Course at a Glance

Plan

The Course at a Glance provides a useful visual organization of the AP Chemistry curricular components, including:

- Sequence of units, along with approximate weighting and suggested pacing. Please note, pacing is based on 45-minute class periods, meeting five days each week for a full academic year.
- Progression of topics within each unit.
- Spiraling of the big ideas and science practices across units.

Teach

SCIENCE PRACTICES

Science practices spiral throughout the course.

- 1 Models and Representations
- 2 Question and Method
- 3 Representing Data and Phenomena
- 4 Model Analysis
- 5 Mathematical Routines
- 6 Argumentation

BIG IDEAS

Big ideas spiral across topics and units.

- SPQ Scale, Proportion, and Quantity
- SAP Structure and Properties
- TRA Transformations
- ENE Energy

Assess

Assign the Personal Progress Checks—either as homework or in class—for each unit. Each Personal Progress Check contains formative multiple-choice and free-response questions. The feedback from the Personal Progress Checks shows students the areas where they need to focus.

UNIT 1 Atomic Structure and Properties

~9–10 Class Periods | **7–9%** AP Exam Weighting

SPQ 5	1.1 Moles and Molar Mass
SPQ 5	1.2 Mass Spectroscopy of Elements
SPQ 2	1.3 Elemental Composition of Pure Substances
SPQ 5	1.4 Composition of Mixtures
SAP 1	1.5 Atomic Structure and Electron Configuration
SAP 4	1.6 Photoelectron Spectroscopy
SAP 4	1.7 Periodic Trends
SAP 4	1.8 Valence Electrons and Ionic Compounds

Personal Progress Check 1

Multiple-choice: ~20 questions
Free-response: 2 questions
- Short-answer
- Short-answer

UNIT 2 Molecular and Ionic Compound Structure and Properties

~12–13 Class Periods | **7–9%** AP Exam Weighting

SAP 6	2.1 Types of Chemical Bonds
SAP 3	2.2 Intramolecular Force and Potential Energy
SAP 4	2.3 Structure of Ionic Solids
SAP 4	2.4 Structure of Metals and Alloys
SAP 3	2.5 Lewis Diagrams
SAP 6	2.6 Resonance and Formal Charge
SAP 6	2.7 VSEPR and Bond Hybridization

Personal Progress Check 2

Multiple-choice: ~15 questions
Free-response: 1 question
- Long-answer

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UNIT 3 Intermolecular Forces and Properties

~14–15 Class Periods | 18–22% AP Exam Weighting

SAP 4	3.1	Intermolecular Forces
SAP 4	3.2	Properties of Solids
SAP 3	3.3	Solids, Liquids, and Gases
SAP 5	3.4	Ideal Gas Law
SAP 4	3.5	Kinetic Molecular Theory
SAP 6	3.6	Deviation from Ideal Gas Law
SPQ 5	3.7	Solutions and Mixtures
SPQ 3	3.8	Representations of Solutions
SPQ 2	3.9	Separation of Solutions and Mixtures Chromatography
SPQ 4	3.10	Solubility
SAP 4	3.11	Spectroscopy and the Electromagnetic Spectrum
SAP 5	3.12	Photoelectric Effect
SAP 2	3.13	Beer-Lambert Law

Personal Progress Check 3

Multiple-choice: ~30 questions
Free-response: 2 questions
- Short-answer
- Short-answer

UNIT 4 Chemical Reactions

~14–15 Class Periods | 7–9% AP Exam Weighting

TRA 2	4.1	Introduction for Reactions
TRA 5	4.2	Net Ionic Equations
TRA 3	4.3	Representations of Reactions
TRA 6	4.4	Physical and Chemical Changes
SPQ 5	4.5	Stoichiometry
SPQ 3	4.6	Introduction to Titration
TRA 1	4.7	Types of Chemical Reactions
TRA 1	4.8	Introduction to Acid-Base Reactions
TRA 5	4.9	Oxidation-Reduction (Redox) Reactions

