Unit 7- Solutions & Colligative Properties

PS-7 Aqueous Reactions: - Solution chemistry is a fundamental concept in chemistry as it provides a mechanism for exploring the chemical nature of many materials. Most of life involves the interaction of soluble particles in aqueous environments and understanding how solutions function is essential to studying science.

TS 7.1 Properties of water- Water is a polar molecule that has been identified as the "universal solvent" due to its properties and ability to dissolve many substances.

7.1.1 Describe the chemical and physical properties of water using the molecular structure of water

- 7.1.2 Explain why water is commonly considered the "universal solvent"
- TS 7.2 Solutions are homogeneous mixtures of two substances, a solvent and solute.
- 7.2.1 Describe the composition of a solution

Key Ideas: solvent, solute, solutions, suspensions & colloid

7.2.2 Explain how solutions are formed via intermolecular attractions

Key Ideas: dissolution, solvation, dissociation, ionization, intermolecular attractions & sphere of hydration

7.2.3 Quantitatively describe the solubility of a substance based on chemical composition & structure

Key Ideas: solubility, saturated, unsaturated, supersaturated, & solubility curve

- 7.2.4 Describe how temperature & pressure can affect the solubility of substances
- 7.2.5 Describe how concentration is measured & calculate different types of concentration measures Key Ideas: Molarity, ppm, ppb
- 7.2.6 Describe qualitatively and quantitatively the changes in concentration from dilution
- 7.2.7 Calculate volume of solutions required in chemical reactions using stoichiometric calculations

TS 7.3 Colligative properties of solutions describe how solvent properties are affected by the concentration of solute in the solution

7.3.1 Describe qualitatively and quantitatively the boiling point elevation of a solvent

Key Idea: Molality & van't Hoff Factor

- 7.3.2 Describe qualitatively and quantitatively the freezing point depression of a solvent
- 7.3.3 Calculate changes in vapor pressure of solvents using Rauolt's Law
 - Key Idea: Mole fraction