

Course Expectations:

AP Chemistry is designed to be a class that contains the same rigor as a college chemistry class. As such, students are expected to prepare ahead of time by completing all reading assignments in advance of class, engaging in the class during lecture and discussion, and completing any assignments on time. It is expected that students will perform college level work, which means that the student can expect to spend on average one hour each evening reading content, completing assignments and studying content.

Textbook and Study Guide[CR1]:

Brown, Theodore L., and LeMay, Eugene H. *Chemistry The Central Science* 11th ed., Person Education,

2008. ISBN-13-978-0-13-601879-7 ISBN-10-0-13-601879-3

Waterman, Edward L., *AP Test Prep Series: AP Chemistry, For: Chemistry: The Central Science*, 11th ed., Pearson Education, 2009.

The College Board. *AP Guided Inquiry Experiments*. New York, NY. (2013)

Vonderbrink, Sally. *Laboratory Experiments for Advanced Placement Chemistry*, 2nd ed. Flinn Scientific, 2006.

Grades:

<i>In Progress Grade:</i>	<i>70%</i>	
Exams		65%
Labs/Activities		25%
Quizzes (Homework and Content Quizzes)		10%
<i>Final Exam Grade</i>	<i>30%</i>	
<i>Course Grade</i>	<i>100%</i>	

Extra Credit

I am not a big fan of extra credit because there are plenty of opportunities to earn points throughout the year, however, to encourage proper reading of the material prior to instruction 5 pts of extra credit will be given to students who turn in neat, organized, and legible notes over the unit chapters prior to instruction occurring. These points will be added to the Exam for the unit. To be clear this is 5 pts per unit not per chapter. The notes must show that the chapters were read, providing only minimal notes such as writing the headings only will not suffice. If you feel 5 pts is not much, keep in mind it is being applied towards unit exams which are worth 100 pts and make up the majority of your overall grade. I am very strict about notes being turned in on time and before instruction commences. If you are absent scan and email prior to scheduled instruction or turn them in early. Because it is extra credit it is a privilege not a right and there will be **NO** exceptions to the on time expectation.

Additional extra credit may or may not be offered throughout the year. I do not offer extra credit on individual student basis. Students need to focus on required work and earn their points by completing these assignments, quizzes and exams.

Exams

Most exams will be in a scaled format of the AP Exam. AP exams are given under strict time frames so students will be expected to complete the exam in the time given to them. Students will have the constant sheet and periodic table to assist them on these exams. Exams are curved depending on the class averages. There are no retakes for exams. If a student misses an exam a makeup time will be scheduled for after school; students are expected to arrange to take the makeup at that time. Makeups will be scheduled within 1 week of the original exam.

Quizzes

Students will have frequent quizzes throughout the year. There are two types of quizzes.

Homework quizzes - will be given on the due date for homework assignments. These quizzes are 30 points each. The quiz will consist of 2-4 questions from the homework and students may use their homework on the quiz. Homework is not collected or graded, however, the solution manuals will be made available for students to check their work. It is important that students work the homework problems, check their work and ask questions. Just copying the answers from the solution manuals may provide a good grade on a homework quiz, but will not help in regards to understanding the material. There are no retakes for homework quizzes.

Content quizzes – a quiz will be given over each chapter throughout the year. These quizzes are 50 points each. 2- 4 questions may be asked on these quizzes and students will only have the constant sheet and periodic table to assist them on these quizzes. A student may retake a quiz after they check in with the teacher. A quiz may only be retaken once and the quiz will be over similar material but will not be the same as the original quiz. The grade recorded in the grade book will be from the retake quiz regardless of the score being better, the same, or lower.

Labs and Activities

Labs - include formal labs (100pts), informal labs (50pts) and various activities (points vary).

Labs and activities are an important part of AP Chemistry. Labs are conducted approximately every two weeks. If a student is absent the day of a lab the student will need to make up the lab after school within 1-2 days. Please understand lab preps cannot be left out for long periods of time. If a student cannot make up the lab or the prep cannot be left out for safety or logistic reasons an alternative assignment may be given. Missing more than two labs in a semester will be cause for great concern and require a parent, student, and teacher conference to determine how to best resolve the issue. Labs are now covered in the AP Exam and a critical component in preparation for the exam.

Late labs will receive a deduction of 20% of points earned. Students will be given appropriate time to complete the labs based on if it is an informal or formal lab.

Activities – include a variety of things from research, writing, POGILS, integrated problems and more. These activities support learning and preparation for the AP Exam. Activities turned in late receive a deduction of 50% of points earned.

