



AP Chemistry

Class Syllabus

Course Description

Chemistry is the study of the composition of substances and the changes they undergo. Advanced Placement (AP) Chemistry is a course that is designed to be the equivalent of a first year, general chemistry college course. As such, the course is suitable only for high school students who are (or will be) particularly able in chemistry. Students need to exhibit high levels of commitment, motivation and academic maturity. Students who take the AP Chemistry Exam in May have the opportunity to receive college credit for the course.

The AP examinations are sponsored by The College Board and administered and operated by the Educational Testing Service (ETS). The College Board provides a topic outline for the subject, which is intended to be a guide to the level and breadth of the content expected, but not a specific syllabus. A more complete description of the structure and guidelines of AP Chemistry can be found at <http://www.apcentral.collegeboard.com>. It is generally accepted by chemical educators that the topic outline published by the College Board is very extensive and it is expected that **students will spend 5-6 hours outside of class in unsupervised individual/group study**. The topics we will cover and the approximate time spent on each are listed in the topic outline on the following pages.

The AP Chemistry course and examination will most likely present students with some problems that they find very difficult or even impossible to solve. However, in order to achieve the highest grade (5) on the AP exam it is only necessary to score somewhere in the region of 65% of the available points. To achieve this top score you must be a highly motivated, self-disciplined student who possesses good time management skills, a strong work ethic, and an excellent attitude. Although this class is challenging, all of your time and effort will be rewarded. You may receive college credit which will save on tuition expenses or you will enter your first year college chemistry course at the head of your class.

Course Content

This course has recently been redesigned by the College Board to focus on the six 'Big Ideas' listed below. These ideas establish the scope of the course and are supported by a sequence of increasingly specific layers—Enduring Understandings, Essential Knowledge statements, Science Practices, and, ultimately, Learning Objectives, which tie directly to the questions on the exam. To help teachers manage the increased depth of the revised curriculum, the College Board has excluded some topics, reducing the breadth that has been covered in the past.

Concept Outline & The Big Ideas

Big Idea 1: The chemical elements are fundamental building materials of matter, and all matter can be understood in terms of arrangements of atoms. These atoms retain their identity in chemical reactions. Including: periodicity, spectroscopy, stoichiometry

Big Idea 2: Chemical and physical properties of materials can be explained by the structure and the arrangement of atoms, ions, or molecules and the forces between them. Including: classification of substances, molecules, solutions, phases of matter

Big Idea 3: Changes in matter involve the rearrangement and/or reorganization of atoms and/or the transfer of electrons. Including: physical and chemical processes, electrochemistry, chemical reactions

Big Idea 4: Rates of chemical reactions are determined by details of the molecular collisions. Including: mechanism, observations (measurements), rate and collision theory

Big Idea 5: The laws of thermodynamics describe the essential role of energy and explain and predict the direction of changes in matter. Including: nature of heat transfer, nature of chemical energy, free energy, work, and calorimetry

Big Idea 6: Any bond or intermolecular attraction that can be formed can be broken. These two processes are in a dynamic competition, sensitive to initial conditions and external perturbations. Including: equilibrium, thermodynamics, acids, bases, solubility

Lab Component and Science Practices

Each learning objective is linked to one of 7 Science Practices which describe ways to collect and analyze data and to use models and theories to explain phenomena. The College Board specifies 16 required experiments, 6 of which must be inquiry-based. Many students will struggle with the transition from teacher-directed experiments to inquiry-based labs. Students will not be told what to do but instead will be faced with a problem and will need to design an experiment to solve it.

Science Practice 1: The student can use representations and models to communicate scientific phenomena and solve scientific problems.

Science Practice 2: The student can use mathematics appropriately.

Science Practice 3: The student can engage in scientific questioning to extend thinking or to guide investigations within the context of the AP course.

Science Practice 4: The student can plan and implement data collection strategies in relation to a particular scientific question. [Note: Data can be collected from many different sources, e.g., investigations, scientific observations, the findings of others, historic reconstruction, and/or archived data.].

Science Practice 5: The student can perform data analysis and evaluation of evidence.

Science Practice 6: The student can work with scientific explanations and theories.

Science Practice 7: The student is able to connect and relate knowledge across various scales, concepts, and representations in and across domains.

