



# Chapter 9

## Classification of Matter

# Composition of Matter

- Science Words
  - Element
  - Compound
  - Substance
  - Heterogeneous mixture
  - Homogeneous mixture
  - Solution



# Composition of Matter

- Colloid
- Tyndall effect



# Composition of Matter

## ■ Objectives

- Distinguish between substances and mixtures
- Compare and contrast solutions, colloids and suspensions.



# Composition of Matter

## ■ Elements

- Make up the atoms of matter
- Pure form of matter

## ■ Compounds

- Made form atoms of two or more elements that are combined.

# Composition of Matter

- Hydrogen and Oxygen make up Water
  - $\text{H}_2\text{O}$
  
  - Sugar = Carbon, Hydrogen, Oxygen
    - $\text{C}_6\text{H}_{12}\text{O}_6$

# Composition of Matter

## ■ Substance

□ Elements or compounds that can be reduced by physical means.

■ Salt, Sugar, Baking soda

■  $\text{NaCl}$ ,  $\text{C}_6\text{H}_{12}\text{O}_6$ ,  $\text{Ca}_2\text{CO}_3$

# Composition of Matter

## ■ Mixtures

- Material made up of two or more substances that can be separated by a physical means
  - Salt water can be separated by boiling off the water
- Not all mixtures are of equal quantity of substances.
  - Some have more of one kind of substances and less of another.

# Composition of Matter

## □ Heterogeneous Mixture

- different materials and separated easily
- Some fabrics, permanent-press
- Granite, Concrete, pizza, dry soup

## ■ Solutions

□ Another name for a homogeneous mixture

## □ Homogeneous Mixtures

- Two or more substances are uniformly mixed

# Composition of Matter

## ■ Colloids and Suspensions

### □ Colloid

- Heterogeneous mixture that never settles out

### □ Milk

- Mixture of water, fats, proteins

### □ Tyndall affect

- Scattering of light by particles in a mixture.



# Describing Matter

- Science Words

- Physical Property

- Physical change

- Chemical Property

- Law of Conservation of Mass

# Describing Matter

- Objectives
- Give Examples of physical properties.
- Distinguish between physical and chemical changes.
- Distinguish between chemical and physical properties.
- State and explain the law of conservation of mass.

# Describing Matter

## ■ Physical Properties

- A characteristic of a material that you can observe without changing the substance
  - Color, shape, size density melting point and boiling point
  - Nail – gray solid
  - Drink – volume, temperature, smell
- How could you separate iron filings and sand?
- How could you separate rocks and sand?

# Describing Matter

## ■ Physical change

- Change in size, shape, or state of matter

- Physical changes

  - Freezes, boils, evaporates, sublimates, condenses

  - Changing a piece of chalk by breaking it.

## ■ Chemical change

- Change one substances into a different substance

# Describing Matter

- Fire works
- Steak burning on the stove
- Production of light or sound as the change takes place.
- Iron rusting and turning a red color, iron oxide
- H and O combine to form water in a rocket

# Describing Matter

- Weathering-- chemical or physical
  - Rocks split by water freezing– physical
  - Lime stone and acid – chemical
  - Iron and rust –chemical
  - Wind blowing sand around– Pysical

# Describing Matter

## ■ Physical properties

- Characteristic of a substance that indicates whether it can undergo a certain chemical change.
- Flammable or combustible
- Drug store and bottles that store things that are brown. Why?

# Describing Matter

## ■ Conservation of Mass

- Matter is neither created nor destroyed during a chemical change

- Mass of a substance is equal to the mass of a new substance (s) that is formed

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- 1-10 Checking Concepts