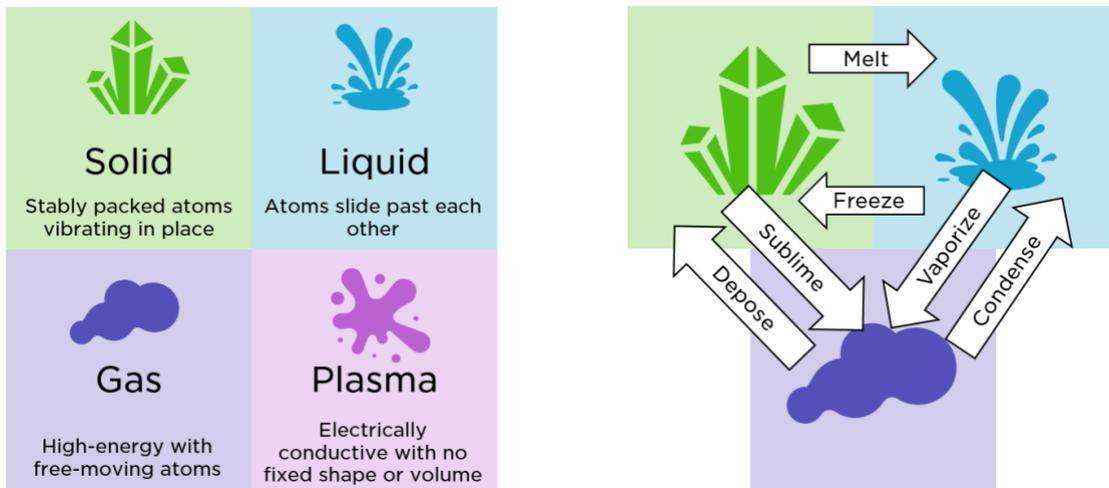


# Matter

- Matter is anything that takes up space and can be weighed.
- In other words, matter has volume and mass.
- There are many different substances, or types of matter, in the universe.
- Four states of matter are observable in everyday life: solid, liquid, gas, and plasma.



## Classification of Matter

Matter can be broken down into two categories::

**1-Pure substance:-** A substances that are made of only one type of atom or only one type of molecule Pure substances are further broken down into :

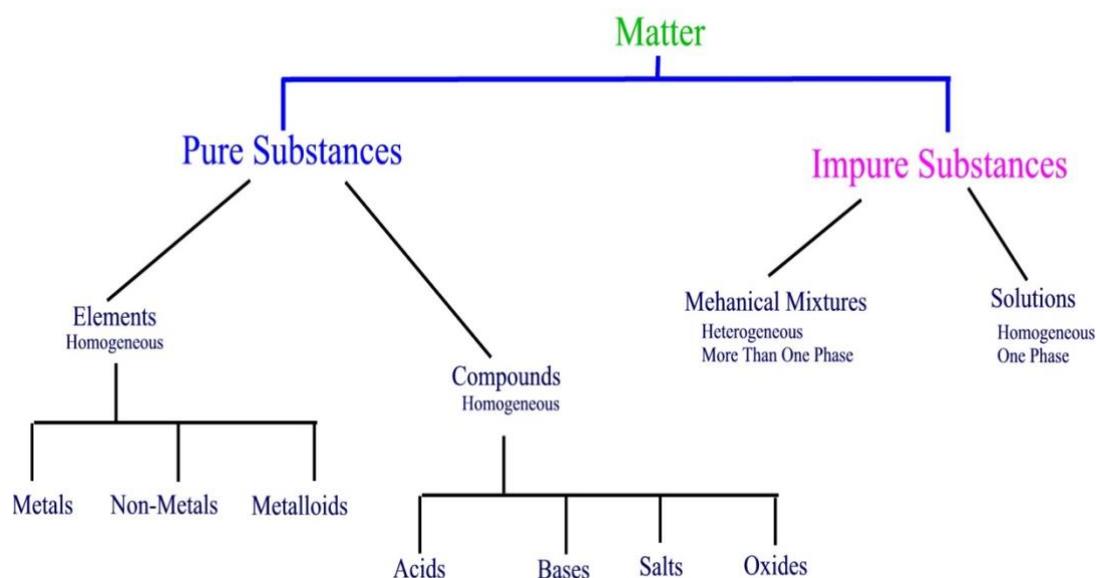
**a. Elements:** Element is the simplest matter which contains one type of atom.

**b. Compounds:** are pure substances that are composed of two or more elements .Substances such as water, salt, and sugar are simple examples of compounds.

**2- Mixture:** are physically combined structures that can be separated into their original components. A mixture is composed of different types of atoms or molecules that are not chemically bonded.. They are not pure matters.

a. Homogeneous Mixtures: is a type of mixture in which the composition is uniform and every part of the solution has the same properties..

b. Heterogeneous Mixtures: is a mixture of two or more chemical substances where the various components can be visually distinguished.



## Units of Measurements

### I. Mass and Weight

• **Mass:** is the quantity of matter that gives the heaviness for an object of the matter.

SI units: Kilogram (kg).

Gram (g) :  $1 \text{ kg} = 1000 \text{ g}$ .

- **Weight:** is the force that gravity exerts on an object.

$W = m g$   $W$  is the weight,  $m$  is the mass, and  $g$  is the gravitational acceleration constant.

$g = 9.81 \text{ m/s}^2$  Measuring Devices for Mass is Top loading balance and analytical balance.

II. Temperature: Temperature is the degree of hotness or coldness of a body or environment.

- SI unit for temperature is kelvin (K) There are three scale of temperature:- 1. kelvin (k): based on absolute zero 2.Celsius ( $^{\circ}\text{C}$ ) is defined from the boiling and freezing points of water. Freezing water=  $0 \text{ }^{\circ}\text{C}$  Boiling water=  $100 \text{ }^{\circ}\text{C}$  3. Fahrenheit ( $^{\circ}\text{F}$ ) is used in United States. Freezing water=  $32^{\circ}$  Lec 2 General chemistry MSc. Ali Fahim 4 Boiling water=  $212^{\circ}$  Conversions between Temperature Scales • K and  $^{\circ}\text{C}$   $\text{K} = ^{\circ}\text{C} + 273.15$  •  $^{\circ}\text{C}$  and  $^{\circ}\text{F}$   $^{\circ}\text{C} = 5/9 (\text{F}-32)$  Measuring Devices for Temperature • Mercury Thermometer • Alcohol Thermometer • Digital Thermometer