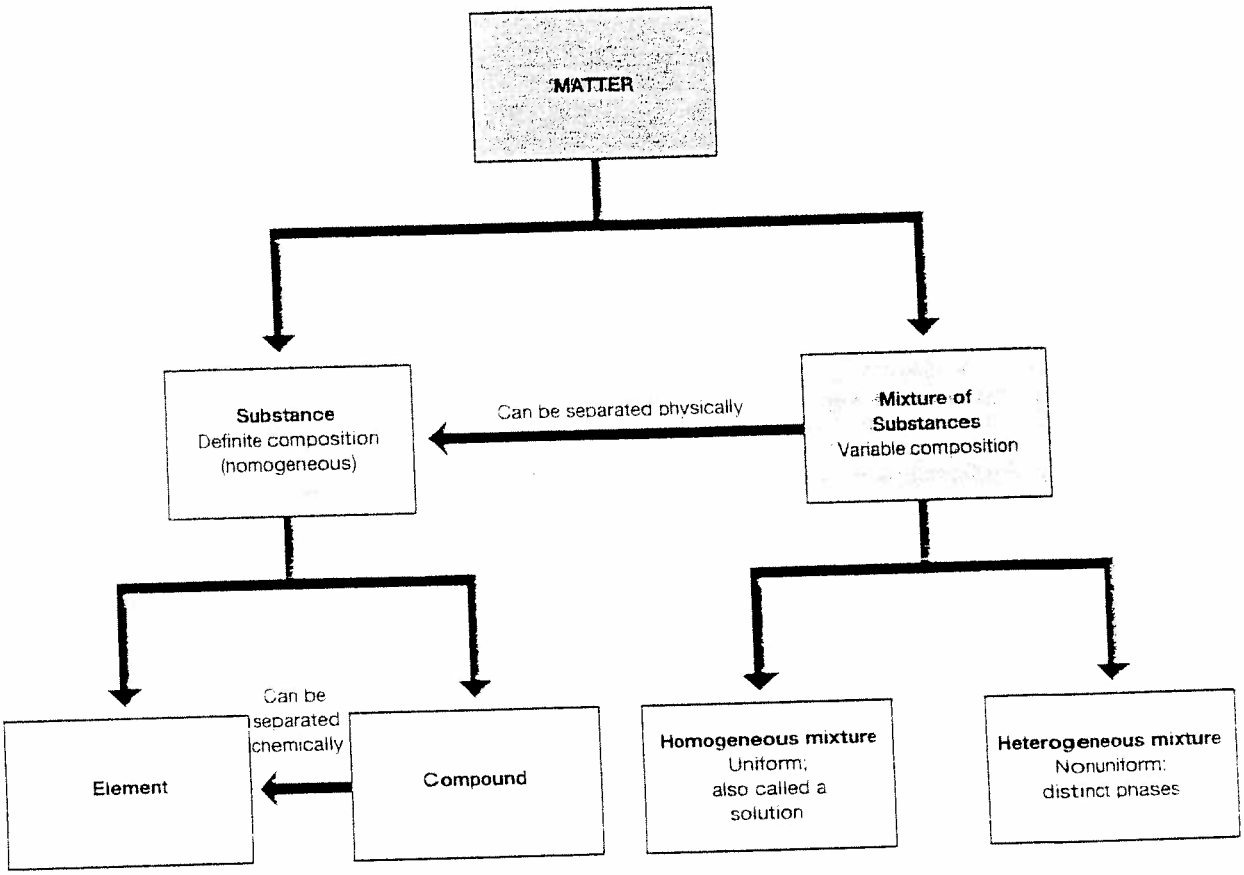
Name _____ Date _____

2 INTERPRETING GRAPHICS

Use with Section 2.3



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Use the flowchart on the previous page, redrawn from Figure 2.8 in your textbook, to answer the following questions.

1. Motor oil is available in various grades (10W30, 10W40, and so on). Is motor oil a homogenous mixture or a compound? Explain.

