



PIPER HIGH SCHOOL

AP CHEMISTRY SYLLABUS 2017-2018

Instructor:

Chloe Huynh
Room B155
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baotran.huynh@browardschools.com

Class Time:

11 AM – 12:30 PM (Orange Day)

Class Webpage:

<http://www.browardschools.instructure.com>

Course Materials:

Chemistry by Zumdahl and Zumdahl, 8th edition, Brooks/Cole, 2010
Pen (black or blue only)
5-subject notebook
Composition notebook
Canvas App & myHomework App
Scientific Calculator
Ruler
Gloves for lab

Course Description:

This course is designed to be comparable to a college-level general chemistry course. Successful completion of this course and the AP Examination may fulfill the college requirement for freshman chemistry and the associated lab. Students taking this course will be substantially better prepared for any college science course due to the intensive nature of study required by the content covered, the math involved, the use of higher-level thinking skills, and the more involved laboratory experience. Major topics covered will include the structure of matter, states of matter, chemical reactions, kinetics, thermochemistry, equilibrium, acid-base, and electrochemistry. Students will learn numerous chemical calculation skills in the study of the content, and in the analysis of lab data. A portion of the course time will consist of participation in laboratory activities that are aligned with the AP Course Description. The content for the course is based on six big ideas:

Big Idea 1: Structure of matter

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

Big Idea 3: Chemical reactions

Big Idea 4: Rates of chemical reactions

Big Idea 5: Thermodynamics

Big Idea 6: Equilibrium

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Classroom Rules:

1. Come to class prepared with writing utensils, calculator, and notebooks.
2. Be on time and sit in your assigned seat at all time unless instructed to do otherwise.
3. Dress appropriately according to Piper High School dress code.
4. Obey the code of conducts given to you by Piper High School.
5. Be respectful toward Ms. Huynh, yourself, and others surround you.
6. NO EATING OR DRINKING IN CLASS
 - Any student who disobey this rule will automatically receive a referral without a warning.
 - Water is NOT permitted on Lab days.
7. Cell phone MUST be on silent and placed inside your book bag the moment you step in the classroom.
8. Clean up after yourself.
9. You may not leave the class prior to the dismissal bell without Ms. Huynh's permission.
10. Be safe and be responsible.

Grading/Evaluation:

Students will be graded on homework, quizzes, laboratory work, projects, and exams. Exams are typically worth 100 points and will consist of questions similar to ones students will see on the AP Exam. Homework assignments and quizzes will consist of problems from the textbook, supplements, and old AP Exams. Projects are long-term, and typically will involve groups of students developing a plan, collecting data and/or research, and presenting conclusions in a meaningful way. Laboratory work is student centered and inquiry based and is discussed below.

Grades will be determined by taking the number of points a student has earned and dividing it by the total number of points that the student could have achieved. This decimal is multiplied by 100, and that will be the student's grade. Late work will NOT be accepted at any time in the school year.

Absent Policy:

All students will follow the guidelines set forth by Broward County Public Schools, the Code of Student Conduct Handbook, and Piper's attendance policy. It is your responsibility to make-up any assignments or test within **48 hours** from the time you return to class. All assignments will be uploaded on class webpage and missing Warm Ups will be sent directly to you on class webpage. If there's a test the day you were absent, see Ms. Huynh during the last 5 minutes of class to sign up for a make-up test or quiz.

Only excused absent work will be graded per Broward County Public School Attendance

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Policies. *If you have more than 4 unexcused absences, you will receive a referral.*

Laboratory Investigation:

The labs completed require following or developing processes and procedures, taking observations, and data manipulation. See lab list provided for lab details. Students communicate and collaborate in lab groups; however, each student writes a laboratory report in a lab notebook for every lab they perform. A minimum of 25% of student contact time will be spent doing hands-on laboratory activities.

A specific format will be given to the student for each lab. Students must follow that format and label all sections very clearly. AP Chemistry lab reports are much longer and more in depth than the ones completed in the rest year chemistry course. Therefore, it is important that students don't procrastinate when doing pre-lab and post-lab work. Late labs will not be accepted. Labs not completed in class must be done at lunch or before/ after school by appointment.

Pre-Lab Work

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

1. Title

The title should be descriptive. For example, "pH Titration Lab" is a descriptive title and "Experiment 5" is not a descriptive title.

2. Date

This is the date the student performed the experiment.

3. Purpose

A purpose is a statement summarizing the "point" of the lab.

4. Procedure Outline

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.

5. Pre-Lab Questions

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 (like a college professor) looks at a student's lab notebook, they should be able to tell

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what the question was by merely looking at their lab report. It is important to produce a good record of lab work.

