MATTER, ELEMENT, COMPOUND, MOLECULE AND ATOM

A Matter is anything that has mass and occupies space. It can change from one state to another. All matters are acted upon by the force of gravity.

All matters are made up of tiny particles called molecules (element), while molecules are made up of atoms

A molecule is the smallest particle of a substance that still keep the properties of the original substance.

An element is the part of matter which cannot be splitted into simpler matter by any chemical method.

A compound is a chemical substance formed when two or more elements are chemically combined in a fixed proportion by mass

An Atom is the smallest part of an element. They cannot be seen with the naked eye and can take part in chemical reactions

STATES OF MATTER: There are three major states of matter namely; solid, liquid and gaseous states.

1. SOLID STATE OF MATTER: The following are the characteristics of any matter in solid state.

a. The molecues of a matter in solid state lies in a regular pattern.
b. It has a definite shape and definite volume, therefore, does not occupy the shape of the container (or shape of any other substance).
c. The molecules are closely packed together and they vibrate about their fixed position.

2. LIQUID STATE OF MATTER: The following are the characteristics of liquid state of matter.

a. The molecules in liquid state are not closely packed like that of solid; although not as far away as that of gases.
b. The molecules have no definite shape; they take the shape of the container.
c. They have no regular pattern, hence, they can move within the liquid.

3. GASEOUS STATE OF MATTER: Some characteristics of molecules of matters in gaseous state are as follow.

a. The molecules of any matter in gaseous state are far apart.
b. Their molecules are in constant motion.
c. They have no definite shape.
d. They move at high speed and collide with one another and with the wall of the container.

DIFFUSION

Diffusion in gases is the tendency of a gas to mix with another and fill an empty space as a result of the constant random motion of the molecules.

Factors that affects rate of diffusion: There are three major factors that affect the rate of diffusion namely; Temperature, Density and Speed.

Graham's law of diffusion: Graham's law of diffusion states that at constant temperature and pressure, the rate of diffusion of a gas is inversely proportional to thesquare root of the density and to the square root of relative molecular mass. Mathematically,

$$\frac{R1}{R2} = \sqrt{\frac{D2}{D1}} = \sqrt{\frac{M2}{M1}}$$ **W***here R is the rate of difussion ,*

$$D \text{ is the density} \wedge M \text{ is the mass of the gas}$$