Matter Around Us Pure

Matter

Matter is anything that has **mass** and **occupies space**.

Classification of Matter:

On the basis of chemical nature, matter is classified into:

1. Substance 2. Mixture

1. Substance

A substance is a form of matter that has a **fixed composition** and **definite properties**.

Key Points:

- It consists of only one type of particles.
- It is a **pure form of matter**.
- Substances are classified into **elements** and **compounds**.

Examples: Gold, Oxygen, Water

Types of Substances

(i) Element

An element is a pure substance that **cannot be broken down into simpler substances** by physical or ordinary chemical methods.

Key Points:

- Simplest form of matter.
- Cannot be divided further.

Types of Elements:

- Metals → Iron, Copper
- Non-metals → Oxygen, Nitrogen
- Metalloids → Silicon

Examples: Hydrogen, Carbon, Gold

(ii) Compound

A compound is a pure substance formed when **two or more elements chemically combine in a fixed ratio**.

Key Points:

- Properties of elements are lost.
- Always has a fixed composition.

Examples: Water (H_2O), Carbon dioxide (CO_2)

2. Mixture

A mixture is formed when two or more substances are combined **without any chemical change**.

Key Points:

- Components retain their properties.
- Can be separated by physical methods.
- Composition can vary.

Examples: Air, Brass (Copper + Zinc)

Types of Mixtures

(i)Homogeneous Mixture

A mixture in which all components are **uniformly distributed**.

Key Points:

- Uniform composition
- Components are not visible separately

Examples: Salt water, Sugar solution, Air

(ii)Heterogeneous Mixture

A mixture in which components are **not uniformly distributed**.

Key Points:

- Non-uniform composition
- Components can be seen separately

Examples: Oil and water, Sand in water

Solution

A solution is a **homogeneous mixture** of two or more substances.

Example: Sugar dissolved in water

Components of a Solution

(a) Solvent

The substance that dissolves the solute and is usually present in larger amount.

Example: Water in a sugar solution

(b) Solute

The substance that gets dissolved in the solvent.

Example: Sugar in water

Types of Solutions

(I) Saturated Solution

A solution in which **maximum amount of solute** is dissolved at a given temperature.

Example: No more sugar dissolves in water

(II) Unsaturated Solution

A solution in which **more solute can still be dissolved**.

Example: Sugar continues to dissolve in water

Concentration of Solution

The amount of solute present in a given amount of solvent or solution.

Types:

- Dilute → Less solute
- Concentrated → More solute

Solubility

The maximum amount of solute that can dissolve in **100 g of solvent at a given temperature**.

Example: Salt dissolving in water

Suspension

A suspension is a **heterogeneous mixture** in which solid particles are dispersed in a liquid but **do not dissolve**.

Key Points:

- Particles are visible
- Settle down on standing
- Can be filtered

Examples: Muddy water, Chalk in water

Colloids

A colloid is a mixture in which particles are **very small** and remain **evenly distributed** without settling.

Key Points:

- Translucent in nature
- Show scattering of light

Examples: Milk, Fog, Smoke

Brownian Movement

The **random zig-zag motion** of colloidal particles in a fluid.

Example: Movement of particles in milk

Tyndall Effect

The scattering of light by colloidal particles, making the path of light visible.

Example: Light passing through fog or smoke

Coagulation

The process in which colloidal particles combine to form larger particles and settle down.

Example: Curd formation from milk

Separation of Mixtures

Common Methods with Examples:

1. Handpicking	→	Removing stones from rice
2. Sieving	→	Separating flour
3. Filtration	→	Tea filtering
4. Centrifugation	→	Separating cream from milk
5. Magnetic Separation	→	Iron from sand
6. Crystallization	→	Obtaining salt
7. Chromatography	→	Separating ink colors
8. Distillation	→	Purifying water
9. Decantation	→	Separating oil and water
10. Separating Funnel	→	Immiscible liquids
11. Evaporation	→	Getting salt from seawater
12. Sublimation	→	Camphor separation

13. Fractional Distillation → Petroleum products

Physical and Chemical Changes

Physical Change	Chemical Change
A change in which only **physical properties** change, not the chemical composition.	A change in which a **new substance with new properties** is formed.
No new substance formed	Irreversible
Usually reversible	New substance formed
Examples: Melting of ice, Cutting paper	Examples:Burning of paper, Rusting of iron, Formation of curd