6. Data Tables

Students will need to create any data tables or charts necessary for data collection in the lab.

During the Lab

7. Data

Students need to record all their data directly in their lab notebook. They are NOT to be recording data on their separate lab sheet. They 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. They should space things out neatly and clearly.

Post-Lab Work

8. Calculations and Graphs

Students should show how calculations are carried out. Graphs need to be titled, axes need to be labeled, and units need to be shown on the axis. To receive credit for any graphs, they must be at least 1/2 page in size.

9. Conclusions

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.

10. Post Lab Error Analysis Questions

Follow the same procedure as for Pre-Lab Questions.

Advanced Placement Chemistry — The Laboratory Notebook

A record of lab work is an important document, which will show the quality of the lab work that students have performed.



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Unit 1: Chemistry Fundamentals

Topics Covered	Curriculum Framework Articulation:
1. Scientific Method	BI 1.D.1:a
2. Classification of Matter	
a. pure substances vs mixtures	1.A.1:b
b. law of definite proportions	1.A.1:c
c. law of multiple proportions	1.A.1:d
d. chemical and physical changes	3.C.1:b, 3.C.1:c, 5.D:2
3. Nomenclature and formula of binary compounds	1.E.2:b
4. Polyatomic ions and other compounds	1.E.2:b
5. Determination of atomic masses	1.A.1:a
6. Mole concept	1.A.3:b, 1.A.3:c, 1.A.3:d, 1.E.2:b
7. Percent composition	1.A.2:a
8. Empirical and molecular formula	1.A.2:b
9. Writing chemical equations and drawn representations	1.E.1:a, 1.E.1:c, 3.C.1:a
10. Balancing chemical equations	1.A.3:a, 1.E.2:c, 1.E.2:d, 3.A.1:a
11. Applying mole concept to chemical equations (Stoich)	1.A.3:a, 1.E.1:b
12. Determine limiting reagent, theoretical and % yield	3.A.2:a

Unit 2: Types of Chemical Reactions

Topics Covered	Curriculum Framework Articulation:
1. Electrolytes and properties of water	2.A.3:h
2. Molarity and preparation of solutions	1.D.3:c, 2.A.3:i, 2.A.3:j
3. Precipitation reactions and solubility rules	6.C.3:d
4. Acid Base reactions and formation of a salt by titration	1.E.2:f, 3.A.2:c
5. Balancing redox	3.B.3:a, 3.B.3:b, 3.B.3:c, 3.B.3:d
6. Simple redox titrations	1.E.2:f
7. Gravimetric calculations	1.E.2:e

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Unit 3: AP Style Net Ionic Equations

Topics Covered

1. Redox and single replacement reactions
2. Double replacement reactions
3. Combustion reactions
4. Addition reactions
5. Decomposition reactions

Curriculum Framework Articulation:

- 3.A.1, 3.B.3:e, 3.C.1:d
3.A.1, 3.C.1:d
3.A.1, 3.B.3:e
3.A.1, 3.B.1:a
3.A.1, 3.B.1:a, 3.C.1:d

Unit 4: Gas Law

Topics Covered

1. Measurement of gases
2. General gas laws - Boyle, Charles, Combined, and Ideal
3. Dalton's Law of partial pressure
4. Molar volume of gases and Stoichiometry
5. Graham's Law
6. Kinetic Molecular Theory
7. Real Gases and deviation from ideal gas law
8. Graham's Law demonstration

Curriculum Framework Articulation:

- 2.A.2:a, 2.A.2:c
2.A.2:b
3.A.2:b
2.A.2:d, 5.A.1
2.A.2:e, 2.A.2:f, 2.A.2:g, 2.B.2:c, 2.B.2:d
LO 2.6; SP 1, 6

Unit 5: Thermochemistry

Topics Covered

1. Law of conservation of energy, work, and internal energy
2. Endothermic and exothermic reactions
3. Potential energy diagrams
4. Calorimetry, heat capacity, and specific heat
5. Hess's law
6. Heat of formation/combustion
7. Bond energies

Curriculum Framework Articulation:

- 5.B.1, 5.E.2:a
3.C.2, 5.B.3:e, 5.B.3:f
3.C.2, 5.C.2:c, 5.C.2:d, 5.C.2:e
5.A.2, 5.B.2, 5.B.3:a, 5.B.3:b, 5.B.4
5.B.3:a
5.C.2:g
2.C.1:d, 5.C.1, 5.C.2:a, 5.C.2:b

