Matter

- **Characteristics of matter particles**
  - Atoms are the smallest possible units of the matter which combine to form molecule.
  - There are spaces between matter particles.
  - Matter particles move continuously – movement increases with rising temperature.
  - Matter particles attract each other – attraction force is highest in solids > liquids > gases.

- Everything around us is composed of matter.
- There are five states of matter- solid, liquid, gaseous, plasma and Bose-Einstein condesate
- **Solid phase**
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  - Permanent change in shape is difficult
  - Negligible compressibility
  - Definite shape, size, and boundary
  - No particle motion

- **Liquid phase**
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  - No fixed shape and boundary
  - Have a fixed volume
  - Low compressibility
  - Lesser particle motion

- **Gaseous state**
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  - No fixed shape, volume, and boundary
  - Highly compressible
  - Gases exert pressure
  - High particle motion

Solid	Liquid	Gas

Definite shape	No definite shape	No definite shape
Occupies space	Occupies space	Occupies space
Definite volume	Definite volume	No definite volume
Cannot be compressed	Slightly compressible	Highly compressible
Rigid	Not rigid	Not rigid
Does not diffuse in other solids	Can diffuse in other liquids	Can diffuse in other gases

- The states of matter (solid, liquid and gas) are interchangeable.
- Change from the solid state to the liquid state is called **melting**.
- Change from the liquid state to the solid state is called **freezing**.
- Change from the liquid state to the gaseous state is called **vapourisation**.
- Change from the gaseous state to the liquid state is called **condensation**.
- The process in which a substance changes directly from the solid state to the gaseous state without entering into the liquid state is called **Sublimation.**
- The process opposite to sublimation. In this, a substance changes directly from the gaseous state to the solid state is called **Deposition**.
- Temperature tells us about the **hotness** or **coldness** of an object.
- The temperature of an object is measured using a thermometer.

All substances expand on heating.

The order of expansion of solid, liquid and gas is:

Gas > Liquid > Solid

- Due to expansion of solids, rail tracks have spaces in them and electric wires are kept loosen
- Due to the expansion of air, hot air balloon moves up

- Changes can broadly be classified into two types − physical and chemical.
  - The characteristics of physical and chemical changes

Physical Change	Chemical Change
1. The chemical composition of a substance does not change.	**1.** The chemical composition of a substance changes.

2. Most changes are reversible. **3.** No new substances are formed. For example, Ice → Water → Steam	**2.** Most changes are irreversible. **3.** New substances are formed. For example, Paper → Ashes

- Burning a candle is a combination of physical and chemical change.