Class 9 Science – Chapter 1

Matter in Our Surroundings (Full Chapter Notes)

🔹 What is Matter?

Anything that **has mass** and **occupies space** is called **matter**.

Examples:

- Air, water, stone, wood, milk, book
- Even gases like oxygen and carbon dioxide are matter

🔹 Physical Nature of Matter

Matter shows the following characteristics:

1️⃣ Matter is made up of particles

- Matter is composed of very tiny particles
- These particles cannot be seen with naked eyes

Example: Sugar dissolves in water but still exists in it

2️⃣ Particles of matter have space between them

- There are spaces between particles
- This space varies in solids, liquids, and gases

Example: Salt dissolves in water because particles of salt occupy the space between water particles

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3️⃣ Particles of matter are in constant motion

- Particles continuously move
- Movement increases with rise in temperature

Example: Smell of perfume spreads in a room

4️⃣ Particles of matter attract each other

- There is force of attraction between particles

- Stronger attraction → solid state

🔹 States of Matter

Matter exists mainly in **three states**:

1. **Solid**
2. **Liquid**
3. **Gas**

🔹 Solids

Characteristics:

- Fixed shape and volume
- Strong intermolecular forces
- Particles tightly packed
- Negligible compressibility

Examples: Ice, wood, iron

🔹 Liquids

Characteristics:

- Fixed volume but no fixed shape
- Can flow
- Moderate force of attraction
- Slightly compressible

Examples: Water, milk, oil

🔹 Gases

Characteristics:

- No fixed shape or volume
- Highly compressible
- Weak force of attraction
- Particles move freely

Examples: Oxygen, nitrogen, carbon dioxide

🔹 **Comparison of Three States of Matter**

Property	Solid	Liquid	Gas
Shape	Fixed	Not fixed	Not fixed
Volume	Fixed	Fixed	Not fixed
Compressibility	Negligible	Low	High
Particle Motion	Least	Moderate	Maximum

🔹 **Effect of Change of Temperature**

🔸 **Melting (Fusion)**

- Solid → Liquid
- Temperature at which solid melts is called **melting point**

Example: Ice melts at 0°C

🔸 **Boiling**

- Liquid → Gas
- Temperature at which liquid boils is called **boiling point**

Example: Water boils at 100°C

🔹 **Effect of Change of Pressure**

- Increasing pressure brings particles closer
- Gas can be converted into liquid by increasing pressure and lowering temperature

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🔹 **Interconversion of States of Matter**

Process	Change
Melting	Solid → Liquid
Freezing	Liquid → Solid
Evaporation	Liquid → Gas
Condensation	Gas → Liquid

Process	Change
Sublimation	Solid → Gas

🔹 Evaporation

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

Factors affecting evaporation:

1. Surface area – More area → faster evaporation
2. Temperature – Higher temperature → faster evaporation
3. Humidity – Lower humidity → faster evaporation
4. Wind speed – Higher wind speed → faster evaporation

🔹 Cooling Effect of Evaporation

- Evaporation causes cooling
- Particles with higher energy leave the liquid

Example: Sweat cools our body

🔹 Sublimation

Process in which solid directly changes into gas without becoming liquid.

Examples: Camphor, naphthalene, ammonium chloride

🔹 Latent Heat

Heat energy required to change the state of matter without changing temperature.

Types:

1. Latent heat of fusion
2. Latent heat of vaporisation

🔹 Plasma (Fourth State of Matter)

- Ionised gas
- Found in stars and fluorescent bulbs

- **Bose-Einstein Condensate (Fifth State of Matter)**
  - Formed at extremely low temperatures
  - Particles show quantum effects

- **Important Definitions (Exam-Oriented)**
  - **Diffusion:** Mixing of particles of different substances
  - **Compressibility:** Ability to reduce volume under pressure
  - **Density:** Mass per unit volume