Topic Outline

Weeks 1-2: The Fundamentals

Chapter 1: Introduction: Matter and Measurement

Chapter 2: Atoms, Molecules, and Ions

Chapter 3: Stoichiometry: Calculations with Chemical Formulas and Equations

Weeks 3-6: Chemical Reactions and Properties of Solutions

Chapter 4: Aqueous Reactions and Solution Stoichiometry

Chapter 13: Properties of Solutions

Weeks 7-9: Thermodynamics

Chapter 5: Thermochemistry

Chapter 19: Chemical Thermodynamics

Weeks 10-11: Electron Structure and Periodicity

Chapter 6: Electron Structure of Atoms

Chapter 7: Periodic Properties of the Elements

Weeks 12-14: Chemical Bonding and Molecular Geometry

Chapter 8: Basic Concepts of Chemical Bonding

Chapter 9: Molecular Geometry and Bonding Theories

Week 15: Gases

Chapter 10: Gases

Weeks 16-17: Solids, Liquids, Changes in Phase, and Intermolecular Forces

Chapter 11: Intermolecular Forces, Liquids, and Solids

Weeks 18-19: Chemical Kinetics

Chapter 14: Chemical Kinetics

Weeks 20-21: Equilibrium

Chapter 15: Chemical Equilibrium

Weeks 22-24: Acid-Base Reactions and Solution Equilibria

Chapter 16: Acid-Base Equilibria

Chapter 17: Additional Aspects of Aqueous Equilibria

Weeks 25-27: Redox Reactions and Electrochemistry

Chapter 20: Electrochemistry

Weeks 28-29: Descriptive, Organic, and Nuclear Chemistry

Weeks 30-34: Review and AP Exam Practice

Expectations

- As you can see from the list above, we will have to move very fast in order to cover all of the content. This means I need your utmost cooperation and attention at all times. If you are holding your classmates back from learning you will be asked to leave.
- I hope it goes without saying that attendance, punctuality, courtesy and good behavior of the highest levels are expected at all times. On the occasions when it is unavoidable that a class is missed it remains the responsibility of the student to catch up with any material missed. You will need to be in your seat, ready to learn when the bell rings or you will be marked TARDY.
- You must come to class prepared to discuss the topics we will be covering. This may include reading your textbook the night before, making sure you have attempted all homework problems, or writing lab procedures that you will follow during an experiment.
- Students are expected to play an active role in their studies by reading around the subject matter and taking an enthusiastic and proactive approach to all their work.
- You must be an active participant in the lesson at all times. This means discussing new material and trying sample problems. You will get a much better grasp of the content when you question ideas that are unclear to you. You will also be expected to explain problems to your classmates on the board.
- You will be performing many laboratory experiments throughout this semester to help you understand the concepts listed above. Being able to work effectively as part of a group is essential to doing well in this class and on the AP exam. Laboratory safety is always of paramount importance. Your exemplary behavior and observance of safety procedures is required at all times.
- The very nature of the AP Chemistry program, attempting as it does to mimic a college chemistry course, requires students to learn and apply college style learning skills. More specifically taking the initiative for one's own learning and being prepared to think around problems to find solutions. Please seek help if you are having difficulties. It would also be to your benefit to form a study group early on.
- All students are expected to take the AP Exam in May. Failure to do so with result in having to take a Spring Final Exam which may negatively impact your grade.
- If a student intends to use their AP Chemistry score for college credit then it is his or her responsibility to research if the college(s) of their choice will accept it. Colleges have widely differing policies in relation to this matter ranging from complete acceptance to total disregard.

Grading:

We will have a lot fewer grades than you were used to in last year's Chemistry course. Tests and quizzes will account for 60% of your grade with homework assignments and lab experiences each accounting for 20% of your grade. Short quizzes will be given on a regular basis to ensure students are keeping up with subject matter on a daily basis.

Each assignment, test, quiz, or experiment will be assigned a number of points out of the total number of points available. These scores are converted and your final grade is based on a percent scale required by L'Anse Creuse Public Schools. The scale used is as follows:

A+	101% and above	C+	77 – 79.9%
A	93 – 100.9%	C	73 – 76.9%
A-	90 – 92.9%	C-	70 – 72.9%
B+	87 – 89.9%	D+	67 – 69.9%
B	83 – 86.9%	D	63 – 66.9%
B-	80 – 82.9%	D-	60 – 62.9%
		F	below 60%

The AP Chemistry Examination Format

The AP Chemistry Exam consists of two sections: multiple choice and free response. The exam is 3 hours long and includes both a 90-minute multiple-choice section and a 90-minute free-response section. The multiple-choice section accounts for half of each student's exam grade, and the free-response section accounts for the other half. Students will be allowed to use a scientific calculator on the entire free-response section of the exam. Additionally, students will be supplied with a periodic table of the elements and a formula and constants chart to use on both the multiple-choice and free-response sections of the exam.

Section I consists of 60 multiple-choice questions, either as discrete questions or question sets, that represent the knowledge and science practices outlined in the AP Chemistry curriculum framework, which students should understand and be able to apply. Question sets are a new type of question: They provide a stimulus or a set of data and a series of related questions (much like the ACT Science portion). Questions will now only have 4 choices.

Section II contains two types of free-response questions (short and long), and each student will have a total of 90 minutes to complete all of the questions. Section II of the exam will contain questions pertaining to experimental design, analysis of authentic lab data and observations to identify patterns or explain phenomena, creating or analyzing atomic and molecular views to explain observations, and following a logical/analytical pathway to solve a problem.

Resources

It is very strongly recommended that students invest in one of the AP Chemistry course preparation books currently on the market. There are several available and students should look through each one and make a selection based upon personal preference. It is not a good idea to wait until two weeks before the examination to purchase the book, buy it at the beginning of the course and use it regularly throughout the year. Examples of such books are listed below and older copies are available to sign out.

1.1. Cracking the AP Chemistry Exam (2013 edition) by Princeton Review

Publisher: Princeton Review; ISBN: 0307944883 (August 7, 2012) ****I DO NOT recommend the 2014 version****

2. 5 Steps to a 5: AP Chemistry, 2015 Edition by John Moore and Richard Langley

Publisher: McGraw-Hill; ISBN: 0071838511 (July 17, 2014)

3. Barron's AP Chemistry, 7th Edition by Neil D. Jespersen

Publisher: Barron's Educational Series; ISBN: 1438002718 (February 1, 2014)

4. AP[®] Chemistry Crash Course Book by Adrian Dingle and Derrick C. Wood

Publisher: REA; ISBN: 0738611549 (January 16, 2014)

Contact Information

Office hours: 2:30-3:30 Monday and Thursday (and Tuesday when no meetings are scheduled)

Room #: 119 (in the new science wing)

Email: strozsa@lc-ps.org

Phone #: (586) 493-5270 ext. 2629

Parent contact: I am most likely to respond to email and voice mail at the end of the school day. My conference hour is 6th hour.

Parent Signature

Please have a parent or guardian sign and date below signifying they have read and understood the guidelines and expectations of this course.

Signature _____ Date _____