AP Chemistry Curriculum Framework

Unit 1 - Atomic Structure and Properties

- 1.1 - Moles and Molar Mass
- 1.2 - Mass Spectra of Elements
- 1.3 - Elemental Composition of Pure Substances
- 1.4 - Composition of Mixtures
- 1.5 - Atomic Structure and Electron Configuration
- 1.6 - Photoelectron Spectroscopy
- 1.7 - Periodic Trends
- 1.8 - Valence Electrons and Ionic Compounds

Unit 2 - Compound Structure and Properties

- 2.1 - Types of Chemical Bonds
- 2.2 - Intramolecular Force and Potential Energy
- 2.3 - Structure of Ionic Solids
- 2.4 - Structure of Metals and Alloys
- 2.5 - Lewis Diagrams
- 2.6 - Resonance and Formal Charge
- 2.7 - VSEPR and Hybridization

Unit 3 - Properties of Substances and Mixtures

- 3.1 - Intermolecular and Interparticle Forces
- 3.2 - Properties of Solids
- 3.3 - Solids, Liquids, and Gases
- 3.4 - Ideal Gas Law
- 3.5 - Kinetic Molecular Theory
- 3.6 - Deviation from Ideal Gas Law
- 3.7 - Solutions and Mixtures
- 3.8 - Representations of Solutions
- 3.9 - Separation of Solutions and Mixtures
- 3.10 - Solubility
- 3.11 - Spectroscopy and the Electromagnetic Spectrum
- 3.12 - Properties of Photons
- 3.13 - Beer-Lambert Law

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Unit 4 - Chemical Reactions

- 4.1 - Introduction for Reactions
- 4.2 - Net Ionic Equations
- 4.3 - Representation of Reactions
- 4.4 - Physical and Chemical Changes
- 4.5 - Stoichiometry
- 4.6 - Introduction to Titration
- 4.7 - Types of Chemical Reactions
- 4.8 - Introduction to Acid-Base Reactions
- 4.9 - Oxidation-Reduction (Redox) Reactions

Unit 5 - Kinetics

- 5.1 - Reactions Rates
- 5.2 - Introduction to Rate Law
- 5.3 - Concentration Changes Over Time
- 5.4 - Elementary Reactions
- 5.5 - Collision Model
- 5.6 - Reaction Energy Profile
- 5.7 - Introduction to Reaction Mechanisms
- 5.8 - Reaction Mechanism and Rate Law
- 5.9 - Pre-Equilibrium Approximation
- 5.10 - Multistep Reaction Energy Profile
- 5.11 - Catalysis

Unit 6 - Thermochemistry

- 6.1 - Endothermic and Exothermic Processes
- 6.2 - Energy Diagrams
- 6.3 - Heat Transfer and Thermal Equilibrium
- 6.4 - Heat Capacity and Calorimetry
- 6.5 - Energy of Phase Changes
- 6.6 - Introduction to Enthalpy of Reaction
- 6.7 - Bond Enthalpies
- 6.8 - Enthalpy of Formation
- 6.9 - Hess’s Law

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Unit 7 - Equilibrium

- 7.1 - Introduction to Equilibrium
- 7.2 - Direction of Reversible Reactions
- 7.3 - Reaction Quotient and Equilibrium Constant
- 7.4 - Calculating the Equilibrium Constant
- 7.5 - Magnitude of the Equilibrium Constant
- 7.6 - Properties of the Equilibrium Constant
- 7.7 - Calculating Equilibrium Concentrations
- 7.8 - Representations of Equilibrium
- 7.9 - Introduction to Le Chatelier's Principle
- 7.10 - Reaction Quotient and Le Chatelier’s Principle
- 7.11 - Introduction to Solubility Equilibria
- 7.12 - Common-Ion Effect

Unit 8 - Acids and Bases

- 8.1 - Introduction to Acids and Bases
- 8.2 - pH and pOH of Strong Acids and Bases
- 8.3 - Weak Acid and Base Equilibria
- 8.4 - Acid-Base Reactions and Buffers
- 8.5 - Acid-Base Titrations
- 8.6 - Molecular Structure of Acids and Bases
- 8.7 - pH and pKa
- 8.8 - Properties of Buffers
- 8.9 - Henderson-Hasselbalch Equation
- 8.10 - Buffer Capacity
- 8.11 - pH and Solubility

Unit 9 - Thermodynamics and Electrochemistry

- 9.1 - Introduction to Entropy
- 9.2 - Absolute Entropy and Entropy Change
- 9.3 - Gibbs Free Energy and Thermodynamic Favorability
- 9.4 - Thermodynamic and Kinetic Control
- 9.5 - Free Energy and Equilibrium
- 9.6 - Free Energy of Dissolution
- 9.7 - Coupled Reactions
- 9.8 - Galvanic (Voltaic) and Electrolytic Cells
- 9.9 - Cell Potential and Free Energy
- 9.10 - Cell Potential Under Nonstandard Conditions
- 9.11 - Electrolysis and Faraday’s Law