

## Chemistry: MATTER

What is *Chemistry* all about? \_\_\_\_\_

What is *Matter*? \_\_\_\_\_

**Examples:** \_\_\_\_\_

Things that are NOT matter - \_\_\_\_\_

**Pure Substances :** \_\_\_\_\_

Example: \_\_\_\_\_

Substances can be classified into:

- **Elements :** \_\_\_\_\_

Example: \_\_\_\_\_

- Elements are made up of atoms; the smallest particle that has the properties of the element.
- Elements have fixed composition because it contains only one type of atom

- **Compounds:** \_\_\_\_\_

Example: \_\_\_\_\_

What is a *Molecule*? \_\_\_\_\_

Examples: \_\_\_\_\_

What are *Chemical Formulas*? \_\_\_\_\_

Examples: \_\_\_\_\_

What is a *Mixture*? \_\_\_\_\_

- Mixtures can be separated into their parts.

Examples of *Mixtures*: \_\_\_\_\_

Types of Mixtures...

**Heterogeneous:** \_\_\_\_\_

Example: \_\_\_\_\_

**Immiscible** - \_\_\_\_\_

Example: \_\_\_\_\_

**Homogeneous:** \_\_\_\_\_

Example: \_\_\_\_\_

**Miscible:** \_\_\_\_\_

Example: \_\_\_\_\_

Classifications of Mixtures

1. \_\_\_\_\_ – Substances that dissolve and form a homogeneous mixture
  - a. Example: \_\_\_\_\_
2. \_\_\_\_\_ – Heterogeneous mixture that separates into layers over time

- a. Example: \_\_\_\_\_
3. \_\_\_\_\_ – Contains some particles that are intermediate in size between the small and large particles. Parts can't be filtered or separated
- a. Example: \_\_\_\_\_

Ways to separate mixtures

**Distillation** – \_\_\_\_\_

Example: Boiling salt water to make freshwater

**Filtration** – \_\_\_\_\_

Example: Strainers, filters, screens

## MATTER AND ENERGY

### KINETIC THEORY

- All matter is made of \_\_\_\_\_ and \_\_\_\_\_ that act like tiny particles.
- These tiny particles are \_\_\_\_\_. The \_\_\_\_\_ the temperature, the \_\_\_\_\_ the particles move.
- At the same temperature, more massive ( \_\_\_\_\_ ) particles move \_\_\_\_\_ than less massive (lighter) particles.

### THREE STATES OF MATTER

#### SOLID :

- \_\_\_\_\_
- Particles are very rigid with very little movement

#### LIQUID:

- \_\_\_\_\_
- Particles move more freely

#### GAS :

- \_\_\_\_\_
- Particles move very fast and spread indefinitely.

#### Gases Can Exert Pressure....

- Gas in a balloon is constantly pushing out against the balloon. Particles are moving fast and bouncing into the sides nonstop. This creates \_\_\_\_\_.

#### **Factors that affect Gas pressure**

- Temperature – \_\_\_\_\_ the \_\_\_\_\_ will \_\_\_\_\_ its pressure
- Volume – \_\_\_\_\_ the \_\_\_\_\_ of a gas \_\_\_\_\_ its pressure
- Number of Particles – \_\_\_\_\_ the \_\_\_\_\_ of particles \_\_\_\_\_ pressure

### ENERGY'S ROLE

- Energy can be thought of as the \_\_\_\_\_.
- Energy must be \_\_\_\_\_ or \_\_\_\_\_ to have a *PHASE CHANGE*.
- \_\_\_\_\_: going from solid to liquid to gas and back down. This does NOT change what it is made out of (composition) or how much you have (mass).

MELTING : \_\_\_\_\_, Energy must be \_\_\_\_\_!

EVAPORATION/BOILING : \_\_\_\_\_, Energy must be \_\_\_\_\_!

SUBLIMATION: \_\_\_\_\_, Energy must be \_\_\_\_\_!

CONDENSATION: \_\_\_\_\_, Energy must be \_\_\_\_\_!

FREEZING: \_\_\_\_\_, Energy must be \_\_\_\_\_!

**Law of Conservation of Mass:** \_\_\_\_\_

- After a chemical or physical change, mass is \_\_\_\_\_ the same.

**Law of Conservation of Energy:** \_\_\_\_\_

- After a chemical or physical change, \_\_\_\_\_ is \_\_\_\_\_ the same.

## Properties of Matter

What is a Property?? \_\_\_\_\_

There are 2 Kinds of Properties:

**1. Chemical Properties:** \_\_\_\_\_

- It can change by either combining with other elements or breaking apart into new substances.
- Example: \_\_\_\_\_

**2. Physical Properties:** \_\_\_\_\_

- Physical properties are characteristics of a substance that can be observed WITHOUT changing the substance.
- Example: **Viscosity, conductivity, malleability, hardness, shape, color, odor, texture, boiling point, melting point, strength, hardness, ability to conduct electricity, magnetism, or heat, density**
- Conductivity – \_\_\_\_\_
  - Example: \_\_\_\_\_
  - Normally conduct electricity
- Viscosity – \_\_\_\_\_
  - Example: \_\_\_\_\_
  - Heating decreases viscosity
- Malleability – \_\_\_\_\_
  - Example: \_\_\_\_\_
- Hardness – \_\_\_\_\_
  - Example: \_\_\_\_\_
- Density - \_\_\_\_\_
  - Substance with LOW density is said to be “\_\_\_\_\_”; HIGH density = “\_\_\_\_\_”.
  - If you know the density of a substance, you can determine if the object will float in water.
  - Density of Water, H<sub>2</sub>O = 1g/mL
  - Density over 1 = \_\_\_\_\_
  - Density under 1 = \_\_\_\_\_

Math equation: Density = mass divided by volume or  $D = m/v$

Piece of wood has a mass of 25 g and a volume of 35 cm. What is its density?

Other examples of Physical Properties

WATER: \_\_\_\_\_

STEEL: \_\_\_\_\_

### **Chemical and Physical Changes**

- Some things \_\_\_\_\_ us because they don't change rapidly while others help us by changing quickly.
  - Things that don't change quickly:
    - \_\_\_\_\_ used to reinforce a broken bone
    - \_\_\_\_\_ used to make buildings
  - Things that change quickly:
    - Water turns to \_\_\_\_\_ quickly to \_\_\_\_\_ homes
    - Liquid gasoline turns to a \_\_\_\_\_ quickly so the gas can burn in a car engine.

### **Chemical Change :** \_\_\_\_\_

- **Nothing is created or destroyed, just rearranged.**
- Signs that a chemical change has occurred:
  - \_\_\_\_\_ change
  - \_\_\_\_\_ change
  - Release of \_\_\_\_\_
  - \_\_\_\_\_ is created
  - Formation of \_\_\_\_\_ – liquid turning solid (cottage cheese)

Examples of Chemical Changes: \_\_\_\_\_

\_\_\_\_\_

### **Physical Change:** \_\_\_\_\_

- **Most physical changes can be reversed**
- Signs that a physical change has occurred:
  - \_\_\_\_\_ has changed
  - \_\_\_\_\_ was changed by someone
  - \_\_\_\_\_ changed
  - \_\_\_\_\_
  - \_\_\_\_\_ changes

Examples of Physical Changes: \_\_\_\_\_

\_\_\_\_\_