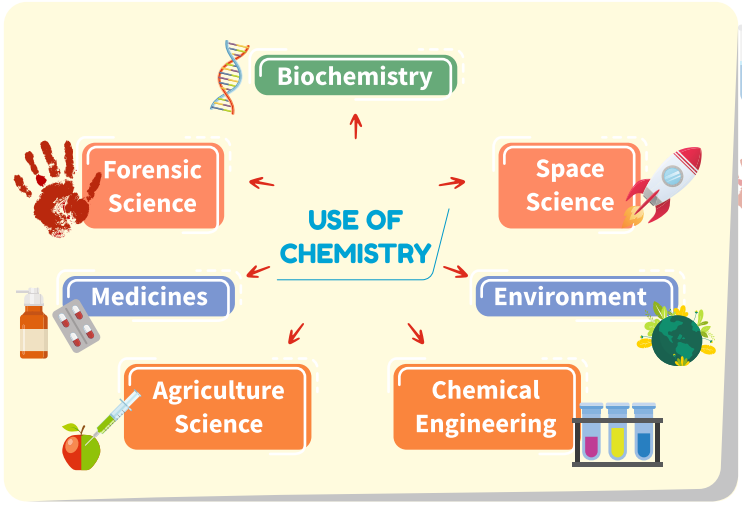
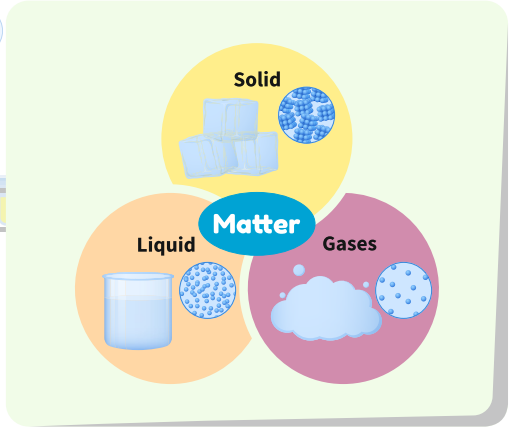
1. SOME BASIC CONCEPTS OF CHEMISTRY





Mixture

Homogeneous Uniform Compostion

Homogeneous NON Uniform Compostion

Significant Figures

- All the non-zero numbers in a measurement are significant.
- Zero's sandwiched anywhere between non-zero's are significant.
- Zero's to the left of a first non-zero digits are not significant.
- The zero's to the right of the last non-zero digits are significant if no. has a decimal point.

LAW OF CHEMICAL COMBINATIONS

Law of Conservation of mass

Matter can neither be created nor be destroyed.

Law of Definite proportions

A given compound always contain same elements in the exact same proportions by mass.

Law of multiple proportions

If two elements can combine to form more than one compound, the masses of one element that combine with a fixed mass of the other element are in ratio of small whole number.

Avogadro's Law

At Constant pressure & temperature, Volume is directly proportional to number of moles.

Gay Lussac's Law

Gay Lussac's Law of combining volumes at same constant temperature and pressure when gases react together to form other gases they do so in simple whole number ratio.

Dalton's Atomic Theory

- Elements consists of indivisble particles (atoms).
- All the atoms of a given element have identical proporties including identical mass.
- Atoms are neither created non destroyed.
- Compounds are formed when atoms of different elements combine in a fixed ratio.

Emperical and Molecular Formula (EF and MF)

Step 1 → Conversion of mass % to grams.
Step 2 → Convert into number of moles of each element.
Step 3 → Divide the mole value obtained above by the smallest Number.
Step 4 → Write Emperical formula by Mentioning the no. after writing the symbols of respective elements.
Step 5 → Writing Molecular Formula
a) Determine EF mass. Add the atomic masses of various atoms present in the EF.
b) Divide molar masses by EF mass.
c) Multiply EF by n obtained above.

Moles (n)

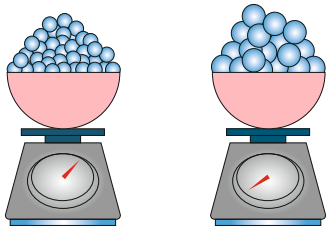
$$n = \frac{\text{given number}}{\text{Avagadro's No}} = \frac{n}{N_A}$$

$$n = \frac{\text{given mass}}{\text{Molar mass}} = \frac{m}{M}$$

$$n = \frac{\text{given Volume}}{22.4\ \text{L}} = \frac{\text{V}}{22.4\ \text{L}}$$

STOICHIOMETRY

Write correct formulas of reactant & products
↓
Balance the equation
↓
Convert units to moles
↓
Use mole ratio
↓
Convert moles of required substance to desired units



Limiting Reagent

The reactant that is entirely used up in a reaction.

CONCENTRATION TERMS

Temperature Dependent

$$\frac{\text{w}}{\text{v}}\,\% = \frac{\text{Weight of solution Kg}}{\text{Volume of Solution in L}}$$

$$\frac{\text{v}}{\text{v}}\,\% = \frac{\text{Volume of Solute in L}}{\text{Volume of Solution in L}}$$

$$\textbf{Molarity} = \frac{\text{No. of moles of Solute}}{\text{Volume of Solution in L}}$$

Normality = Molarity × n-factor

Temperature Independent

$$\frac{\text{w}}{\text{w}}\,\% = \frac{\text{Weight of Solute in kg}}{\text{Weight of Solution in kg}} \times 100$$

$$\textbf{PPM Parts per Million} = \frac{\text{Weight of Solute in kg}}{\text{Weight of Solution in kg}} \times 10^6$$

$$\textbf{Mole fraction} = \frac{\text{Moles of solute or Solvent}}{\text{Total moles of Solution}}$$

$$\textbf{Molality} = \frac{\text{no. of moles of solute}}{\text{weight of solvent in kg}}$$

Dilution

$M_1V_1 = M_2V_2$

Basicity

number of H^+ ion displaced in one molecule the acid.

Acidity

Number of OH^- ion displaced in one molecule of the base.