Personal Progress Check 4

Multiple-choice: ~20 questions
Free-response: 1 question
- Long-answer

UNIT 5 Kinetics

~13–14 Class Periods | 7–9% AP Exam Weighting

TRA 6	5.1	Reaction Rates
TRA 5	5.2	Introduction to Rate Law
TRA 5	5.3	Concentration Changes Over Time
TRA 5	5.4	Elementary Reactions
TRA 6	5.5	Collision Model
TRA 3	5.6	Reaction Energy Profile
TRA 1	5.7	Introduction to Reaction Mechanisms
TRA 5	5.8	Reaction Mechanism and Rate Law
TRA 5	5.9	Steady-State Approximation
TRA 3	5.10	Multistep Reaction Energy Profile
ENE 6	5.11	Catalysis

Personal Progress Check 5

Multiple-choice: ~25 questions
Free-response: 2 questions
- Short-answer
- Long-answer

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UNIT 6 Thermodynamics

~10–11 Class Periods | 7–9% AP Exam Weighting

ENE 6	6.1	Endothermic and Exothermic Processes
ENE 3	6.2	Energy Diagrams
ENE 6	6.3	Heat Transfer and Thermal Equilibrium
ENE 2	6.4	Heat Capacity and Calorimetry
ENE 1	6.5	Energy of Phase Changes
ENE 4	6.6	Introduction to Enthalpy of Reaction
ENE 5	6.7	Bond Enthalpies
ENE 5	6.8	Enthalpy of Formation
ENE 5	6.9	Hess's Law

Personal Progress Check 6

Multiple-choice: ~20 questions
Free-response: 2 questions
- Short-answer
- Short-answer

UNIT 7 Equilibrium

~14–16 Class Periods | 7–9% AP Exam Weighting

TRA 6	7.1	Introduction to Equilibrium
TRA 4	7.2	Direction of Reversible Reactions
TRA 3	7.3	Reaction Quotient and Equilibrium Constant
TRA 5	7.4	Calculating the Equilibrium Constant
TRA 6	7.5	Magnitude of the Equilibrium Constant
TRA 5	7.6	Properties of the Equilibrium Constant
TRA 3	7.7	Calculating Equilibrium Concentrations
TRA 3	7.8	Representations of Equilibrium
TRA 6	7.9	Introduction to Le Châtelier's Principle
TRA 5	7.10	Reaction Quotient and Le Châtelier's Principle
SPQ 5	7.11	Introduction to Solubility Equilibria
SPQ 2	7.12	Common-Ion Effect
SPQ 2	7.13	pH and Solubility
SPQ 4	7.14	Free Energy of Dissolution

Personal Progress Check 7

Multiple-choice: ~30 questions
Free-response: 2 questions
- Short-answer
- Long-answer

UNIT 8 Acids and Bases

~14–15 Class Periods | 11–15% AP Exam Weighting

SAP 5	8.1	Introduction to Acids and Bases
SAP 5	8.2	pH and pOH of Strong Acids and Bases
SAP 5	8.3	Weak Acid and Base Equilibria
SAP 5	8.4	Acid-Base Reactions and Buffers
SAP 5	8.5	Acid-Base Titrations
SAP 6	8.6	Molecular Structure of Acids and Bases
SAP 2	8.7	pH and pK_a
SAP 6	8.8	Properties of Buffers
SAP 5	8.9	Henderson-Hasselbalch Equation
SAP 6	8.10	Buffer Capacity

Personal Progress Check 8

Multiple-choice: ~30 questions
Free-response: 1 question
- Long-answer

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UNIT 9 Applications of Thermodynamics

~10–13 Class Periods | 7–9% AP Exam Weighting

ENE 6	9.1	Introduction to Entropy
ENE 5	9.2	Absolute Entropy and Entropy Change
ENE 6	9.3	Gibbs Free Energy and Thermodynamic Favorability
ENE 6	9.4	Thermodynamic and Kinetic Control
ENE 6	9.5	Free Energy and Equilibrium
ENE 4	9.6	Coupled Reactions
ENE 2	9.7	Galvanic (Voltaic) and Electrolytic Cells
ENE 5	9.8	Cell Potential and Free Energy
ENE 6	9.9	Cell Potential Under Nonstandard Conditions
ENE 5	9.10	Electrolysis and Faraday's Law

Personal Progress Check 9

Multiple-choice: ~30 questions
Free-response: 2 questions
- Short-answer
- Long-answer