Students are expected to keep an organized notebook of labs and activities (50 pts). This notebook will be graded on exam days. Failure to have your lab notebook will result in a zero for your notebook grade.

The 10 Parts of a Formal Laboratory Report [CR 7]:

A specific format will be given to the student for each lab. Students must follow that format and label all sections clearly. AP Chemistry lab reports are much longer and more in depth than the ones completed in perquisite chemistry courses. Therefore it is important that students don't procrastinate when doing pre-lab and post-lab work. Failure to complete the pre-lab will preclude the student from participating in the actual lab. An alternative lab assignment will be given upon completion of the pre-lab and a deduction of points in accordance with the late lab policies noted above.

In the student's laboratory notebook, all work should be neatly written in blue or black ink. Students may type their work and graphs may be completed in Excel and imported to the final document. However, all data collected during lab must be handwritten into the data tables prepared prior to the lab while actually performing the lab. You may take a photo of your data tables and insert them into the final lab report or attach the original data table.

Pre-Lab Work:

Pre-lab work is to be completed and turned in on or before the day the lab is to be performed.

Reports:

1. Pre-lab Questions (please complete on a separate sheet of paper to turn in at the start of lab)
 - a. Students will be given some questions to answer before the lab is done. They will need to either rewrite the question or incorporate the question in the answer. The idea here is that when someone looks at a student's lab, they should be able to tell what the question was by merely looking at their lab report. It is important to produce a good record of lab work.
2. Title
 - a. The title should be descriptive. For example "pH Titration Lab" is a descriptive title and "Experiment 5" is not a descriptive title.
3. Date
 - a. This is the date the student will perform the experiment.
4. Purpose
 - a. A purpose is a statement summarizing the "point" of the lab.
5. Procedure Outline
 - a. Students need to write an outline of the procedure. They should use bulleted statements or outline format to make it easy to read. If a student is doing a guided inquiry lab, they may be required to write a full procedure that they develop.
6. Data Tables
 - a. Students will need to create any data tables or charts necessary for data collection in the lab.

During the lab:

7. Data
 - a. Students need to record all their data directly on their pre-lab data tables. Students are **NOT** to be recording data on any other paper or depending on their lab partners to provide the data to them at a later time. Students need to label all data clearly and always include proper units of measurement. Students should underline, use capital letters, or use any device they choose to help organize this section well. This section should be spaced out neatly and clearly as it contains the important data collected.

Post-Lab Work:

8. Calculations and Graphs
 - a. Students should show how calculations are carried out (DO NOT SKIP ANY STEPS OR LEAVE OFF ANY UNITS). Graphs need to have proper titles, axis need to be labeled, and units need to be shown on the axis to receive credit for any graphs. Graphs must be at least $\frac{1}{2}$ page in size and the data must take up at least $\frac{3}{4}$ of the graphing area.
9. Conclusion
 - a. This will vary from lab to lab. Students will usually be given direction as to what to write, but it is expected that all conclusions will be well thought out and well written.
 - b. Components of a conclusion should include but is not limited to:
 - i. Restate purpose
 - ii. Restate hypothesis and state if supported or not supported
 - iii. Summary of what was done
 - iv. Statement that supports results and refers to data
 - v. Error analysis that includes sources of error and how it affected the outcome AND how the error could be avoided in future labs.
 - vi. Reflection on the lab that includes EITHER the need to repeat in order to validate with explanation why and improvements that may be added OR further investigations that were inspired by the lab and results.
10. Post Lab Analysis and Questions
 - a. Follow the same procedure as for Pre-Lab Questions.

AP Chemistry Unit Overview [CR2]:

Big Idea 1: Structure of matter

- 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.

Big Idea 2: Properties of matter-characteristics, states, and forces of attraction

- 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.

Big Idea 3: Chemical Reactions

- Changes in matter involve the rearrangement and/or reorganization of atoms and/or the transfer of electrons.

Big Idea 4: Rates of chemical reactions

- Rates of chemical reactions are determined by details of the molecular collisions.

Big Idea 5: Thermodynamics

- The laws of thermodynamics describe the essential role of energy and explain and predict the direction of changes in matter.

Big Idea 6: Equilibrium

- 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.

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.

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.

