Section 2.2
Properties of Matter

EQ: Why are color, volume, and density classified as physical properties?

§ 2.2: PROPERTIES OF MATTER
• Physical Properties:
  – Characteristics that can be observed without changing the identity of the substance.
  – Ex: color (yellow), mass (58.5 grams), volume (cm³), shape (round), odor (new tennis ball smell), texture (fuzzy), state of matter (solid)

PHYSICAL PROPERTIES OF MATTER
• Physical Properties:
  – Can help identify substances
    • Ex: color, odor, texture, melting point, boiling point, mass, density (mass/volume)
  – Can be observed and measured
    • Ex: melting point, boiling point, mass, density (mass/volume), strength, hardness, strength, magnetism
  – Help determine uses
    • Ex: Aluminum is lightweight, flexible, & durable
EQ: Why are color, volume, and density classified as physical properties?

DENSITY IS A PHYSICAL PROPERTY

• A measurement of how much matter is contained in a certain volume of a substance.
• Density = \( \frac{\text{mass}}{\text{volume}} \)
• Liquids or Solids: expressed in g/cm\(^3\).
• 1 cubic centimeter = 1 milliliter
• Density of water = 1 g/cm\(^3\)

EQ: Why are color, volume, and density classified as physical properties?

DENSITY IS DIFFERENT FROM WEIGHT

• When comparing objects of the same volume, more dense objects feel heavier than less dense objects do.
• When comparing objects of the same mass, less dense objects take up more space than more dense objects do.
• However, when comparing different volumes or mass, there is no relationship between the two.

EQ: Why are flammability and reactivity classified as chemical properties?

CHEMICAL PROPERTIES OF MATTER

• Chemical Properties:
  – Describes how a substance changes into a new substance, either by combining with other elements or breaking apart into new substances.
  – Ex: Flammability, reactivity with water, acids, bases, or heat
EQ: Why are flammability and reactivity classified as chemical properties?

PHYSICAL AND CHEMICAL PROPERTIES ARE DIFFERENT

• Physical Properties:
  – Can be observed without changing the identity of the substance.

• Chemical Properties:
  – Can only be observed when the identity of the substance changes.