

2

MATTER AND CHANGE**SECTION 2.1 MATTER (pages 29–31)**

This section helps you identify the characteristics of matter and substances. It teaches you how to differentiate among the three states of matter. It also defines a physical property and lists examples of physical properties and physical changes.

► Properties of Matter (pages 29–30)

1. What is matter?

2. The _____ of an object is the amount of matter the object contains.

3. Matter that has a uniform and definite composition is called a

_____.

4. How many kinds of matter does a pure substance contain?

5. Is the following sentence true or false? All samples of a substance have different physical properties. _____

6. A physical property is a quality or condition of a substance that can be

_____ or _____ without

changing the substance's composition.

7. Circle the letter of the term that is NOT a physical property.

a. odor c. boiling point

b. density d. melting

8. Look at Table 2.1 on page 29. What is the melting point of bromine? _____

9. Look at Table 2.1 on page 29. Circle the letter of the substance that is a white solid and melts at 185 °C.

a. sucrose

b. sodium chloride

c. sulfur

d. mercury

10. Is the following sentence true or false? A chemist can help identify a substance by its physical properties. _____

CHAPTER 2, Matter and Change *(continued)*

► States of Matter (pages 30–31)

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

- a. water
- b. gas
- c. liquid
- d. solid

12. Complete the table about properties of the states of matter. Use these terms: *definite, indefinite, moderate, very slight, great, almost, and readily.*

Properties of the States of Matter			
Property	Solid	Liquid	Gas or Vapor
Shape		indefinite	
Volume	definite		indefinite
Expansion on heating	very slight		
Compressibility			readily compressible

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

Physical State

_____ gas

_____ liquid

_____ solid

Arrangement

a. packed tightly together

b. close, but not rigidly packed

c. spaced far apart

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

15. The term gas is limited to those substances that exist in the gaseous state at ordinary _____ .

16. What is vapor?

► **Physical Changes (page 31)**

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

18. What are some words that describe physical change?

19. What do boiling, freezing, and melting have in common?

SECTION 2.2 MIXTURES (pages 32–35)

This section explains how to categorize a sample of matter as a substance or a mixture. It also teaches you how to distinguish between homogeneous and heterogeneous samples of matter.

► **Classifying Mixtures (pages 32–33)**

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

2. What is a mixture?

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

4. What is another name for a homogeneous mixture?

5. Which physical state, if any, cannot exist in a solution?

6. Circle the letter of the term that describes a part of a system with uniform composition and properties.

- a. solution
- b. mixture
- c. state
- d. phase

CHAPTER 2, Matter and Change *(continued)*

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

a. Homogeneous _____

b. Heterogeneous _____

Match each type of solution with an example of it.

_____ 8. solid-solid

a. sugar water

_____ 9. solid-liquid

b. vinegar

_____ 10. liquid-liquid

c. carbon mixed with iron to form steel

_____ 11. gas-liquid

d. soda water

_____ 12. gas-gas

e. air

► Separating Mixtures (pages 33–34)

13. Is the following sentence true or false? It is always easy to separate the components in mixtures. _____

14. What is distillation?

Match each term with its location in the diagram.

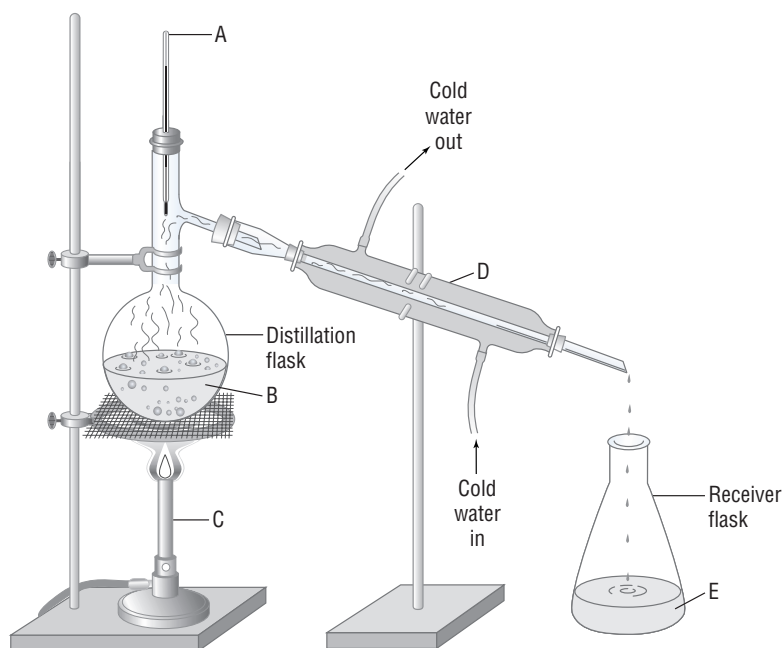
_____ 15. condenser

_____ 16. heat source

_____ 17. thermometer

_____ 18. impure solution

_____ 19. distilled liquid



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Reading Skill Practice

By looking carefully at photographs and drawings in textbooks, you can better understand what you have read. Look carefully at Figure 2.5 on page 34. What important idea does this drawing communicate?

