

AP CHEMISTRY — 8-MONTH SYLLABUS

2 Classes per Week • 8 Months • Approximately 64 Classes

Course Length	8 Months
Class Frequency	2 classes per week
Approx. Total	64 classes
Course Level	AP Chemistry
Focus	AP concepts • Quantitative reasoning • Laboratory thinking • FRQ preparation • Exam strategies

MONTH 1 • Atomic Structure & Properties

- Week 1 — Class 1: Moles, molar mass and chemical quantities. | Class 2: Atomic mass, isotopes and mass spectra.
- Week 2 — Class 1: Electron structure and configurations. | Class 2: Photoelectron spectroscopy and PES data.
- Week 3 — Class 1: Periodic trends and effective nuclear charge. | Class 2: Ionic size, ionization energy and electronegativity.
- Week 4 — Class 1: Valence electrons and chemical properties. | Class 2: AP-style quantitative questions and Unit 1 review/test.

MONTH 2 • Molecular & Ionic Compound Structure

- Week 5 — Class 1: Ionic compounds, lattice energy and Coulombic interactions. | Class 2: Lewis structures and formal charge.
- Week 6 — Class 1: Resonance and octet exceptions. | Class 2: VSEPR theory and molecular geometry.
- Week 7 — Class 1: Bond polarity and molecular polarity. | Class 2: Intermolecular forces and physical properties.
- Week 8 — Class 1: Spectroscopy and structure-property connections. | Class 2: Unit 2 review, MCQ practice and FRQ assessment.

MONTH 3 • Intermolecular Forces, Properties & Reactions

- Week 9 — Class 1: States of matter and particle-level models. | Class 2: Solids, liquids and intermolecular interactions.
- Week 10 — Class 1: Solutions, solubility and concentration. | Class 2: Molarity and dilution calculations.
- Week 11 — Class 1: Chemical equations and reaction representations. | Class 2: Net ionic equations and reaction types.
- Week 12 — Class 1: Stoichiometry and limiting reactants. | Class 2: Percent yield and reaction analysis; assessment.

MONTH 4 • Kinetics & Thermodynamics

- Week 13 — Class 1: Collision theory and reaction rates. | Class 2: Factors affecting reaction rate.
- Week 14 — Class 1: Rate laws and reaction orders. | Class 2: Integrated rate laws and half-life.
- Week 15 — Class 1: Activation energy and Arrhenius relationships. | Class 2: Reaction mechanisms and elementary steps.
- Week 16 — Class 1: Energy diagrams and thermochemical calculations. | Class 2: Kinetics review and AP-style assessment.

MONTH 5 • Thermodynamics & Equilibrium

- Week 17 — Class 1: Enthalpy, calorimetry and heat transfer. | Class 2: Hess's law and bond enthalpy.

- Week 18 — Class 1: Entropy and spontaneity. | Class 2: Gibbs free energy and thermodynamic relationships.
- Week 19 — Class 1: Dynamic equilibrium and equilibrium constants. | Class 2: Reaction quotient and predicting shifts.
- Week 20 — Class 1: Le Châtelier's principle. | Class 2: ICE tables, equilibrium calculations and assessment.

MONTH 6 • Acids, Bases & Applications

- Week 21 — Class 1: Brønsted–Lowry acids and bases. | Class 2: Conjugate acid-base pairs and acid strength.
- Week 22 — Class 1: pH, pOH and water autoionization. | Class 2: Strong and weak acid/base calculations.
- Week 23 — Class 1: K_a , K_b and percent ionization. | Class 2: Buffers and Henderson–Hasselbalch applications.
- Week 24 — Class 1: Titrations and titration curves. | Class 2: Acid-base review, MCQs and FRQ assessment.

MONTH 7 • Solubility, Electrochemistry & Applications

- Week 25 — Class 1: Solubility equilibria and K_{sp} . | Class 2: Common-ion effect and precipitation.
- Week 26 — Class 1: Oxidation-reduction reactions. | Class 2: Oxidation numbers and balancing redox equations.
- Week 27 — Class 1: Galvanic cells and cell notation. | Class 2: Standard reduction potentials and spontaneity.
- Week 28 — Class 1: Electrolysis and quantitative electrochemistry. | Class 2: Organic chemistry connections and unit review.

MONTH 8 • AP Exam Review, FRQs & Final Preparation

- Week 29 — Class 1: Atomic structure, bonding and periodicity review. | Class 2: AP-style mixed MCQs.
- Week 30 — Class 1: Stoichiometry, reactions and kinetics review. | Class 2: Thermodynamics and equilibrium review.
- Week 31 — Class 1: Acids/bases and electrochemistry review. | Class 2: Timed AP-style FRQ practice and scoring strategies.
- Week 32 — Class 1: Full-length AP Chemistry practice exam and error analysis. | Class 2: Final targeted review and exam strategy.

Assessment & AP Exam Preparation

Component	Recommended Approach
Every Class	Retrieval practice • concept instruction • worked examples • quantitative practice • AP-style questions
Weekly	Targeted practice, data analysis or short AP-style check
Monthly	Unit assessment with MCQs, quantitative problems and FRQ-style responses
Mid-Course	Cumulative assessment after Month 4 with timed practice
Final Month	Full-length practice exam, FRQ scoring, error analysis and targeted revision

Learning Outcomes

- Explain atomic structure, electron configurations, periodic trends and bonding using particle-level reasoning.
- Construct and interpret Lewis structures, molecular geometry, polarity and intermolecular forces.
- Use stoichiometry, concentration and reaction representations to solve quantitative problems.
- Analyze reaction rates using rate laws, mechanisms, energy profiles and experimental data.
- Apply enthalpy, entropy and Gibbs free energy to chemical processes.
- Use equilibrium constants, reaction quotients and Le Châtelier's principle.
- Calculate and interpret pH, K_a , K_b , buffers and titration behavior.
- Analyze redox reactions and electrochemical cells using oxidation states and reduction potentials.
- Interpret graphs, tables, particle diagrams, experimental results and laboratory data.
- Communicate solutions effectively in AP-style multiple-choice and free-response questions.

Pacing Note

Designed specifically for two classes per week over eight months. Laboratory demonstrations, virtual labs, data-analysis activities and AP-style practice can be integrated into the weekly sessions according to available time and resources.