_____

_____

_____

2. Iron ore is a heterogenous mixture that contains iron oxide. Iron ore can be smelted to produce pure iron. Is iron smelting a chemical or physical process? Explain.

_____

_____

_____

3. Classify each of the following as physical or chemical separations.

   a. air → oxygen + nitrogen

   _____

   b. water → hydrogen + oxygen

   _____

   c. salt water → water + sodium chloride

   _____

4. Classify each of the following as mixtures or substances.

   a. sulfur

   _____

   b. air

   _____

   c. concrete

   _____

   d. water

   _____

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2.3 ELEMENTS AND COMPOUNDS

Section Review

Objectives

- Explain the difference between an element and a compound
- Distinguish between a substance and a mixture
- Identify the chemical symbols of elements, and name elements, given their symbols

Vocabulary

- element
- compound
- chemical change
- chemical symbol

Part A Completion

Use this completion exercise to check your understanding of the concepts and terms that are introduced in this section. Each blank can be completed with a term, short phrase, or number.

A substance is either a(n) ___1___ or a(n) ___2___.

Compounds are made up of ___3___, which are always present in the same ___4___ in a given compound. Compounds can be broken down into simpler substances by ___5___ means.

If the composition of a material is fixed, it is a ___6___.

If the composition of a material may vary, it is a ___7___.

Each element is represented by a one- or two-letter ___8___. For example, carbon is represented by the symbol ___9___, while potassium is represented by the symbol ___10___.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

Part B True-False

Classify each of these statements as always true, AT; sometimes true, ST; or never true, NT.

_____ 9. Heating a chemical compound produces elements.

_____ 10. Compounds can be broken down into elements by physical means.

_____ 11. An element is the simplest form of matter that has a unique set of properties.

_____ 12. Compounds are represented by chemical formulas.

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Part C Matching

Match each description in Column B to the correct term in Column A.

Column A	Column B
_____ 13. element	a. substance that can be separated into simpler substances only by chemical means
_____ 14. compound	b. a physical blend of two or more components
_____ 15. mixture	c. one or two letters that represent an element
_____ 16. chemical symbol	d. simplest form of matter that has a unique set of properties
_____ 17. chemical change	e. a change that produces matter with a different composition than the original matter

Part D Questions and Problems

Answer the following questions in the space provided.

18. Classify each substance as an element or a compound.

a. water a. _____

b. oxygen b. _____

c. table salt c. _____

d. sucrose d. _____

e. gold e. _____

19. Write the chemical symbols for each of the following elements.

a. potassium a. _____

b. lead b. _____

c. sodium c. _____

d. chlorine d. _____

e. sulfur e. _____

20. Name the chemical elements represented by the following symbols.

a. Cu a. _____

b. H b. _____

c. Ag c. _____

d. Fe d. _____

e. N e. _____

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2.4 CHEMICAL REACTIONS

Section Review

Objectives

- Describe what happens during a chemical change
- Identify four possible clues that a chemical change has taken place
- Apply the law of conservation of mass to chemical reactions

Vocabulary

- chemical property
- chemical reaction
- reactant
- product
- precipitate
- law of conservation of mass

Part A Completion

Use this completion exercise to check your understanding of the concepts and terms that are introduced in this section. Each blank can be completed with a term, short phrase, or number.

Substances change into new substances during a(n) ___1___ reaction. A change in which the properties of a substance change, but not its composition, is a ___2___ change. If the composition changes, then a ___3___ change has occurred. The only way to be sure a ___4___ change has occurred is to test the ___5___ composition of a sample before and after a change. The law of ___6___ states that mass is conserved in any physical change or chemical reaction. In other words, ___7___ is neither created nor destroyed.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____

Part B True-False

Classify each of these statements as always true, AT; sometimes true, ST; or never true, NT.

_____ 9. A physical change is reversible.

_____ 10. In a chemical reaction, reactants are changed into products.

_____ 11. The amount of matter present appears to change during a chemical reaction.

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_____ 12. Matter can be created during a chemical reaction.

_____ 13. The substances formed in a chemical reaction are called reactants.

Part C Matching

Match each description in Column B to the correct term in Column A.

