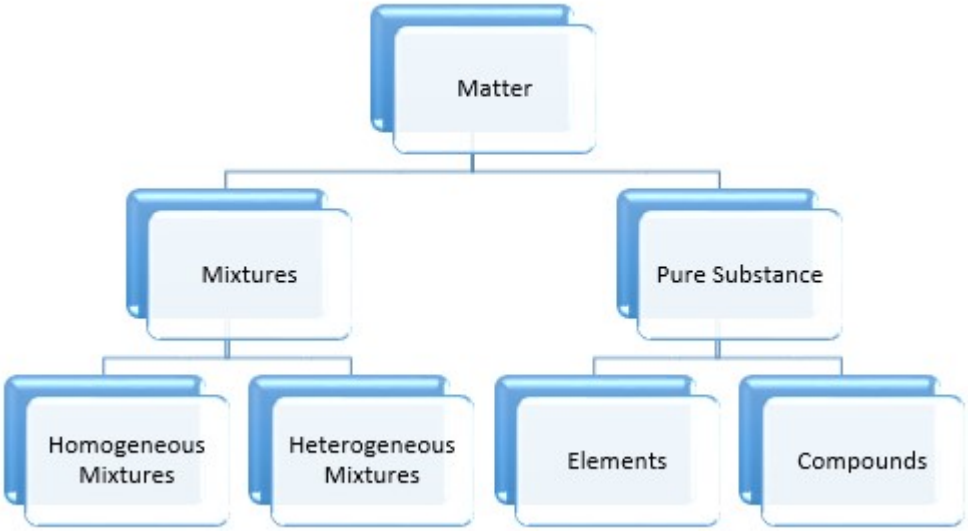
Some Basic Concepts in Chemistry:

Basic Concepts of Chemistry

Classification of Matter:



Properties of Matter:

Physical properties: Colour, odour, melting point, boiling point, density

Chemical properties: Acidity, basicity, combustibility

The International System of Units (SI):

Physical quantity	Symbol for quantity	Name of SI unit	Symbol for SI unit
Length	l	metre	m
Mass	m	kilogram	kg

Time	t	second	s
Electric current	I	ampere	A
Thermodynamic temperature	T	kelvin	K
Amount of substance	n	mole	mol
Luminous intensity	I_o	candela	Cd

Mass and weight:

- Mass of a substance is the amount of matter present in it, while weight is the force exerted by gravity on an object.

Temperature:

- Thermometer with the Celsius scale is calibrated from 0 to 100.
- The Fahrenheit scale is represented between 32 and 212.
- Negative values of temperature are not possible on the Kelvin scale.

Significant figures:

- Significant figures are meaningful digits which are known with certainty.

Laws of Chemical Combination

- **Law of conservation of mass:** Matter can neither be created nor be destroyed.
- **Law of definite proportions:** given compound always contains the same proportion of elements by weight.
- **Law of multiple proportions:** If two elements can combine to form more than one compound, the masses of one element which
  combine with a fixed mass of the other element are in the ratio of small whole numbers.

- **Gay-Lusaac's law of gaseous volumes:** When gases combine or are produced in a chemical reaction, they do so in a simple ratio by volume provided all gases are at the same temperature and pressure.
- **Avogadro's law:** Equal volumes of gases at the same temperature and pressure should contain equal number of molecules.

Atomic mass

- One atomic mass is defined as mass exactly equal to 1/12th the mass of one carbon-12 atom.

Molecular mass

- Molecular mass is the sum of atomic masses of the element present in the molecule.

Formula mass

- The formula mass of a molecule is the sum of the atomic weights of the atoms in the empirical formula of a compound.

Mole

- One mole is the amount of substance which contains as many particles or entities as there are atoms in exactly 12 g of the C-12 isotope.

Molar mass

- The mass of one mole of a substance in grams.

Empirical formula and molecular formula

- An empirical formula represents the simplest whole number ratio of various atoms present in a compound.
- A molecular formula shows the exact number of different types of atoms present in a molecule of a compound.

Stoichiometry

- Stoichiometry deals with the relationship between reactants and products involved in a chemical reaction to determine desired quantitative data.

Limiting reagent

- A limiting reagent in a chemical reaction is a substance which is totally consumed when the reaction is completed.

Concentration terms

- **Molarity (M):** Number of moles of a solute present in per unit volume of solution.
- **Molality (m):** Number of moles of a solute present in one kilogram of a solvent.
- **Normality (N):** Number of gram equivalents of a solute present in per unit volume of solution.
- **Mole fraction:** Ratio of the number of moles of a particular component to the total number of moles of the solution.
- **Mass per cent or weight per cent (w/w%):** Gram of solute present in 100 gram of solution.
- **Volume by volume per cent (v/v%):** mL of solute present in 100 mL of solution.
- **Weight by volume per cent (w/v%):** Gram of solute present in 100 mL of solution.