Instructor Information:

Instructor:
Email:
Tutorial Times:

Textbook:

Chemistry: A Molecular Approach, AP Edition (Nivaldo Tro) by Pearson.

Required Course Materials:

Spiral or Composition Notebook (physically or electronically), Pencils, Pens, Highlighters, Index Cards, Chromebook.

Prerequisites:

Prior to enrolling in AP Chemistry, students should have successfully completed a general high school chemistry course and Algebra II.

Course Outline & Reading Assignments

AP Chem Syllabus

https://apcentral.collegeboard.org/pdf/ap-chemistry-course-overview.pdf?course=ap-chemistryline.html

Course Description:

AP Chemistry is an introductory college-level chemistry course. Students will learn about the fundamental concepts of chemistry including structure and states of matter, intermolecular forces, and reactions. You'll also do hands-on lab investigations and use chemical calculations to solve problems. The course is broken down into nine instructional units. Each unit is broken down into segments called topics.

- 1st Six Weeks
  - Unit 1: Atomic Structure and Properties **(6-7 class periods)**
  - Unit 2: Molecular and Ionic Compound Structure and Properties **(7-8 class periods)**

- 2nd Six Weeks
  - Unit 3: Intermolecular Forces and Properties **(8-9 class periods)**
  - Unit 4: Chemical Reactions **(6-7 class periods)**

- 3rd Six Weeks
  - Unit 5: Kinetics **(6-7 class periods)**

- 4th Six Weeks
  - Unit 6: Thermodynamics **(6-7 class periods)**
  - Unit 7: Equilibrium **(6-7 class periods)**

- 5th Six Weeks
  - Unit 8: Acids and Bases **(9-10 class periods)**
  - Unit 9: Applications of Thermodynamics **(6-7 class periods)**
- 6th Six Weeks
  - AP Exam Review & Test

Semester 1: Units 1-5

Unit 1: Atomic Structure and Properties

Students will learn about the composition of atoms and ways scientists' measure and categorize these molecular building blocks. Topics may include:

- 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

On The Exam: 7%–9% of exam score.

Unit 2: Molecular and Ionic Compound Structure and Properties

Students will discover the range of chemical bonds and how their structure can affect the properties of the molecules created. Topics may include:

- 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

On The Exam: 7%–9% of exam score

Unit 3: Intermolecular Forces and Properties

Students will explore how atoms come together to create solids, liquids, and gases, and how subatomic forces govern the properties of everything around you. Topics may include:

- Intermolecular forces
- Solids, liquids, and gases
- Kinetic molecular theory
- Solutions and mixtures
- Photoelectric effect

On The Exam: 18%–22% of exam score

Unit 4: Chemical Reactions

Students will learn how to differentiate physical and chemical processes, and how to measure and express chemical reactions via chemical equations. Topics may include:

- Introduction for reactions
- Net ionic equations
- Representations of reactions
- Physical and chemical changes
- Stoichiometry
- Types of chemical reactions

On The Exam: 7%–9% of exam score

Unit 5: Kinetics

Students will explore various methods to observe the changes that occur during a chemical reaction and the effects of a series of reactions. Topics may include:

- Reaction rate
- Introduction to rate law
- Elementary reactions
- Collision model
- Introduction to reaction mechanisms
- Multistep reaction energy profile
- Catalysis

On The Exam: 7%–9% of exam score.

Semester 2: Units 6-9

Unit 6: Thermodynamics

Students will learn about energy changes in chemical reactions and how a transfer of energy can change a substance's physical qualities. Topics may include:

- Endothermic and exothermic processes
- Heat transfer and thermal equilibrium
- Heat capacity and calorimetry
- Energy of phase changes
- Introduction to enthalpy of reaction
- Enthalpy of formation
- Hess's law

On The Exam: 7%–9% of exam score

Unit 7: Equilibrium

Students will chart how chemical reactions change over time, what causes substances to reach equilibrium, and how systems react when that equilibrium is disturbed. Topics may include:

- Introduction to equilibrium
- Calculating the equilibrium constant
- Calculating equilibrium concentrations
- Introduction to Le Châtelier's principle
- Introduction to solubility equilibria
- pH and solubility
- Free energy of dissolution

On The Exam: 7%–9% of exam score

Unit 8: Acids and Bases

Students will learn more about pH, the qualities and properties of acids and bases, and how they interact in chemical reactions. Topics may include:

- Introduction to acids and bases
- pH and pOH of strong acids and bases
- Acid-base reactions and buffers
- Molecular structure of acids and bases
- pH and pK_a
- Properties of buffers

On The Exam: 11%–15% of exam score

Unit 9: Applications of Thermodynamics

Students will be introduced to the concept of "thermodynamic favorability" for reactions, meaning how likely they are to occur given energy changes and environmental factors.
Topics may include: Introduction to entropy

- Gibbs free energy and thermodynamic favorability
- Thermodynamic and kinetic control
- Free energy and equilibrium
- Galvanic (voltaic) and electrolyte cells
- Electrolysis and Faraday's law

On The Exam: 7%–9% of exam score

Lab Schedule:

The College Board has organized the AP Chemistry course into six big ideas. Students will complete two lab investigations from each big idea.

Big Idea 1: Atoms
Big Idea 2: Chemical and Physical Properties
Big Idea 3: Changes in Matter
Big Idea 4: Rates of Chemical Reactions
Big Idea 5: Thermodynamics
Big Idea 6: Chemical Equilibrium

Students will be using Flinn Scientific (Kit DC11193) or Carolina Investigations for AP Chemistry kits **(Item #: 840565)**. Carolina Investigations for AP Chemistry kits are specifically designed to meet the goals of the AP Chemistry curriculum.

Lab Work:

Students will be required to maintain a science notebook, journal, or field guide, either physically or electronically, to include:

- Pre-lab Questions and their corresponding answers.
- Formulated hypotheses
- Identified variables
    - Students will be required to identify the control group, independent variable and dependent variable in all investigations.
- Outlined methodologies
- Data collection & analysis (AP Chemistry Equation and Constants)
- Graphical representation of data/results
    - This information should be found in both your science notebook and lab report.
- Evidence to support all claims.
    - Proper citation will be required for any information taken from published sources.
- Group/Class discussion.

Grading Policy:

The following grading categories will be used in this course. Each category will be weighted accordingly.

- Daily Work/Formative Assessments (50%)
    - Includes but is not limited to all daily class assignments, homework, designated quizzes and labs.
- Summative Assessments (50%)
    - Includes but is not limited to all tests, lab reports, designated quizzes and labs.

Charter Late Work Policy/Eagle Academy:

Students are expected to adhere to all deadlines and submission requirements. Failure to adhere to these expectations will result in the assignment being classified as late. Late work will be graded based on the following guidelines:

- Assignments submitted one or more class periods after the assigned due date cannot receive any grade higher than a 70%.
- Late/Missing assignments will result in the student being assigned to Eagle Academy.
    - If the late/missing assignment is not completed by the next class period after Eagle Academy, further actions will be taken in accordance with the Student Conduct Handbook.
- In the event you are absent, it is **YOUR** responsibility to ensure you receive all missing work in a timely fashion.
    - Check all online platforms for instructions and assignments while you are absent.
    - Technological issues **DO NOT** excuse you from completing your work! Please contact your teacher if any issues arise.

AP Exam:

If you are registered for this course, you **MUST** take the AP Chemistry exam.

The AP Chemistry Exam is scored on a scale from 1-5. Students who receive a score of 3 or higher may receive college credit for the course, depending on the colleges/universities. requirements.
REMINDER: Review what score will be accepted for the colleges/universities you intend to apply to, they do differ.

The AP Chemistry Exam is made up of two sections. A scientific or graphing calculator is recommended for use on section I and II.

- **Section I:** Multiple Choice (50%)
    - Time: 90 minutes
    - Number of Questions: 60
- **Section II:** Free Response Questions (50%)
    - Time: 105 minutes
    - Number of Questions: 7
        - 3 long essays questions (10 pts each)
        - 4 short essays questions (4 pts each)