Year Overview: [CR 3a, 3b, 3c, 3e, 3f]

Unit	Chapters	Topics	Topic Highlights	Problem Sets
1	1 – 2	Matter and measurements Atoms, molecules and ions	Summer Assignment Significant figures Dimensional analysis Moles	Summer assignment
2	3 – 4	Stoichiometry Chemical Reactions, solutions	Mole quantities Types of reactions Titrations and gravimetric analysis	Chapter 3: 11, 14, 20, 38, 46, 48, 52, 58, 60, 62, 68, 74, 78 Integrated Problem 3.108 Chapter 4: 16, 22, 24, 40, 50, 52, 56, 62, 68, 70, 80, 82, 86 Integrated Problem 4.110
3	10	Gases	Gas Laws	Chapter 10: 23, 28, 30, 40, 46, 54, 58, 62, 66, 70, 76, 78, 83 Integrated Problem 10.121
4	13	Solutions and colligative properties	Solubility Fp, Bp, Mp	Chapter 13: 16, 20, 24, 38, 40, 58, 62, 66, 68 Integrated Problem 13.109
5	14 - 15	Chemical Kinetics Equilibrium	Rates Rate Laws Mechanisms Equilibrium constants, Q Le Chateliers Solubility Equilibrium	Chapter 14: 7, 16, 20, 26, 30, 32, 36, 38, 48, 58, 64, 66, 68, 70, 73 Integrated Problem 14.111 Chapter 15: 14, 22, 28, 30, 38, 42, 48, 52, 56 Integrated Problem 15.85
6	16 - 17	Acid Base Solutions and Acid Base Reactions	Acids/Bases Weak Acids (K_a and K_b) Buffers Acid/Base Reactions Titrations	Chapter 16: 16, 28, 30, 32, 40, 46, 48, 52, 58, 64, 74, 78, 88, 90, 94, 96, 102, 104 Integrated Problem 16.123 Chapter 17: 16, 18, 22, 24, 32, 38, 46, 50, 52, 68 Integrated Problem 17.103
7	5 - 19	Thermodynamics	Heat and Enthalpy Entropy and Free Energy Equilibrium and Thermodynamics	Chapter 5: 12, 18, 26, 28, 36, 40, 44, 52, 56, 62, 64, 72, 78 Integrated Problem 5.116 Chapter 19: 10, 24, 26, 40, 42, 46, 50, 54, 56, 62, 68, 76 Integrated Problem 19.107
8	20	Electrochemistry	Galvanic Cells Electrolysis Equilibrium/Thermo/Electro	Chapter 20: 16, 22, 26, 34, 36, 42, 50, 64, 66, 74, 82, 90 Integrated Problem 20.112

9	6-7	Atomic Theory	Structure of atoms Periodic table Mass Spec Quantum Mechanical Model - PES Electron configurations Periodic Trends	Chapter 6: 16, 22, 30, 36, 66, 68 Integrated Problem 6.102 Chapter 7: 16, 24, 28, 44, 52 Integrated Problem 7.108
10	8-9	Molecular Theory	Covalent bonding – energetics Lewis structures UV/IR spec Shapes and polarity MO Theory	Chapter 8: 8, 20, 24, 32, 36, 46, 52, 62, 72 Integrated Problem 8.105 Chapter 9: 20, 22, 36, 40, 48, 51, 67, 68 Integrated Problem 9.96
11	11	States of Matter	Properties of substances Interparticle forces Chromatography IMFs and Molecular structure Types and properties of solids	Chapter 11: 16, 20, 30, 36, 48, 56, 58, 70 Integrated Problem 11.100

Bold topics not covered or covered briefly (students are responsible for this content)

Student Safety Contract

PURPOSE

Science is a hands-on laboratory class. You will be doing many laboratory activities which require the use of hazardous chemicals. Safety in the science classroom is the #1 priority for students, teachers, and parents. To ensure a safe science classroom, a list of rules has been developed and provided to you in this student safety contract. These rules must be followed at all times. Two copies of the contract are provided. One copy must be signed by both you and a parent or guardian before you can participate in the laboratory. The second copy is to be kept in your science notebook as a constant reminder of the safety rules.