Unit 6: Atomic Structure and Periodicity

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Topics Covered

1. Electron configuration and the Aufbau principle
2. Valence electrons and Lewis dot structures
3. Periodic trends
4. Table arrangement based on electronic properties
5. Properties of light and study of waves
6. Atomic spectra of hydrogen and energy levels
7. Quantum mechanical model
8. Quantum theory and electron orbitals
9. Orbital shape and energies
10. Spectroscopy

Curriculum Framework Articulation:

- 1.B.2:a
- 1.B.2:c
- 1.B.1:b, 1.B.1:c, 1.B.2:b, 1.B.2:d, 1.C.1:c, 1.D.1:b, 2.C.1:a, 2.C.1:b
- 1.C.1:a, 1.C.1:b, 1.C.1:d
- 1.C.2:e, 1.D.3:a, 5.E.4:b
- 1.B.1:d, 1.B.1:e, 1.D.3:b
- 1.C.2:d
- 1.C.2:c
- 1.C.2:b
- 1.D.2:a, 1.D.2:b, 1.D.2:c, 1.D.3:ba, 5.C.2:b

Unit 7: Chemical Bonding

Topics Covered

1. Lewis Dot structures
2. Resonance structures and formal charge
3. Bond polarity and dipole moments
4. VSEPR models and molecular shape
5. Polarity of molecules
6. Lattice energies
7. Hybridization
8. Molecular orbitals and diagrams

Curriculum Framework Articulation:

- 2.C.4:a
- 2.C.4:c, 2.C.4:d, 2.C.4:e
- 2.C.1:c, 2.C.1:e, 2.C.1:f
- 2.C.4:b, 2.C.4:e, 2.C.4:f
- 2.C.1:e
- 1.B.1:a, 1.C.2:a, 2.C.1:d (1-2), 2.C.2:a, 2.C.2:b, 2.D.1:b
- 2.C.4:g
- 2.C.4:h, 2.C.4:i

Unit 8: Liquids, Solids, and Solutions

Topics Covered

Curriculum Framework Articulation:

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|---|--|
| 1. Structure and bonding | |
| a. metals, network, and molecular | 2.A.1:a, 2.A.1:d, 2.C.3, 2.D.1:a, 2.D.2:a, 2.D.1:b, 2.D.3, 2.D.4 |
| b. ionic, hydrogen, London, van der Waals | 2.A.1:b, 2.B.1:a, 2.B.1:b, 2.B.1:c, 2.B.2:a, 2.B.2:b, 2.B.2:c, 2.B.2:d, 2.B.3:a, 5.D:1 |
| 2. Vapor pressure and changes in state | |
| 3. Heating and cooling curves | 2.A.1:e, 5.B.3:c, 5.B.3:d |
| 4. Composition of solutions | 2.A.1:c, 2.A.3:b, 2.A.3:c, 2.B.3:b |
| 5. Colloids and suspensions | 2.A.3:a, 2.A.3:b, 2.A.3:g |
| 6. Separation techniques | 2.A.3:e, 2.A.3:f |
| 7. Effect on biological systems | 2.B.3:e, 2.D.3, 5.E.4:c |

Unit 9: Kinetics

Topics Covered

1. Rates of reactions
2. Factors that effect rates of reactions/
collision theory
3. Reaction Pathways
4. Rate equation determination
 - a. rate constants
 - b. mechanisms
 - c. method of initial rates
 - d. integrated rate laws
5. Activation energy and Boltzmann
distribution

Curriculum Framework Articulation:

- 4.A.1:a
- 4.A.1:b, 4.A.1:c, 4.D.1, 4.D.2
- 4.B.3:a, 4.B.3:b
- 4.A.2:a
- 4.A.3
- 4.B.1, 4.C.1, 4.C.2, 4.C.3
- 4.A.2:c
- 4.A.2:b, 4.A.3:d
- 4.B.2, 4.B.3:c

Unit 10: General Equilibrium

Topics Covered

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1. Characteristics and conditions of chemical equilibrium	6.A.1, 6.A.3:a, 6.A.3:f
2. Equilibrium expression derived from rates	6.A.3:b
3. Factors that affect equilibrium	6.A.3:c
4. Le Chatlier's principle	6.A.3:b, 6.B.1, 6.B.2, 6.C.3:e, 6.C.3:f
5. The equilibrium constant	6.A.3:d, 6.A.3:e, 6.A.4
6. Solving equilibrium problems	6.A.2

Unit 11: Acids and Bases

Topics Covered	Curriculum Framework Articulation:
1. Definition and nature of acids and bases	3.B.2, 6.C.1:c, 6.C.1:d, 6.C.1:e, 6.C.1:f
2. K_w and the pH scale	6.C.1:a, 6.C.1:b, 6.C.1:g
3. pH of strong and weak acids and bases	6.C.1:h
4. Polyprotic acids	6.C.1:n
5. pH of salts	
6. Structure of Acids and Bases	

