *(continued)*

8. Complete the labels in the diagram below.



▶ Symbols and Formulas (pages 51–52)

9. What is used to represent an element?

An element is represented by a one- or two-letter chemical symbol.

10. What are chemical symbols used for?

Chemical symbols are used to write the chemical formulas of compounds.

11. Subscripts in chemical formulas are used to indicate the relative proportions of the elements in the compound.

12. Is the following sentence true or false? The elements that make up a compound are always present in the same proportions. true

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13. Use Table 2.2 on page 52 to answer the following questions.

a. Pb is the symbol for what element? lead

b. What is the symbol for gold? Au

c. Stibium is the Latin name for which element? antimony

SECTION 2.4 CHEMICAL REACTIONS (pages 53–55)

This section provides clues to help you recognize a chemical change. It also teaches the law of conservation of mass.

▶ Chemical Changes (page 53)

1. What is a chemical property?
A chemical property is the ability of a substance to undergo a specific chemical change.

2. Is the following sentence true or false? Chemical properties are observed only when a substance undergoes a chemical change. true

3. What happens during a chemical reaction?
One or more substances change into one or more new substances.

4. In chemical reactions, the substances present at the start of the reaction are called reactants and the substances produced are called products.

5. Circle the letter of the term that best completes the sentence. A change in the composition of matter _____ occurs during a chemical reaction.

a. sometimes

b. rarely

c. always

d. never

6. Which representation of a chemical reaction is correct?

a. products → reactants

b. reactants → products

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▶ Recognizing Chemical Changes (page 54)

7. List the four possible clues to a chemical change?

transfer of energy, a change in color, the production of a gas, or the formation of a precipitate

8. Is the following statement true or false? If you observe a clue for chemical change, you can be certain that a chemical change has taken place. false

9. Define a precipitate.

A precipitate is a solid that forms and settles out of a liquid mixture.

▶ Conservation of Mass (page 55)

10. During a chemical reaction, the mass of the products is always equal to the mass of the reactants .

11. The law of conservation of mass states that in any physical change or chemical reaction, mass is neither created nor destroyed .

12. Look at Figure 2.15 on page 55. How do you know that mass was conserved?

The mass of the product is the same as the mass of the reactants.

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