

Ap Chemistry

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Kyle Guillemet

What is this
course all about?

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.

- | | |
|---------------------------------|-----------------------|
| Models and Representations | Model Analysis |
| Question and Method | Mathematical Routines |
| Representing Data and Phenomena | Argumentation |

BIG IDEAS

Big ideas spiral across topics and units.

- | | |
|---------------------------------|------------------------------|
| Scale, Proportion, and Quantity | Transformations and Kinetics |
| Structure and Properties | 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 3	1.3 Elemental Composition of Pure Substances
SPQ 3	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
• Long-answer

UNIT 2 Molecular and Ionic Compound Structure and Properties	
~12–13% Class Periods	7–9% AP Exam Weighting
SAP 8	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 8	2.6 Resonance and Formal Charge
SAP 8	2.7 VSEPR and Bond Hybridization

Personal Progress Check 2

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

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 3	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 3	3.13 Beer-Lambert Law

Personal Progress Check 3

Multiple-choice: ~30 questions
Free-response: 2 questions
• Short-answer
• Long-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 4	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 5	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 5	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 3	5.9 Steady-State Approximation
TRA 3	5.10 Multistep Reaction Energy Profile
TRA 5	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 3	6.1 Endothermic and Exothermic Processes
ENE 3	6.2 Energy Diagrams
ENE 3	6.3 Heat Transfer and Thermal Equilibrium
CNC 2	6.4 Heat Capacity and Calorimetry
ENB 1	6.5 Energy of Phase Changes
CNC 4	6.6 Introduction to Enthalpy of Reaction
ENE 5	6.7 Bond Enthalpies
ENE 5	6.8 Enthalpy of Formation
CNC 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 3	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 5	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 3	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 3	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 3	8.6 Molecular Structure of Acids and Bases
SAP 3	8.7 pH and pK_a
SAP 3	8.8 Properties of Buffers
SAP 3	8.9 Henderson-Hasselbalch Equation
SAP 3	8.10 Buffer Capacity

Personal Progress Check 8

Multiple-choice: ~30 questions

Free-response: 1 question

- Long-answer

UNIT
9

Applications of Thermodynamics

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

CNE 5	9.1 Introduction to Entropy
ENE 5	9.2 Absolute Entropy and Entropy Change
ENE 5	9.3 Gibbs Free Energy and Thermodynamic Favorability
CNE 5	9.4 Thermodynamic and Kinetic Control
ENE 5	9.5 Free Energy and Equilibrium
ENE 4	9.6 Coupled Reactions
CNE 2	9.7 Galvanic (Voltaic) and Electrolytic Cells
ENE 5	9.8 Cell Potential and Free Energy
ENE 4	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

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What does a typical
Unit look like?

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Types of assignments to get you ready for the test

Challenging to prepare you for the exam

- Ap Classroom daily videos
 - Packet work/I do, We do, You do
 - Personal Progress Checks
 - Short Quizzes to check understanding
 - MCQ and FRQ Tests each Unit
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Packet/I do, we do, you do

1. These are an example of the types of notes and assignments that you will encounter
2. Expect about 30 mins-1 hour of homework
3. Typical class period, go over work, notes, time to do assignment

Laboratories

For every unit, we
will do at least 1
Lab

Students will keep a lab notebook

1) Helps keep the students organized and easy to access labs

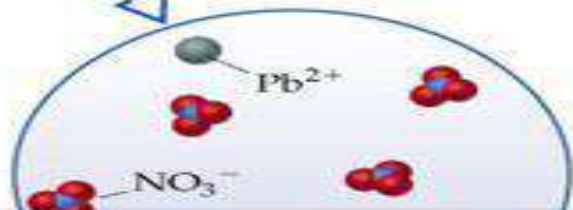
Some questions on the AP exam require students to set up a lab, so being familiar with equipment is important

2) Some colleges ask for them

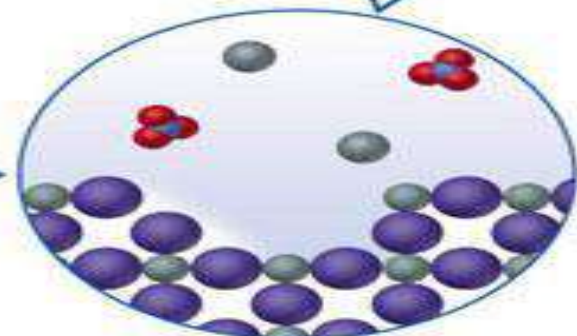
- In order to receive credit for the lab section at college (if you pass the test)



$2 \text{KI}(aq)$



$\text{Pb}(\text{NO}_3)_2(aq)$



$\text{PbI}_2(s) + 2\text{KNO}_3(aq)$

Example of an experiment we do in class

Why take the class?

- Interest in going into the medical field (need chemistry in college)
- Can potentially be worth 10 credits at the college level!
- Are interested in learning more about what we learned this year
- Interested in engineering (chemical engineering)

Success Stories and growing program

- Before I took over the program, more not many students and not many passes
- I took over the class in 2020 (distance learning year)
- Class of 7 students and 4 of them passed (3 4's and 1 3)
- Grew the class to 12 this year!
- Let's keep the growth going next year!