Unit 12: Buffers, K_{sp} , and Titrations

Topics Covered	Curriculum Framework Articulation:
1. Characteristics and capacity of buffers	6.C.2
2. Titrations and pH curves	6.C.1:i, 6.C.1:j, 6.C.1:k, 6.C.1:l, 6.C.1:m
3. Choosing Acid Base Indicators	
4. pH and solubility	6.C.3:a, 6.C.3:b
5. K_{sp} Calculations and Solubility Product	

Unit 13: Thermal Dynamics

Topics Covered	Curriculum Framework Articulation:
1. Laws of thermodynamics	
2. Spontaneous process and entropy	5.E.1
3. Spontaneity, enthalpy, and free energy	5.E.2:c, 5.E.3, 5.E.2:d, 5.E.2:e, 5.E.2:f, 6.C.3:c, 6.D.1:a
4. Free energy	5.E.2, 6.D.1:b, 6.D.1:c, 6.D.1:d 5.E.2:e,
5. Free energy and equilibrium	5.E.5
6. Rate and Spontaneity	

Unit 14: Electrochemistry

Topics Covered	Curriculum Framework Articulation:
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|--|------------------------------------|
| 1. Balancing redox equations | 3.B.3:a, 3.B.3:b, 3.B.3:c, 3.B.3:d |
| 2. Electrochemical cells and voltage | 3.C.3:a, 3.C.3:b, 3.C.3:c, 5.E.4:a |
| 3. The Nernst equation | 3.C.3:d |
| 4. Spontaneous and non-spontaneous equations | 3.C.3:e |
| 5. Chemical applications | 3.C.3:f |

Cell Phone Policy:

Prior to the start of class, students must turn their cell phones off to avoid unnecessary classroom disruptions. Cell phones must remain off until the end of class. Violation of these rules will result in confiscation of cell phone, detention, and/or referrals. Phones and any unapproved electronic devices are not permitted in class. If seen, they will be confiscated and given to administration. Parents will have to pick up devices.

This page must be returned to your **SCIENCE** teacher by the first week of school.
Keep the other pages of your syllabus as a reference.

Student Name

Student ID #

Period

This page must be returned to your **SCIENCE** teacher by the first week of school.
Keep the other pages of your syllabus as a reference.

Syllabus Confirmation Page

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I _____ (*CLEARLY print student name*) have read through and discussed this course syllabus with my teacher today in class. I understand what exactly is expected of me in this class and what my responsibilities are for this semester. I know and understand what the academic policies and procedures that I am to follow are. I am aware of and understand how I am going to be evaluated and assessed in this course and how my final grade will be calculated. I am aware of and understand that tardiness is not tolerated and can negatively affect my class grade. I know that if I need extra help or have concerns I should speak with my teacher as soon as possible.

Student Signature: _____ Date: _____

Parent Signature: _____ Date: _____

How can we contact you? Please write below:

Student Email Address:

_____ @ _____

Parent Email Address:

_____ @ _____

Parent Phone Number: _____

Safety in Science Student Laboratory Contract

I have been instructed in the necessary safety procedures required in this course. I agree to abide by the following guidelines:

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1. Safety apparel will be worn when specified by the instructor.
2. Long or loose hair will be tied back. Excessively loose clothing or jewelry will not be worn.
3. All safety rules and regulations will be followed.
4. There will be no drinking or eating in the laboratory.
5. Experiments will be done in the specified order with the prescribed quantities of chemicals.
6. Only the chemicals specified by the teacher will be used. No unauthorized experimentation will be done.
7. The proper use of safety equipment and correct evacuation procedures will be followed.
8. Wash hands thoroughly before beginning and after completing an experiment.
9. Contact lenses will not be worn during specified experiments.
10. Horseplay or other inappropriate behavior will not be tolerated during laboratory experiments.
11. Never taste chemicals or smell them directly.
12. Never pick up broken glass with bare hands.
13. Report all accidents, no matter how minor, to the teacher.
14. Never work without teacher supervision in the lab.
15. Do not remove any chemicals or equipment from the lab without the teacher's permission.

Failure to follow these guidelines may result in reduction in grade, disciplinary action, and/or exclusion from laboratory activities.

Student Name

Student Signature

Date

Parent Name

Parent Signature

Date

Emergency Contact Information:

Does student have any allergies? Yes No

If yes, please list: _____

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	Mother/Guardian	Father/Guardian
Cell Number:		
Work Number:		
Home Number:		
Email:		

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