GENERAL RULES

1. Conduct yourself in a responsible manner at all times in the laboratory.
2. Follow all written and verbal instructions carefully. If you do not understand a direction or part of a procedure, ask the instructor before proceeding.
3. Never work alone. No student may work in the laboratory without an instructor present.
4. When first entering a science room, do not touch any equipment, chemicals, or other materials in the laboratory area until you are instructed to do so.
5. Do not eat food, drink beverages, or chew gum in the laboratory. Do not use laboratory glassware as containers for food or beverages.
6. Perform only those experiments authorized by the instructor. Never do anything in the laboratory that is not called for in the laboratory procedures or by your instructor. Carefully follow all instructions, both written and oral. Unauthorized experiments are prohibited.
7. Be prepared for your work in the laboratory. Read all procedures thoroughly before entering the laboratory.
8. Never fool around in the laboratory. Horseplay, practical jokes, and pranks are dangerous and prohibited.
9. Observe good housekeeping practices. Work areas should be kept clean and tidy at all times. Bring only your laboratory instructions, worksheets, and/or reports to the work area. Other materials (books, purses, backpacks, etc.) should be stored in the classroom area.
10. Keep aisles clear. Push your chair under the desk when not in use.
11. Know the locations and operating procedures of all safety equipment including the first aid kit, eyewash station, safety shower, fire extinguisher, and fire blanket. Know where the fire alarm and the exits are located.
12. Always work in a well-ventilated area. Use the fume hood when working with volatile substances or poisonous vapors. Never place your head into the fume hood.
13. Be alert and proceed with caution at all times in the laboratory. Notify the instructor immediately of any unsafe conditions you observe.
14. Dispose of all chemical waste properly. Never mix chemicals in sink drains. Sinks are to be used only for water and those solutions designated by the instructor. Solid chemicals, metals, matches, filter paper, and all other insoluble materials are to be disposed of in the proper waste containers, not in the sink. Check the label of all waste containers twice before adding your chemical waste to the container.
15. Labels and equipment instructions must be read carefully before use. Set up and use the prescribed apparatus as directed in the laboratory instructions or by your instructor.
16. Keep hands away from face, eyes, mouth and body while using chemicals or preserved specimens. Wash your hands with soap and water after performing all experiments. Clean all work surfaces and apparatus at the end of the experiment. Return all equipment clean and in working order to the proper storage area.
17. Experiments must be personally monitored at all times. You will be assigned a laboratory station at which to work. Do not wander around the room, distract other students, or interfere with the laboratory experiments of others.

18. Students are never permitted in the science storage rooms or preparation areas unless given specific permission by their instructor.
19. Know what to do if there is a fire drill during a laboratory period; containers must be closed, gas valves turned off, fume hoods turned off, and any electrical equipment turned off.
20. Handle all living organisms used in a laboratory activity in a humane manner. Preserved biological materials are to be treated with respect and disposed of properly.
21. When using knives and other sharp instruments, always carry with tips and points pointing down and away. Always cut away from your body. Never try to catch falling sharp instruments. Grasp sharp instruments only by the handles.
22. If you have a medical condition (e.g., allergies, pregnancy, etc.), check with your physician prior to working in lab.

CLOTHING

23. Any time chemicals, heat, or glassware are used, students will wear laboratory goggles. There will be no exceptions to this rule!
24. Contact lenses should not be worn in the laboratory unless you have permission from your instructor.
25. Dress properly during a laboratory activity. Long hair, dangling jewelry, and loose or baggy clothing are a hazard in the laboratory. Long hair must be tied back and dangling jewelry and loose or baggy clothing must be secured. Shoes must completely cover the foot. No sandals allowed.
26. Lab aprons have been provided for your use and should be worn during laboratory activities.

ACCIDENTS AND INJURIES

27. Report any accident (spill, breakage, etc.) or injury (cut, burn, etc.) to the instructor immediately, no matter how trivial it may appear.
28. If you or your lab partner are hurt, immediately yell out "Code one, Code one" to get the instructor's attention.
29. If a chemical splashes in your eye(s) or on your skin, immediately flush with running water from the eyewash station or safety shower for at least 20 minutes. Notify the instructor immediately.
30. When mercury thermometers are broken, mercury must not be touched. Notify the instructor immediately.

HANDLING CHEMICALS

31. All chemicals in the laboratory are to be considered dangerous. Do not touch, taste, or smell any chemicals unless specifically instructed to do so. The proper technique for smelling chemical fumes will be demonstrated to you.
32. Check the label on chemical bottles twice before removing any of the contents. Take only as much chemical as you need.
33. Never return unused chemicals to their original containers.
34. Never use mouth suction to fill a pipet. Use a rubber bulb or pipet pump.
35. When transferring reagents from one container to another, hold the containers away from your body.
36. Acids must be handled with extreme care. You will be shown the proper method for diluting strong acids. Always add acid to water, swirl or stir the solution and be careful of the heat produced, particularly with sulfuric acid.
37. Handle flammable hazardous liquids over a pan to contain spills. Never dispense flammable liquids anywhere near an open flame or source of heat.
38. Never remove chemicals or other materials from the laboratory area.
39. Take great care when transporting acids and other chemicals from one part of the laboratory to another. Hold them securely and walk carefully.

