AP Chemistry Timeline

Content Area: **Science**
Course(s):
Time Period: **36 Weeks**
Length: **180 days**
Status: **Published**

Mandated Course of Study/Topical Outline with Timeline

Unit	Topic	Days
01. Atomic Structure and Properties	• Moles and Molar Mass • Mass Spectroscopy of Elements • Elemental Composition of Pure Substances • Composition of Mixtures • Atomic Structure and Electron Configuration • Photoelectron Spectroscopy • Periodic Trends • Valence Electrons and Ionic Compounds	15
02. Molecular and Ionic Compound Structure and Properties	• Types of Chemical Bonds • Intramolecular Force and Potential Energy • Structure of Ionic Solids • Structure of Metals and Alloys • Lewis Diagrams • Resonance and Formal Charge • VSEPR and Bond Hybridization	15
03. Intermolecular Forces and Properties	• Intermolecular Forces • Properties of Solids • Solids, Liquids, and Gases • Ideal Gas Law • Kinetic Molecular Theory	22

	• Deviation from Ideal Gas Law • Solutions and Mixtures • Representations of Solutions • Separation of Solutions and Mixtures Chromatography • Solubility • Spectroscopy and Electromagnetic Spectrum • Photoelectric Effect • Beer-Lambert Law	
04. Chemical Reactions	• Introduction for Reactions • Net Ionic Equations • Representations of Reactions • Physical and Chemical Changes • Stoichiometry • Introduction to Titration • Types of Chemical Reactions • Introduction to Acid-Base Reactions • Oxidation-Reduction (Redox) Reactions	20
05. Kinetics	• Reaction Rates • Introduction to Rate Laws • Concentration Changes Over Time • Elementary Reactions • Collision Model • Reaction Energy Profile • Introduction to Reaction Mechanisms • Reaction Mechanism and Rate Law • Steady-State Approximation • Multistep Reaction	19

	Energy Profile • Catalysis	
06. Thermodynamics	• Endothermic and Exothermic Processes • Energy Diagrams • Heat Transfer and Thermal Equilibrium • Heat Capacity and Calorimetry • Energy and Phase Changes • Introduction to Enthalpy of Reaction • Bond Enthalpies • Enthalpy of Formation • Hess's Law	18
07. Equilibrium	• Introduction to Equilibrium • Direction for Reversible Reactions • Reaction Quotient and Equilibrium Constant • Calculating the Equilibrium Constant • Properties of the Equilibrium Constant • Calculation Equilibrium Concentrations • Representations of Equilibrium • Introduction to LeChâtelier's Principle • Reaction Quotient and Le Châtelier's Principle • Introduction to Solubility Equilibria • Common-Ion Effect • pH and Solubility • Free Energy of Dissolution	21
08. Acids and Bases	• Introduction to Acids and Bases • pH and pOH of Strong Acids and Bases • Weak Acid and Base	17

	Equilibria • Acid-Base Reactions and Buffers • Acid-Base Titrations • Molecular Structure of Acids and Bases • pH and pK_a • Properties of Buffers • Henderson-Hasselbalch Equation • Buffer Capacity	
09. Applications of Thermodynamics	• Introduction to Entropy • Absolute Entropy and Entropy Change • Gibbs Free Energy and Thermodynamic Favorability • Thermodynamic and Kinetic Control • Free Energy and Equilibrium • Coupled Reactions • Galvanic (Voltaic) and Electrolytic Cells • Cell Potential and Free Energy • Cell Potential Under Nonstandard Conditions • Electrolysis and Faraday's Law	16
Review or AP Exam	• Review Concepts • Lab Analysis Tips • Test Taking Tips • Practice Exams	17

Optional Course of Study/Topical Outline with Timeline

Unit	Topic	Days
