

**SCIENCE CURRICULUM SUMMARY**

The purpose of the Science Curriculum Summary is to present an overview of the Honors Chemistry II: Extended Topics in Chemistry curriculum. Parents are the intended audience of the Science Curriculum.

**Atomic Theory**

- Evidence for atomic theory
- Atomic particles
- Electrons, light, and orbitals
- Periodic relationships

**Reactions in Aqueous Solutions**

- Precipitation reactions
- Oxidation reduction reactions (acidic and basic mediums)
- Neutralization reactions

**Chemical Equations and Reactions**

- Types of chemical reactions
- Prediction of products of various reactions
- Limiting and excess reagents
- Percent yield of chemical reactions

**Acids and Bases**

- Theories
- Strengths of acids and bases
- pH, pOH,  $[H^+]$ , and  $[OH^-]$  calculations
- Indicators
- Titrations
- Buffers

**Organic Chemistry**

- Nomenclature
- Types of functional groups
- Organic reactions (hydrogenation, hydration, halogenation, and esterification)

**Kinetics**

- Concentration graphs
- Rate law determination
- Factors affecting reaction rates
- Integrated rate laws
- Collision theory and reaction mechanisms

**Solution Chemistry**

- Properties and composition of solutions
- Concentration calculations (molarity, molality, weight percent, and mole fraction)
- Solubilities
- Raoult's Law
- Colligative properties

**Equilibrium**

- Equilibrium constant and reaction quotient calculations
- Le Chatelier's Principle
- Equilibrium of weak acids and bases
- Solubility product constant ( $K_{sp}$ )
- Common ion effect

**Bonding**

- Bond types (Ionic, covalent, and metallic)
- Polarity and geometry of molecules
- Lewis structures and resonance
- Molecular orbital theory

**Gases**

- Gas laws
- Ideal Gas Law variations
- Kinetic Molecular Theory

**Changes of State (Liquids and Solids)**

- Crystalline and amorphous solids
- Intermolecular forces
- Crystal structure
- Crystalline structures
- Phase change diagrams

**Thermodynamics**

- Laws of Thermodynamics
- Enthalpy changes
- Entropy and spontaneous processes
- Free energy
- State functions

**Thermochemistry**

- Properties of heat
- Calorimetry
- Heat Capacity and specific heats
- Heats of reactions
- Hess's law

**Electrochemistry**

- Galvanic cell diagrams and potentials
- Cell potential, electrical work, and free energy
- Nernst equation
- Cell potential and equilibrium constants