HANDLING GLASSWARE AND EQUIPMENT

40. Carry glass tubing, especially long pieces, in a vertical position to minimize the likelihood of breakage and injury.
41. Never handle broken glass with your bare hands. Use a brush and dustpan to clean up broken glass. Place broken or waste glassware in the designated glass disposal container.
42. Inserting and removing glass tubing from rubber stoppers can be dangerous. Always lubricate glassware (tubing, thistle tubes, thermometers, etc.) before attempting to insert it in a stopper. Always protect your hands with towels or cotton gloves when inserting glass tubing into, or removing it from, a rubber stopper. If a piece of glassware becomes “frozen” in a stopper, take it to your instructor for removal.
43. Fill wash bottles only with distilled water and use only as intended, e.g., rinsing glassware and equipment, or adding water to a container.
44. When removing an electrical plug from its socket, grasp the plug, not the electrical cord. Hands must be completely dry before touching an electrical switch, plug, or outlet.
45. Examine glassware before each use. Never use chipped or cracked glassware. Never use dirty glassware.
46. Report damaged electrical equipment immediately. Look for things such as frayed cords, exposed wires, and loose connections. Do not use damaged electrical equipment.
47. If you do not understand how to use a piece of equipment, ask the instructor for help.
48. Do not immerse hot glassware in cold water; it may shatter.

HEATING SUBSTANCES

49. Exercise extreme caution when using a gas burner. Take care that hair, clothing and hands are a safe distance from the flame at all times. Do not put any substance into the flame unless specifically instructed to do so. Never reach over an exposed flame. Light gas (or alcohol) burners only as instructed by the teacher.
50. Never leave a lit burner unattended. Never leave anything that is being heated or is visibly reacting unattended. Always turn the burner or hot plate off when not in use.
51. You will be instructed in the proper method of heating and boiling liquids in test tubes. Do not point the open end of a test tube being heated at yourself or anyone else.
52. Heated metals and glass remain very hot for a long time. They should be set aside to cool and picked up with caution. Use tongs or heat-protective gloves if necessary.
53. Never look into a container that is being heated.
54. Do not place hot apparatus directly on the laboratory desk. Always use an insulating pad. Allow plenty of time for hot apparatus to cool before touching it.
55. When bending glass, allow time for the glass to cool before further handling. Hot and cold glass have the same visual appearance. Determine if an object is hot by bringing the back of your hand close to it prior to grasping it.

Student Safety Contract QUESTIONS

Do you wear contact lenses?

YES or NO

Are you color blind?

YES or NO

Do you have allergies?

YES or NO

If so, list specific allergies _____

Please identify and questions or concerns you have regarding laboratories conducted in the classroom:

AGREEMENT

I, _____ (student's name please print) have read and agree to follow all of the safety rules set forth in this contract. I realize that I must obey these rules to ensure my own safety, and that of my fellow students and instructors. I will cooperate to the fullest extent with my instructor and fellow students to maintain a safe lab environment. I will also closely follow the oral and written instructions provided by the instructor. I am aware that any violation of this safety contract that results in unsafe conduct in the laboratory or misbehavior on my part, may result in being removed from the laboratory, detention, receiving a failing grade, and/or dismissal from the course.

Student Signature: _____ Date: _____

Dear Parent or Guardian:

We feel that you should be informed regarding the school's effort to create and maintain a safe science classroom/laboratory environment.

With the cooperation of the instructors, parents, and students, a safety instruction program can eliminate, prevent, and correct possible hazards.

You should be aware of the safety instructions your son/daughter will receive before engaging in any laboratory work. Please read the list of safety rules above. No student will be permitted to perform laboratory activities unless this contract is signed by both the student and parent/guardian and is on file with the teacher.

Your signature on this contract indicates that you have read this Student Safety Contract, are aware of the measures taken to ensure the safety of your son/daughter in the science laboratory, and will instruct your son/ daughter to uphold his/her agreement to follow these rules and procedures in the laboratory.

Parent/Guardian Signature: _____ Date: _____

Classroom Expectations and Policies

I, _____ (students name please print) have read and understood the classroom expectations and policies for Principals of Chemistry.

Student Signature: _____ Date: _____

Parent/Guardian Signature: _____ Date: _____

Question, concerns or additional information regarding your student:

