

Equinox Program

Course Title

Chemistry (AP Designation Pending)

Course Description

This course focuses more deeply on topics such as thermodynamics, thermochemistry, the physical behavior of gases, states and structure of matter, chemical equilibrium and kinetics and various chemical reactions. Laboratory work emphasizes increased competency in solving chemical calculations and problems. Upon completion, students attain a deeper understanding of chemistry fundamentals and are prepared to take the AP Chemistry exam.

Advanced Placement Chemistry is a laboratory-based course that is designed to be equivalent to a general chemistry course that would be taken during the first year of college. This course focuses on topics such as states and structure of matter, chemical thermodynamics, physical behavior of gases, chemical equilibrium, and kinetics, and the qualitative and quantitative nature of chemical reactions. Laboratory work emphasizes increased competency in solving chemical calculations and problems. Upon completion of the course, students will have a deeper understanding of chemistry fundamentals and be prepared to take the Advanced Placement Chemistry exam. This is a foundation course for those interested in life science, pre-medicine, engineering, and applied science.

Outcomes

Upon successful completion of this course, students will be able to do the following:

- Identify the binding forces of matter
- Understand the relationship between the structure of matter and its properties
- Understand how the structure of the atom dictates the periodic relationships of matter
- Evaluate the differences of gases, liquids, and solids from the viewpoint of Kinetic Molecular Theory
- Understand how intermolecular forces affect the physical properties and characteristics of liquids and solids
- Evaluate how the evaporation, vapor pressure and boiling point of liquids are determined by their structure
- Classify the types of crystalline solids
- Determine the affect of pressure and volume on the phase of solids and liquids
- Qualitatively and quantitatively describe the behaviors of solutions
- Identify the types of chemical reactions
- Evaluate the mass and volume relationships of chemical systems
- Evaluate the dynamic nature of chemical equilibrium
- Understand the principles that affect the rate of a chemical reaction
- Understand how thermodynamics affects the plausibility of a chemical or physical process
- Understand the mathematical formulation of chemical principles
- Demonstrate the ability to calculate and interpret results based the data obtained through laboratory experimentation

Resources and Materials

Brown, T., LeMay, H., Bursten, B, *Chemistry: The Central Science*, 10th Ed., 2006,

ISBN: 0-13-193719-7

Accompanying Solutions to Red Exercises, ISBN: 0-13-146486-8

Graphing Calculator

3-ring binder with loose-leaf paper (for notes, handouts, quizzes and exams)

3-ring binder (for graded labs)

Lab dress requirements:

Short sleeve shirt, long pants, closed-toed shoes with socks

Student Evaluation and Grading Policies

CTD Grading Scale

A+	100-97%	A	96-93%	A-	92-90%
B+	89-87%	B	86-83%	B-	82-80%
C+	79-77%	C	76-73%	C-	72-70%
D+	69-67%	D	66-63%	D-	62-60%
F	below 60%				

Breakdown of Final Grade

Tests—50%

Given the accelerated nature of this course, 1-2 chapters will be covered each day. There will be a test covering the previous two day's material during the morning session of the test day.

Labs—15%

Laboratory experiments will be conducted daily. For each laboratory experiment, a written report consisting of purpose, procedure, data, data analysis, error analysis, and conclusion is graded and returned to the student. The laboratory reports are collected into a portfolio (lab binder) for the students to show to the college of their choice for evaluation for possible college credit. Group collaboration and presentations are expected for selected laboratories. The labs will be due the following day. Lab reports will follow a formal format and will be handwritten or typed. Details regarding this format will be elaborated upon at a later date.

Homework—15%

Homework will be checked, but not strictly graded. It is the responsibility of each student to do all assigned homework. Homework is meant to assist in learning outside the classroom.

Final Exam—20%

A comprehensive exam will be administered on the last day of class. The exam used will be an AP Chemistry type exam.

Schedule

Date	Lecture, Lab & Test	Assignments (Homework is due the next class day after it is assigned.)	Instructional Strategies
Sun 6/28	Opening Day —Introduction Parent/Teacher Conferences Sign-up	Read Chapters 1 & 2	
Day 1 Mon 6/29	Chapter 1: Matter & Measurement Section 1.1-1.6 Chapter 2: Atoms, Molecules & Ions Section 2.1-2.8 Chapter 3: Stoichiometry Section 3.1-3.7 Lab: Density of Liquids and Solids Pretest: Monday evening with TA	Problems —10, 12, 20, 26, 30, 32, 38, 42, 48, 52, 66 Problems —20, 24, 30, 44, 48, 54, 56, 60, 62, 64 Problems —12, 18, 20, 22, 24, 34, 36, 42, 44, 46, 50, 58, 60, 74, 76	Question/Answer Session Problem Based Learning
Day 2 Tues 6/30	Chapter 4: Reactions in Aqueous Solution Section 4.1-4.6 Lab: Analysis of an Unknown Chloride	Problems —16, 20, 22, 26, 30, 32, 40, 50, 56, 62, 64, 68, 70, 80, 84, 88	Question/Answer Session Problem Based Learning
Day 3 Wed 7/1	Chapter 10: Gases Section 10.1-10.9 Test: Ch. 1-4 Lab: Al/Zn Alloy	Problems —12, 18, 22, 26, 34, 36, 44, 48, 52, 64, 76, 78, 98	Question/Answer Session Problem Based Learning
Day 4 Thur 7/2	Chapter 5: Thermochemistry Section 5.1-5.7 Test: Ch. 10 Lab: Thermodynamics—Enthalpy of Reaction and Hess's Law	Problems —36, 38, 46, 48, 52, 54, 56, 60, 62, 64, 70, 74, 76	Question/Answer Session Problem Based Learning
Day 5 Fri 7/3	Chapter 6: Electronic Structure of Atoms Section 6.1-6.9 Chapter 7: Periodic Properties of the Elements Section 7.1-7.6 Test: Ch. 5 Lab: Finding the Ratio of Moles of Reactants in a Chemical Reaction	Problems —16, 18, 24, 28, 36, 50, 54, 64, 74, 82 Problems —14, 22, 24, 26, 30, 34, 42, 44, 48, 50	Question/Answer Session Problem Based Learning

Day 6 Mon 7/6	Chapter 8: Covalent Bonding Section 8.1-8.8 Chapter 9: Molecular Geometric and Bonding Theories Section 9.1-9.6 Test: Ch. 6-7 Lab: Molecular Models	Problems —12, 16, 30, 34, 40, 46, 52, 62, 66, 68, 72, 86 Problems —22, 26, 30, 32, 36, 38, 46, 54, 82, 86	Question/Answer Session Flexible Groups
Day 7 Tues 7/7	Chapter 11: Intermolecular Forces, Liquids and Solids Section 11.1-11.7 (excluding units cells pp. 466-470), 11.8 Test: Ch. 8-9 Lab: Intermolecular Forces	Problems —12, 16, 22, 24, 26, 34, 38, 40, 50, 54, 72, 78, 100	Question/Answer Session Flexible Groups
Day 8 Wed 7/8	Chapter 13: Properties of Solutions Section 13.1-13.5 Lab: Freezing Point Depression Lab Test: Ch. 11	Problems —22, 28, 32, 36, 38, 42, 46, 50, 58, 62, 64, 68, 72	Question/Answer Session Problem Based Learning
Day 9 Thur 7/9	Chapter 14: Chemical Kinetics Section 14.1-14.7 Test: Ch. 13 Lab: Kinetics of a Reaction	Problems —10, 14, 18, 22, 24, 28, 30, 38, 40, 48, 50, 54, 62, 66, 94	Question/Answer Session Problem Based Learning
Day 10 Fri 7/10	Chapter 15: Chemical Equilibrium Section 15.1-15.7 Test: Ch. 15 Lab: Equilibrium Lab	Problems —2, 10, 14, 16, 20, 22, 28, 30, 34, 38, 42, 44, 46, 50, 52, 54, 64, 72	Question/Answer Session Flexible Grouping
Day 11 Mon 7/13	Chapter 16: Acid-Base Equilibria Section 16.1-16.11 Test: Ch. 15 Lab: Titration of a Weak Acid	Problems —16, 18, 20, 26, 30, 36, 38, 44, 48, 54, 56, 60, 64, 74, 76, 78, 82, 86, 88, 94, 102	Question/Answer Session Problem Based Learning
Day 12 Tues	Chapter 17: Additional Aspects of Aqueous Equilibria	Problems —12, 14, 20, 24, 28, 30, 38, 40, 44, 50, 52, 60, 78	Question/Answer Session

7/14	Section 17.1-17.6 Test: Ch. 16 Lab: Determination of K_s of an Ionic Compd.		Problem Based Learning
Day 13 Wed 7/15	Chapter 19: Chemical Thermodynamics Section 19.1-19.7 Test: Ch. 17 Lab: Hydrolysis Lab	Problems —8, 22, 30, 38, 42, 44, 48, 52, 54, 56, 60, 72, 76, 78	Question/Answer Session Problem Based Learning
Day 14 Thur 7/16	Chapter 20: Electrochemistry Section 20.1-20.6 Test: Ch. 19 Review!!!	Problems —14, 18, 20, 24, 32, 34, 36, 40, 46, 48, 50, 52, 60, 62, 66	Question/Answer Session
Day 15 Fri 7/17	Final Exam 9am—12pm Parent/Teacher Conferences 1pm—5pm		

Summer Sample