Chapter 15: Classification of Matter

- Composition of Matter
  - Pure Substances
  - Mixtures
    - Homogeneous
    - Heterogeneous
- Properties of Matter
  - Physical Properties & Changes
  - Chemical Properties & Changes

Pure Substances

- Elements
  - All the atoms have the same identity
  - Examples: copper, iron, mercury, gold, hydrogen

- Compounds

  Two or more elements combined in a fixed proportion (chemically bonded)

  Examples: water (H_20), Salt (NaCl)

Mixtures

- Heterogeneous Mixtures
  - A mixture with different materials that are different and easily recognized
  - Examples: Italian dressing, pizza, cement, fabric
- Homogeneous Mixtures
  - Two or more substances blended evenly throughout
  - Examples: air, soda, vinegar, tea

Homogeneous Mixture

- Solution
  - Small particles that are evenly mixed and will not settle out
  - Examples: soda is a solution of water, sugar, flavor, color, and carbon dioxide

Heterogeneous Mixture

- Suspension
  - Mixture that has visible particles that will settle out
  - Examples: muddy water, hot chocolate,

Other Type of Mixture

- Colloid
  - Like homogeneous- particles won't settle out
  - Like heterogeneous- particles are larger and vary in proportion
  - Example: milk, fog, smoke, gelatin

Tyndall Effect

- Scattering of light by the particles in a colloid.
- Example: Light beam shining through fog

Physical Properties

- Characteristic of substance that can be observed without changing the identity
- Examples: color, shape, size, density, melting, freezing, or boiling point.

Chemical Properties

- Characteristic of substance that indicates if it can undergo certain chemical changes
- Example: ability to burn and reactivity

Physical Changes

- A change in the physical appearance (size, shape, etc.)
- A change in state of matter (solid-liquid-gas)
- Examples: painting a house, making a milk shake, melting ice, erosion

Chemical Changes

- A change to the chemical composition of a substance.
- Clues are rise or drop in temperature, fizzing or bubbling following a reaction.
- Examples: baking soda and vinegar fizzes when mixed, alka seltzer when added to water, burning paper, frying an egg

Practice

Physical or Chemical Change?

- Toasting Bread
- Adding sugar to coffee
- Melting butter
- Boiling salt water
- Making chocolate milk
- Burning magnesium
- Frying an egg
- Digesting your dinner
- Battery terminals corroding
- Breaking a glass

Conservation of Mass

- Matter can not be created nor destroyed during a chemical change
- All of the mass present before the chemical reaction will equal the mass after the reaction