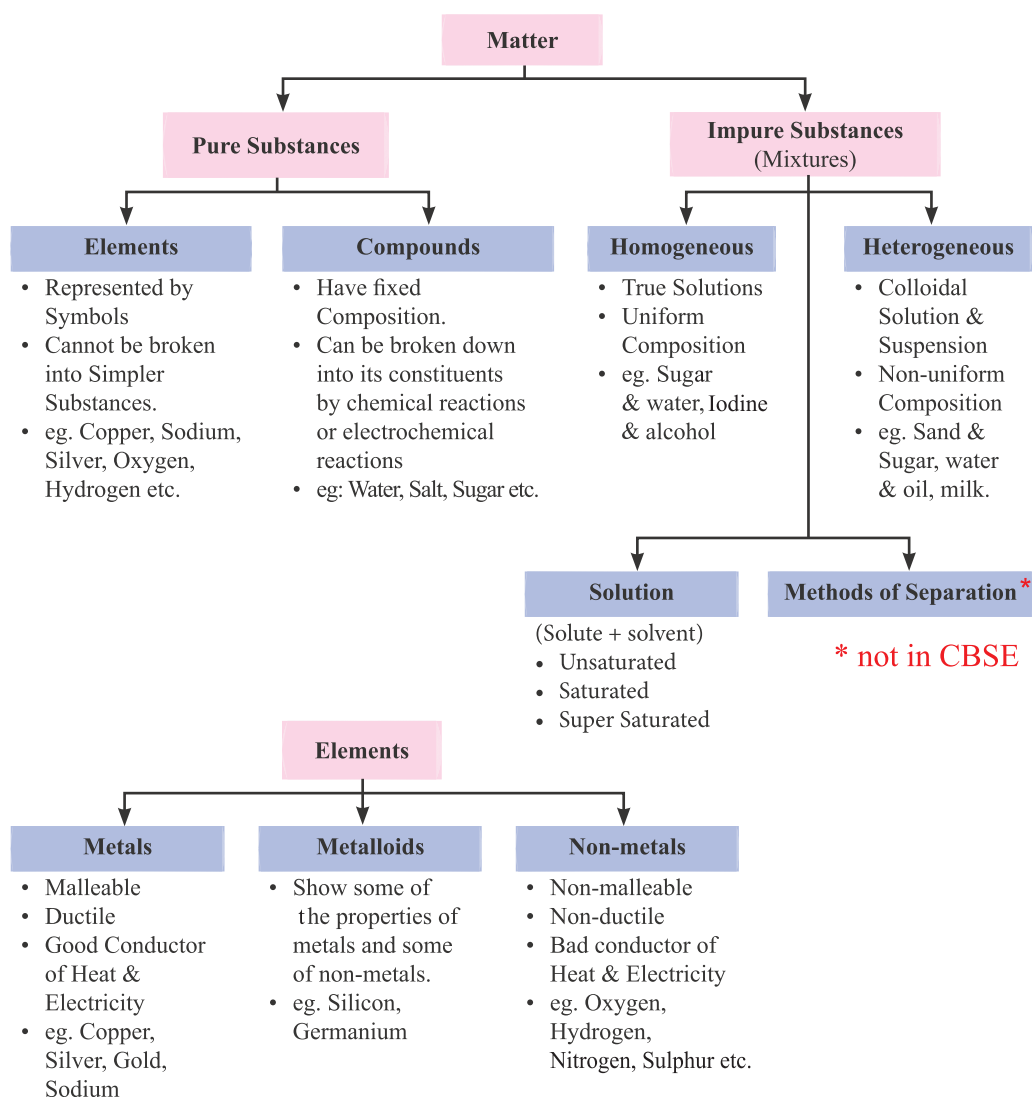




Chapter - 2

Is Matter Around Us Pure ?

CONCEPT MAPPING



'Pure' word means that there is no mixing in a substance. But according to scientific language all things are mixture of so many substances, not of single one. That's why they are not pure.

E.g. Milk, water, fat, etc.

- *Pure substances means that all elements have same chemical properties.*
- *A pure substance is made up of same kind of elements.*

Substance : A substance is a kind of matter that cannot be separated into other kind of matter by any physical process. A pure substance is made up of same kind of elements.

What is a mixture ?

It is a substance in which two or more substances (element or compound) are simply mixed together in any proportion. Examples : The air is a mixture of oxygen, nitrogen, carbon dioxide and water vapour.

Types of Mixture : Mixture is of two types :

- Homogenous mixture
- Heterogenous mixture

Homogenous Mixture : These types of mixtures have no visible boundaries of separation between the various constituents.

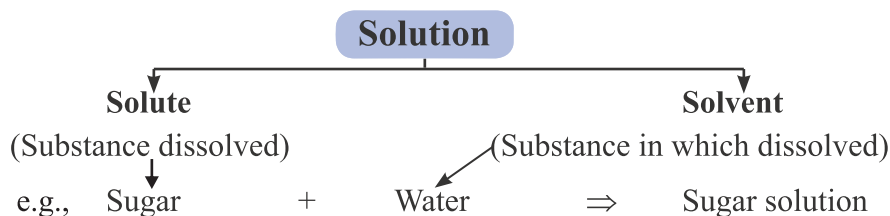
Example : Sugar in water. It has a uniform composition throughout its mass.

Heterogenous Mixture : These types of mixtures have visible boundaries of separation between the various constituents.

Example : Mixture of sugar and sand. It does not have a uniform composition throughout its mass.

Solution : A solution is a homogenous mixture of two or more substances. E.g., Nimboo pani, soda water.

Solution : A solution has a solvent and a solute as its components. The component of the solution that dissolves the other component in it is called the solvent. The component of the solution that is dissolved in the solvent is called the solute.



Types of Mixtures

True Solution	Colloidal	Suspension
1. Size of solute particles is smallest. $< 10^{-9}$ m.	1. Size of solute particles bigger than true but smaller than suspension. In between 10^{-9} to 10^{-6} m.	1. Size of particles biggest. $> 10^{-6}$ m.
2. Solute particles can't be seen with naked eye.	2. Solute particles can't be seen with Naked eye.	2. Can be seen with naked eye.
3. Homogenous mixture.	3. Seems homogenous but actually heterogenous mixture.	3. Heterogenous mixture.
4. Particles can't be separated by filtration.	4. Particles can't be separated by filtration.	4. Can be Separated by filtration.
5. Transparent	5. Translucent	5. Opaque
6. Stable solutions - i.e., solute particles do not settle on keeping.	6. Stable solutions.	6. Unstable solution – solute particles settle upon keeping.
7. Do not show tyndall effect.	7. Show tyndall effect.	7. May or may not show tyndall effect.
8. Solution diffuse rapidly through filter paper as well as parchment paper.	8. Colloid particles pass through filter paper but not through parchment paper.	8. Suspension particles do not pass through filter paper as well as parchment paper.
9. e.g., Sugar in water.	9. e.g., Milk, blood.	9. e.g., Sand/mud in water.

Common examples of colloids :

	Dispersal Phase (Solute)	Dispersion Medium (Solvent)	Type	Example
1.	Liquid	Gas	Aerosol	Fog, cloud
2.	Solid	Gas	Aerosol	Smoke

3.	Gas	Liquid	Foam	Shaving Cream
4.	Liquid	Liquid	Emulsion	Milk, face cream, emulsion paint
5.	Solid	Liquid	Sol	Mud, digene
6.	Gas	Solid	Foam	Foam, rubber sponge
7.	Liquid	Solid	Gel	Jelly, cheese
8.	Solid	Solid	Solid sol	Coloured gemstones, glass (milky, coloured)

- Gas in gas is not a colloidal solution – it is called a mixture.

Saturated Solution : Solution in which no more solute can be dissolved without raising its temperature is called saturated solution.

Unsaturated Solution : Solutions in which more solute can be dissolved without raising its temperature is called Unsaturated solution.

Solubility : It is the amount of solute in a saturated solution at a given temperature.

Concentration of Solution

1. Mass by mass percentage $= \frac{\text{mass of solute}}{\text{mass of solution}} \times 100$
2. Mass by volume percentage $= \frac{\text{mass of solute}}{\text{volume of solution}} \times 100$

Physical Vs Chemical Changes

Chemical

- Not easily reversible
- New Product(s) formed
- Reactants used up
- Often heat/light/sound/ fizzing occurs
- Electricity may be produced
- A precipitate may form
e.g., Wood burning

Physical

- Easily reversible
- No new products
- Often just a state change
e.g., ice melting

Elements

Made of same type of atoms

S.No.	Metals	Non-metals	Metalloids
1.	Lustrous	Non-lustrous	Metalloids have intermediate properties between metals and non-metals.
2.	Malleable, ductile	Non-malleable, non-ductile	E.g., Boron, Germanium, Silicon
3.	Sonorous	Non-sonorous	
4.	Good conductors of heat & electricity	Bad conductors	
5.	e.g., Gold, iron etc.	e.g., Oxygen, Phosphorus	

Element	Compound
1. Can not be broken into simpler substance by chemical reaction.	Can be separated into simpler substance by chemical reactions.
2. Consists of similar kind of atoms.	Consist of atoms of different element in fixed mass ratio.
3. It can be represented by using symbols	Represented by using chemical formula.
4. Ex.: Iron, Copper etc.	Ex.: Water, Sodiumchloride, etc.

Mixture	Compound
1. Elements or compounds are simply mixed so no new substance is formed.	1. Substances are reacted together with each other to make a new substance.
2. Elements do not combine in a fixed ratio.	2. Composition of the components is fixed i.e., they combine together in a fixed ratio according to their masses.
3. A mixture shows the properties of its components.	3. Compound doesn't show the properties of component elements.
4. Components can be easily separated by any mechanical method which is suitable.	4. Components can't be separated from each other by simple mechanical methods.
5. e.g., sugar in water, oil in water	5. e.g., Iron and sulphur react to form iron sulphide.