Matter in Our Surroundings

Introduction

Everything around us occupies space and has mass. Such substances are called **matter**. Matter exists in different forms and can change from one state to another under different conditions of temperature and pressure. This chapter explains the properties of matter, its states, and the processes involved in changing its state.

What is Matter?

Definition

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

Examples: Air, water, wood, stone, milk, books, and oxygen.

Matter is made up of tiny particles called **molecules**.

Characteristics of Particles of Matter

Properties

Particles of matter have the following characteristics:

- They are extremely small.
- They have spaces between them.
- They are continuously moving.
- They attract each other.

These properties explain why different substances behave differently.

States of Matter

Solid

Solids have a fixed shape and fixed volume. Their particles are closely packed and have very little space between them.

Examples: Wood, iron, ice, and stone.

Liquid

Liquids have a fixed volume but no fixed shape. They take the shape of the container in which they are kept.

Examples: Water, milk, and oil.

Gas

Gases have neither a fixed shape nor a fixed volume. Their particles move freely and spread in all directions.

Examples: Oxygen, carbon dioxide, and air.

Change of State

Interconversion of States

Matter can change from one state to another by changing temperature or pressure.

- **Melting:** Solid → Liquid
- **Freezing:** Liquid → Solid
- **Vaporisation:** Liquid → Gas
- **Condensation:** Gas → Liquid
- **Sublimation:** Solid → Gas (without becoming liquid)

Effect of Temperature

Heating and Cooling

When matter is heated, its particles gain kinetic energy and move faster. This increases the distance between particles, causing a change of state.

On cooling, particles lose energy, come closer together, and may change back to their previous state.

Evaporation

Process of Evaporation

Evaporation is the process in which a liquid changes into vapour at any temperature below its boiling point.

Factors affecting evaporation:

- Increase in temperature

- Increase in surface area
- Increase in wind speed
- Decrease in humidity

Latent Heat

Meaning

Latent heat is the heat absorbed or released during a change of state without any change in temperature.

There are two types:

- **Latent Heat of Fusion:** Heat required to convert a solid into a liquid.
- **Latent Heat of Vaporisation:** Heat required to convert a liquid into a gas.

Key Points

- Matter has mass and occupies space.
- Matter is made up of tiny particles.
- The three common states of matter are solids, liquids, and gases.
- Heating and cooling can change the state of matter.
- Evaporation occurs at all temperatures.
- Sublimation is the direct conversion of a solid into a gas.
- Latent heat is required for a change of state.

Chapter Summary

Matter exists in different states depending on the arrangement and movement of its particles. Changes in temperature and pressure can convert matter from one state to another. Understanding the properties of matter helps explain many natural and everyday phenomena such as melting, boiling, evaporation, and condensation.