

9Th Class

➤ Effect of Change of Temperature

1. Kinetic Energy:

- Temperature is a measure of the average kinetic energy of particles in a substance.
- Higher temperature corresponds to increased particle motion and kinetic energy.

2. State Transitions:

❖ Melting (Solid to Liquid):

- Increasing temperature causes solids to absorb heat energy.
- Particles gain energy, overcoming forces that hold them in a fixed position.
- Solid transitions to liquid.

❖ Freezing (Liquid to Solid):

- Decreasing temperature removes heat energy from liquids.
- Particles lose energy, and attractive forces cause them to arrange in a more ordered manner.
- Liquid transitions to solid.

❖ Vaporization (Liquid to Gas):

- Increasing temperature allows liquids to absorb energy.
- Particles gain enough energy to overcome intermolecular forces and become a gas.
- Includes evaporation and boiling.

❖ Condensation (Gas to Liquid):

- Decreasing temperature removes energy from gases.
- Particles lose energy, leading to a transition from gas to liquid.

❖ Sublimation (Solid to Gas):

- Some solids transition directly to the gas phase without passing through the liquid phase.
- Examples include dry ice (solid carbon dioxide).

❖ Deposition (Gas to Solid):

- Gases can transition directly to the solid phase without becoming a liquid.
- Examples include the formation of frost.

3. Expansion and Contraction:

- Most substances expand when heated and contract when cooled.
- Expansion and contraction affect the volume and, consequently, the density of a substance.

4. Gas Laws:

- **Boyle's Law:** At constant temperature, the volume of a gas is inversely proportional to its pressure.
- **Charles's Law:** At constant pressure, the volume of a gas is directly proportional to its temperature.

5. Chemical Reaction Rates:

- Temperature influences the rates of chemical reactions.
- Higher temperatures generally lead to increased reaction rates due to more energetic collisions between particles.

6. Thermal Expansion:

- Materials expand or contract with temperature changes.
- Important in the design of structures and systems to accommodate temperature variations.