2–5 Review and Reinforcement

Mixtures

Use what you have learned in Section 2–5 to identify each of the following substances as pure substances, heterogeneous mixtures, or homogeneous mixtures. Write “pure,” “heterogeneous,” or “homogeneous” on the line.

1. alphabet soup
2. salt
3. concrete
4. vegetable oil
5. air
6. paint
7. sea water
8. granite
9. steel
10. sugar

Complete the following sentences by filling in the appropriate word from the list below. Each word can be used once, more than once, or not at all.

filtration crystallization chromatography electrolysis distillation

11. Heterogeneous mixtures are often separated by ________________.
12. Separating sand from water can be done by ________________.
13. The sugar in sugar water can be removed by ________________.
14. The separation technique that takes advantage of different boiling points is called ________________.
15. Removing chlorophyll pigment from leaves might be done by ________________.
16. The best way to decompose water into oxygen and hydrogen is by ________________.
17. Crude oil is broken down by heat, vaporized, and allowed to condense into various liquids such as gasoline. This process is called ________________.
2-5 Review and Reinforcement (continued)

Answer each of the following questions in the space provided.

18. How could you separate a mixture of iron filings and aluminum filings? What property of these metals would allow such a separation?

19. Could distillation be used to separate air into oxygen, nitrogen, carbon dioxide, argon, and so forth? Explain.

20. Why is every solution a mixture, but not every mixture is a solution?

21. Explain, or use examples to show, how a mixture may appear homogeneous but actually be heterogeneous.
Classification of Matter

DIRECTIONS: Write on the line at the right of each statement the letter preceding the word or expression that best completes the statement.

1. All of the following are mixtures with the exception of (a) brass; (b) air; (c) baking soda; (d) concrete.

2. Water composed of 11.2% hydrogen and 88.8% oxygen by mass is (a) a mixture; (b) a solution; (c) heterogeneous; (d) a pure substance.

3. Pure substances, solutions and elements (a) all contain phases; (b) are mixtures; (c) are heterogeneous; (d) are homogeneous.

4. Pure substances can be (a) solutions; (b) heterogeneous; (c) elements; (d) mixtures.

5. A compound composed of three elements is (a) salt; (b) water; (c) sugar; (d) carbon dioxide.

DIRECTIONS: Complete the following table by checking either homogeneous or heterogeneous, depending on the type of substance.

<table>
<thead>
<tr>
<th>Substance</th>
<th>Homogeneous</th>
<th>Heterogeneous</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. iron ore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. quartz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. granite</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. pancake syrup</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. vegetable soup</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. salt</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. water</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. nitrogen</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DIRECTIONS: Write the answers to the following on the lines provided.

14. State the law of definite composition.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

15. Identify and give examples of the two primary types of homogeneous matter.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
CHAPTER 4 REVIEW ACTIVITY

Text Reference: Section 4-7

Classification of Matter

Choose words from the list to fill in the blanks in the paragraphs.

Word List

<table>
<thead>
<tr>
<th>chemical property</th>
<th>intensive property</th>
</tr>
</thead>
<tbody>
<tr>
<td>compound</td>
<td>mixture</td>
</tr>
<tr>
<td>element</td>
<td>physical property</td>
</tr>
<tr>
<td>extensive property</td>
<td>property</td>
</tr>
<tr>
<td>heterogeneous matter</td>
<td>substance</td>
</tr>
</tbody>
</table>

Matter that has uniform characteristics throughout is called (1). Matter that has parts with different characteristics is called (2). A characteristic by which a variety of matter is recognized is called a(n) (3). A characteristic that depends upon the amount of matter in the sample is called a(n) (4). A characteristic that does not depend upon the amount of matter is called a(n) (5). A characteristic that can be observed without producing new kinds of matter is called a(n) (6). A characteristic that depends on how a kind of matter changes during interactions with other kinds of matter is called a(n) (7).