Column A	Column B
_____ 14. chemical reaction	a. solid that forms and settles out of a liquid mixture
_____ 15. reactants	b. starting substances in a chemical reaction
_____ 16. product	c. ability of a substance to undergo a specific chemical change
_____ 17. chemical property	d. substance formed in a chemical reaction
_____ 18. precipitate	e. process in which one or more substances change into one or more new substances

Part D Questions and Problems

Answer the following questions in the space provided.

19. When 400 grams of wood are burned, 30 grams of ash remain. What happened to the missing 370 grams of matter?

_____

_____

20. Some car batteries give off a potentially explosive mixture of gases. What kind of change is taking place in the battery?

_____

_____

21. When 16 grams of methane gas combine with 64 grams of oxygen, 44 grams of carbon dioxide form, plus water. What mass of water is produced?

_____

_____

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2 MATTER AND CHANGE

Practice Problems

In your notebook, solve the following problems.

SECTION 2.1 PROPERTIES OF MATTER

1. Which of the following is *not* a physical change?
   a. dissolving sugar in water
   b. burning gasoline in an engine
   c. evaporating sea water to obtain salt
   d. slicing a piece of bread
2. Which of the following is *not* a property of a gas?
   a. has a definite shape
   b. has an indefinite volume
   c. assumes the shape of its container
   d. is easily compressed
3. Which of the following is *not* a physical property of sucrose?
   a. solid at room temperature
   b. decomposes when heated
   c. dissolves in water
   d. tastes sweet
4. Which of the following is in a different physical state at room temperature than the other three?
   a. salt b. sugar c. flour d. water
5. Complete the following table.

Physical state	Definite Shape?	Definite Volume?	Easily Compressed?
gas			
	no		no
	yes		

Use the Table 2.1 to answer the following questions.

6. Which substance is a colored gas?
7. Which liquids boil at a lower temperature than water?
8. Classify the following properties as extensive or intensive.
   a. color b. volume c. mass d. boiling point

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SECTION 2.2 MIXTURES

1. How might you separate a mixture of water and salt?
2. What is a homogeneous mixture?
3. Which of the following mixtures are homogeneous? Which are heterogeneous?
   a. gasoline b. chunky peanut butter c. oil and vinegar salad dressing
4. Which of the following are substances? Which are mixtures?
   a. ethanol b. motor oil c. vinegar d. neon

SECTION 2.3 ELEMENTS AND COMPOUNDS

1. What elements make up ammonia, chemical formula NH_3?
2. Name the elements represented by the following chemical symbols.
   a. Pb b. K c. Au d. Fe
3. Classify the following as elements, compounds, or mixtures.
   a. table salt b. water c. iron d. stainless steel
4. Write the chemical symbol for each of the following elements.
   a. tin b. sodium c. silver d. carbon
5. A liquid is allowed to evaporate and leaves no residue. Can you determine whether it was an element, a compound, or a mixture?
6. Which of the following is not an element?
   a. copper b. sulfur c. sucrose d. helium

SECTION 2.4 CHEMICAL REACTIONS

1. Which one of the following is a chemical change?
   a. Gasoline boils.
   b. Oxygen is added to gasoline.
   c. Gasoline burns.
   d. Gasoline is poured into a tank.
2. Classify each of the following changes as physical or chemical.
   a. A puddle is dried by the sun.
   b. A dark cloth is faded by sunlight.
   c. Bread is toasted.
   d. Soap is mixed with water.
3. Carbon dioxide plus water yields carbonic acid.
   a. Name the product(s) of this reaction.
   b. Name the reactant(s) of this reaction.
4. If 44 grams of carbon dioxide react completely with 18 grams of water, what is the mass of carbonic acid formed?
5. In an engine, octane combines with oxygen to form carbon dioxide and water. If 22.8 grams of octane combine completely with 80 grams of oxygen to form 70.4 grams of carbon dioxide, what mass of water is formed?
6. What is the name of the chemical law on which problems 4 and 5 are based?