

# 9th Class Chemistry - Chapter 1: States of Matter and Phase Changes

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## 1.1 What is Chemistry

- Q: What is Chemistry?

Ans: Chemistry is the branch of science that deals with the composition, structure, properties, and changes of matter.

- Q: Who is known as the Father of Modern Chemistry?

Ans: Antoine Lavoisier is known as the Father of Modern Chemistry.

- Q: Name two branches of chemistry.

Ans: 1. Organic Chemistry  
2. Inorganic Chemistry

- Q: How is chemistry related to daily life?

Ans: Chemistry helps us understand cooking, cleaning, medicines, agriculture, and even the air we breathe.

- Q: Explain the importance of chemistry in daily life.

Ans: Chemistry plays a vital role in our everyday life. It helps us:

- Understand the food we eat and the medicines we use.
- Make cleaning agents like soap and detergents.
- Develop fertilizers and pesticides for better crop yield.
- Purify water and improve sanitation.
- Manufacture fuels and plastic products.

Thus, chemistry improves health, hygiene, and lifestyle.

## 1.2 States of Matter

- Q: What are the three main states of matter?

Ans: The three main states of matter are solid, liquid, and gas.

- Q: What is the fourth state of matter?

Ans: The fourth state of matter is plasma.

- Q: How do particles behave in a solid?

Ans: In solids, particles are tightly packed and vibrate in fixed positions.

- Q: How do liquids differ from solids?

Ans: Liquids have loosely packed particles that can move around each other.

- Q: How do gases differ from liquids?

Ans: Gases have particles that are far apart and move freely in all directions.

### 1.3 Elements, Compounds and Mixtures

- Q: What is an element?

Ans: An element is a pure substance made up of only one type of atom.

- Q: What is a compound?

Ans: A compound is a substance made from two or more elements chemically combined in a fixed ratio.

- Q: What is a mixture?

Ans: A mixture is a combination of two or more substances that are not chemically combined.

- Q: Give one example each of element, compound, and mixture.

Ans: Element: Oxygen

Compound: Water

Mixture: Air

- Q: Differentiate between element, compound, and mixture.

Ans: Element: Single type of atom.

Compound: Chemically combined elements.

Mixture: Physically combined substances with variable composition.

### 1.4 Allotropic Forms of Substances

- Q: What is allotropy?

Ans: Allotropy is the existence of an element in more than one physical form in the same physical state.

- Q: Name two allotropes of carbon.

Ans: Diamond and Graphite.

- Q: What is the difference between diamond and graphite?

Ans: Diamond is hard and an insulator, while graphite is soft and conducts electricity.

- Q: What is ozone?

Ans: Ozone ( $O_3$ ) is an allotrope of oxygen that protects us from harmful UV rays.

## 1.6 Solution, Colloidal Solution and Suspension

- Q: What is a solution?

Ans: A solution is a homogeneous mixture of solute and solvent.

- Q: What is a colloidal solution?

Ans: A colloidal solution has particles intermediate in size between those in solutions and suspensions.

- Q: What is a suspension?

Ans: A suspension is a heterogeneous mixture where particles settle down on standing.

- Q: Differentiate between solution, colloid and suspension.

Ans: Solution: Clear, particles not visible.

Colloid: Cloudy, particles do not settle.

Suspension: Particles visible and settle on standing.

## 1.7 Formation of Unsaturated and Saturated Solution

- Q: What is a saturated solution?

Ans: A saturated solution is one in which no more solute can dissolve at a given temperature.

- Q: What is an unsaturated solution?

Ans: An unsaturated solution is one that can dissolve more solute at a given temperature.

- Q: How can a saturated solution be made unsaturated?

Ans: By increasing the temperature or removing some solute.

## 1.8 Effect of Temperature on the Solubility of Solutes

- Q: How does temperature affect solubility?

Ans: Generally, solubility of solid solutes increases with temperature.

- Q: What happens to the solubility of gases when temperature increases?

Ans: Solubility of gases decreases as temperature increases.

- Q: Why does sugar dissolve faster in hot water?

Ans: Because increased temperature increases the solubility of sugar.

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