Matter can also be classified according to the basic types of matter it contains. A simple substance that cannot be broken down into other substances by chemical means is called a(n) (8). A chemical combination of simple substances is called a(n) (9). A physical combination of different substances that retain their individual properties is called a(n) (10). Either an element or a compound may be referred to as a(n) (11).

Classify each of the following as an element, compound, heterogeneous mixture, or homogeneous mixture.

12. Water
13. Carbon
14. Air
15. Table salt
16. Sugar dissolved in water
17. Homogenized milk
18. Granite
19. Oxygen
20. Sand in water
1. Fill in the blanks on the illustration, using the letter of the correct term.
   a. air-water interface
   b. solid phase
   c. liquid phase
   d. solid-liquid interface

2. Define the following terms and list one example of each.
   a. heterogeneous mixture

   b. solution

   c. compound

   d. element

3. Classify the following materials as heterogeneous mixtures, solutions, compounds, or elements.
   a. concrete
   b. sodium
   c. baking soda
   d. table salt
   e. aluminum
   f. gravel
   g. brass
   h. milk
   i. apple
   j. noncarbonated soft drink

4. Define the following terms.
   a. chemical property

   b. physical property

5. Classify the following properties as chemical or physical.
   a. heat conductivity
   b. combustibility
   c. resistance to acids
   d. length
   e. brittleness
   f. malleability
## Properties

Recall that **physical properties** can be observed without producing new substances. **Chemical properties** describe how a substance interacts (or fails to interact) with other substances to produce new substances. **Extensive properties** depend upon the amount of matter in the sample; **intensive properties** do not.

Classify each of properties listed below as **extensive physical**, **intensive physical**, or **chemical**.

1. Color
2. Combustibility
3. Hardness
4. Density
5. Mass
6. Melting point
7. Ductility
8. Volume
9. Failure to react with other substances
10. Odor
11. Weight
12. Malleability
13. Tendency to corrode

Some of the measured properties of a given substance are listed below. Write the general name describing each property. Select the names from the properties listed for Exercises 1–13 above.

14. 15 dm³
15. Can easily be hammered into sheets.
16. 2.8 g/cm³
17. Burns when heated in the presence of O₂.
18. Stinks when heated.
19. Can be scratched by a diamond.
20. 500°C
21. Can easily be drawn into a wire.
Physical and Chemical Changes

Indicate with an X in the blank whether the change described is a physical change, a chemical change, or both.

Description of Change

<table>
<thead>
<tr>
<th>Physical Change</th>
<th>Chemical Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Drops of water collect on the outside of a cold glass of water.</td>
<td></td>
</tr>
<tr>
<td>2. Air bubbles form in the cold water as it is warmed by the surroundings.</td>
<td></td>
</tr>
<tr>
<td>3. The metal in an automobile exposed to salt and water slowly crumbles into tiny pieces.</td>
<td></td>
</tr>
<tr>
<td>4. A mixture of cement, sand, and water hardens into concrete with the release of heat over a period of a few days.</td>
<td></td>
</tr>
<tr>
<td>5. An image develops on film exposed to light.</td>
<td></td>
</tr>
<tr>
<td>6. Dry ice slowly disappears without an apparent trace when left exposed to warm temperatures.</td>
<td></td>
</tr>
<tr>
<td>7. Gasoline changes into a gas and burns as it enters the cylinder of an automobile engine.</td>
<td></td>
</tr>
<tr>
<td>8. The volume of a balloon is reduced when the balloon is placed in cooler surroundings.</td>
<td></td>
</tr>
<tr>
<td>9. Food that is eaten is changed by the body and energy is released.</td>
<td></td>
</tr>
<tr>
<td>10. A sample of a liquid in a narrow tube expands as its temperature is increased.</td>
<td></td>
</tr>
</tbody>
</table>

Identify three clues that are often helpful in determining that a change is a chemical change.

11. 
   
   
   
   
   
   

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