States of Matter

1. What is Matter?

- Matter is anything that occupies space and has mass.
- It exists in three main states:
  - o Solid
  - o Liquid
  - o Gas

2. Differences Between Solids, Liquids, and Gases

Property	Solids	Liquids	Gases
Particle Arrangement	Particles are tightly packed.	Particles are loosely packed.	Particles are very loosely packed.
Shape	Fixed shape and size.	No fixed shape, takes the shape of the container.	No fixed shape, takes the shape of the container.
Volume	Fixed volume.	Fixed volume.	No fixed volume.
Compressibility	Cannot be compressed easily.	Slightly compressible.	Highly compressible.
Flow Ability	Cannot flow.	Can flow from one place to another.	Can flow freely in all directions.
Rigidity	Hard and rigid.	Not rigid but can flow.	Not rigid, expands freely.
Space Occupied	Occupies definite space.	Occupies the space of the container.	Occupies all available space.

3. Key Characteristics of Each State

Solids:

- Particles are tightly packed → No space to move.
- Have a definite shape and volume.

  Examples:

  - o Wood
  - o Brick
  - o Pencil
  - o Book

Liquids:

- Particles are loosely packed → Can move slightly.

- No fixed shape → Take the shape of the container.
- Fixed volume → The amount of liquid remains the same.

  Examples:

  - Water
  - Milk
  - Oil
  - Juice

Gases:

- Particles are very loosely packed ⟶ Can move freely.
- No fixed shape or volume ⟶ Fill the entire container.
- Highly compressible ⟶ Volume can be reduced under pressure.

  Examples:

  - Air
  - Helium in balloons
  - Cooking gas (LPG)
  - Compressed Natural Gas (CNG)

4. How Matter Changes State

Matter can change from one state to another when heated or cooled.

- **Melting:** Solid ⟶ Liquid (by heating).
- **Freezing:** Liquid ⟶ Solid (by cooling).
- **Evaporation:** Liquid ⟶ Gas (by heating).
- **Condensation:** Gas ⟶ Liquid (by cooling).