SECTION 2.3 ELEMENTS AND COMPOUNDS (pages 36–40)

This section explains the difference between an element and a compound. It also helps you identify the chemical symbols of common elements, and name common elements, given their symbols.

► Distinguishing Elements and Compounds (pages 36–39)

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

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

3. Compounds are substances that can be separated into simpler substances only by _____ means.

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

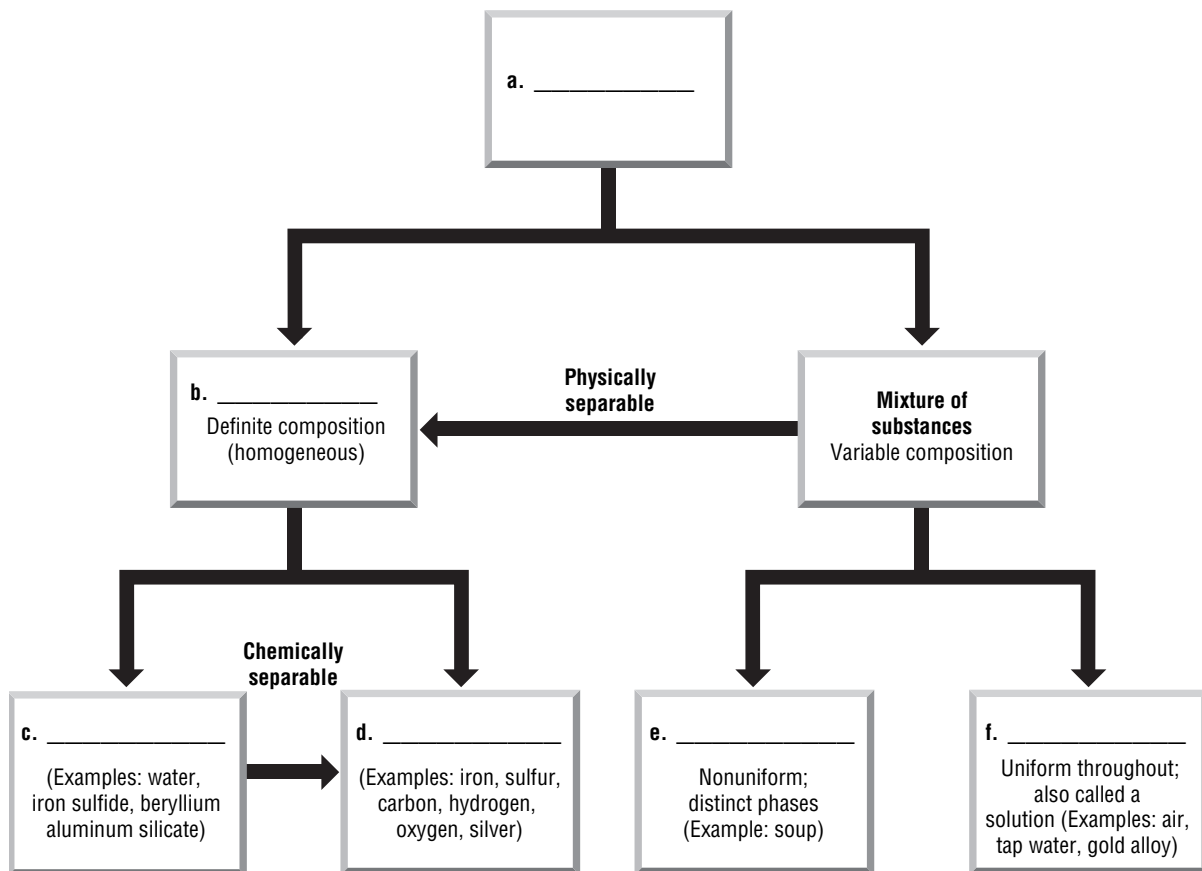
5. Use Figure 2.7 on page 37 and its caption to help you complete this sentence.

Table salt (sodium chloride) is a _____ of sodium, a soft _____, and chlorine, a _____.

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

CHAPTER 2, Matter and Change (continued)

7. Complete the labels in the diagram below.



► Symbols and Formulas (pages 39–40)

8. What is used to represent each element?

9. What are chemical symbols used for?

10. The subscript numbers in chemical formulas represent the proportions of the various elements in the _____.

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

12. Use Table 2.4 on page 40 to answer the following questions.

- a. Pb is the symbol for what element? _____
- b. What is the symbol for gold? _____
- c. Stibium is the Latin name for which element? _____

SECTION 2.4 CHEMICAL REACTIONS (pages 41–43)

This section helps you differentiate between physical and chemical changes in matter. It also teaches you how to apply the law of conservation of mass.

► Changing Reactants to Products (pages 41–42)

1. What happens in a chemical reaction?

2. In chemical reactions, the starting substances are called

_____ and the substances formed are called _____.

3. What is a chemical property?

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

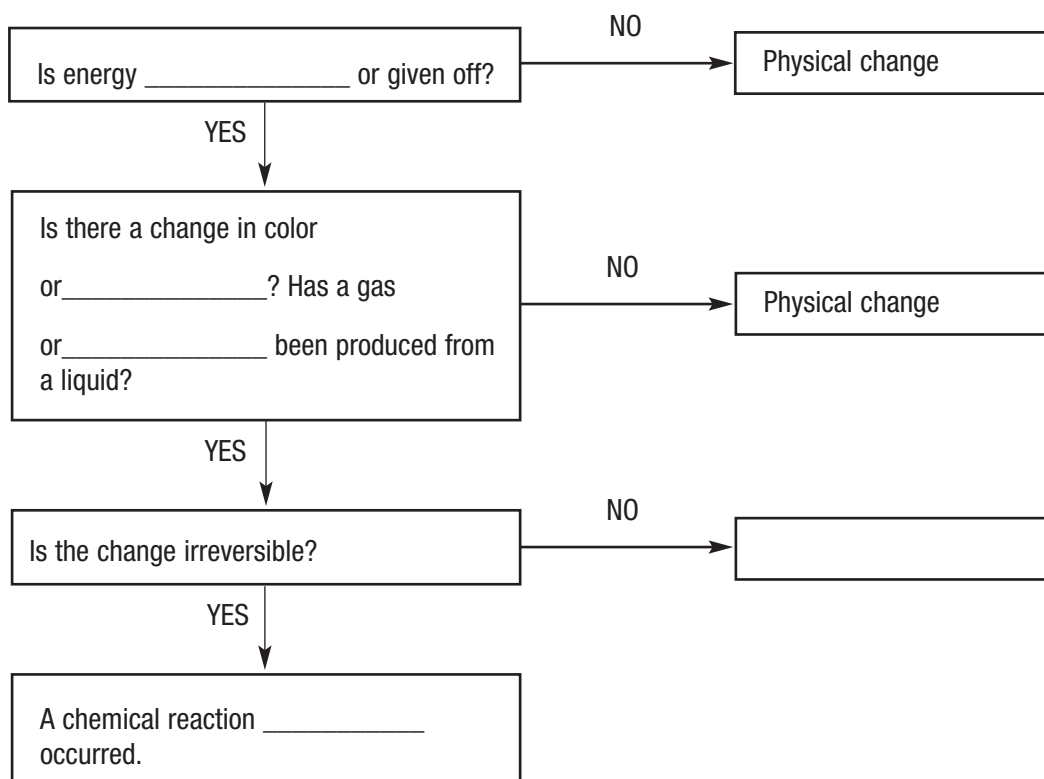
5. Circle the letter of the term that best completes the sentence. A chemical change _____ results in a change in chemical composition of the substances involved.

- a. sometimes
- b. rarely
- c. always
- d. never

6. What are some words that describe chemical change?

CHAPTER 2, Matter and Change *(continued)*

7. Which representation of a chemical reaction is correct?
- products \rightarrow reactants
 - reactants \rightarrow products
8. Complete the flowchart below, which describes the process of determining whether a chemical reaction has taken place.



► Conservation of Mass *(page 43)*

9. During a chemical reaction, the mass of products is always equal to the mass of _____ .
10. How was the law of conservation of mass determined?

11. The law of conservation of mass states that in any physical change or chemical reaction, mass is neither _____ nor _____ .
12. Look at Figure 2.12 on page 43. Explain how it is easier to demonstrate the law of conservation of mass with a flashbulb than with a burning match.
