**Advanced Placement Chemistry 2013-2014**

**I. Course Description** The AP Chemistry course is designed to provide a strong solid foundation for a first-year college chemistry experience both conceptually and in the laboratory. For most students, the course enables them to undertake, as a freshman, second year work in the chemistry sequence at their institution or to register in courses in other fields where general chemistry is a prerequisite. AP Chemistry should meet the objectives of a good general chemistry course. Students in such a course should attain a depth of understanding of fundamentals and a reasonable competence in dealing with chemical problems. The course should contribute to the development of the students’ abilities to think clearly and to express their ideas orally and in writing with clarity and logic. My main goal of the class is to develop independent, critical and analytical thinkers.

Because the topics listed below are covered extensively in first year chemistry course, we are able to cover these topics quickly and as a review.

**First year students have a previous knowledge of:**

* Molar relationships
* Stoichiometry (empirical/molecular formulas, limiting reactants)
* Atomic structure
* Periodicity
* Bonding, molecular geometry, hybridization, polarity and attractive forces
* Gas laws, Kinetic theory of gases
* Formula writing
* Solutions and solution strengths
* Balancing and product prediction of equations.
* Net ionic equations
* Acid/Base theories
* Redox equations
* Heating and cooling curves, phase diagrams
* Calorimetry and specific heat capacity.

**II. Tutoring Hours** – Tutoring hours will be posted both inside my classroom and outside my door. If these hours do not work for you schedule, please discuss it with me. If a parent needs to contact me, please call or preferably e-mail me for a meeting.

**III. Materials** - 3 ring binder, TI84 or higher graphing calculator. Materials for laboratory will be discussed the first day of class.

**IV. Text**

**Student Text:**

Brown, Theodore L., H. Eugene LeMay,Jr. and Bruce E. Bursten, Chemistry: The Central Science, Twelth Edition, Prentice Hall, Upper Saddle River, NJ, 2006

**Supplemental Texts and Laboratory Manuals:**

College Board, AP Chemistry: Guided-Inquiry Experiements: Applying the Science Practices, The College Board, New York, NY 2013

College Board, AP Chemistry: Workshop Handbook and Resources 2013-2014, The College Board, New York, NY 2013

Ebbing and Gammon, Experiments in General Chemistry, Houghton Mifflin Company, Boston, 2009

Knoespel, Sheldon, Ohn-Sabatello, Tina, and Morian, Gordon, Preparing for the AP Chemistry Examination, Brooks/Cole Cengage Learning, Belmont, CA, 2010

Maguire, Cynthia (Editor), Catalyst: Introduction Chemistry, Pearson Learning Solutions, New York, 2008

Moog, Richard S. and Farrell, John J. Chemistry: A Guided Inquiry, Fifth Edition, John Wiley & Sons, Inc, John Wiley & Sons, Inc, Hoboken, NJ, 2012

Peebles, Lynda R. (Editor), Catalyst: Introduction Chemistry, Pearson Learning Solutions, New York, 2011

Spenser, James, Bodner, George M., and Rickard, Layman H. Chemistry: Structure and Dynamics**,** 5th Edition, John Wiley & Sons, Inc, Hoboken, NJ, 2012

Zumdahl, Steven, S., and Susan A. Zumdahl, Chemistry, Fifth Edition, Houghton Mifflin Company, Boston, MA, 2003

**V. Study Habits** - The material in this course must be studied and learned daily as it is presented because the units build upon one another. The AP course description booklet states that students should spend at least 5 hours a week studying outside of class. The actual amount of time spent will depend upon each student's background. If a student does not understand a concept, he or she should see me as soon as possible.

**VI. Grading Policy** Grades will be based on the following categories

**Homework** problems will be assigned at the beginning of a new chapter. The problems will be due close to the end of the chapter. At the start of each new chapter Cornell two column notes will be due. This allows the students to have read the chapter before commencing to do work and any open discussions that will occur during class time.

**Quizzes** will be given throughout a unit to test for understanding of the curriculum/ concept.

**Labs** are essential to understanding Chemistry. Labs are taken very seriously so you need to follow a specific format. Lab reports are all formal labs and must be written in ink. On Monday the calculations of the lab, chemicals, and procedure are gone over either in class or as homework. Labs are done on Tuesday. The introduction and the procedure are due the day of the lab. This will help you and ultimately help me because you will understand the lab better. They must be written in your lab book before you start the lab. Wednesday is the post lab discussion and if any necessary group data needs to be shared/compiled it is at this time. Thursday (end of day) all lab books are submitted for grading. The formal lab must be written in the following format and only on the right side of the page.

**TITLE**

**INTRODUCTION:** The introduction must contain information concerning the lab. Definitions, equations, statements and drawings are placed here. On the average this will contain at least three paragraphs. Do not shortchange this area. At the end of the introduction in bold letters will be the **Objective of the Lab**. You will find this stated somewhere within the lab.

**PROCEDURE:** In your own words rewrite the lab procedure. Brief statements are fine as long as they convey the meaning and you can follow along during the lab.

**DATA:** This is the area where tables and graphs will be placed. All graphs must be labeled with a title and x and y labeled appropriately. All calculations for any part of the lab is placed here and on the left side of the page. Calculations from a graph will be entered on the left side as well. If a chart is used, number the chart and then number your calculations to coincide with the table. All formulas, labels and significant figures must be used.

**QUESTIONS:** All questions must be written out and the answers underneath them.

**CONCLUSION:** This describes the theme of the lab. What did you discover? It links the data of the lab with this theme.

**VII. Assignments:** A calendar will be issued every unit with all assignments listed. It is the students’ responsibility to keep up with the calendar and anything listed on it. Any changes that need to be made to the calendar will be announced in class. A calendar will also be available on the website.

**VIII. Make-up Work:** According to the school handbook, students have one day for everyday absent to make up missing work. I will only make exceptions in the event of extenuating circumstances.

Students will also be responsible to take any quiz or test scheduled **on the day they return** from an absence if no new material was covered in regards to that quiz/test. Students who actually miss quizzes and tests need to expect to make them up **on the day they return** during lunch, before school, or after school.

**XI. Tardiness:** You will be counted tardy if you are not in class when the bell rings. After 5 minutes, you will be counted absent. I am an instructor who takes tardiness seriously and make no exceptions without a pass from the attendance office.

**FIRST SEMESTER:**

* **ALL LABS ARE STUDENT DIRECTED UNLESS OTHERWISE MENTIONED**

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| **CH.** | **TIME (45 minute days)** | **CONCEPT** | **LAB/ASSIGNMENTS** |
| 1 & 2 | 1-2 days | ***Introduction and Lab Safety: Atoms, Molecules, and Ions*** | **LAB:**  Atom board practice of atomic and mass numbers and isotopes |
| 2 | 1-2  days | ***Nomenclature*** | **LAB:**   Analysis of a Penny   Chemical Reactions and Equations |
| 3 | 6-7 days | ***Stoichiometry: Calculations with Chemical Formulas and Equations*** | **LAB:**  Analysis of a Penny  Chemical Reactions and Equations  **ASSIGNMENTS:**  Stoichiometry AP FR Worksheet |
| 4 | 4 days | ***Types of Reactions and Net Ionic Equations*** | **Labs:**  Absorption Spectrum of Cobalt (II) Chloride  Ionic Reactions in Aqueous Solutions  **ASSIGNMENTS:**  Writing Net Ionic Equations  **DEMO:** Pickle Glow |
| 4 & 20 | 14 days | ***Redox Reactions and Electrochemistry***   * Galvanic Cells * Nernst * Electrolytic Cells | **LAB:**  Electrochemistry  Estimating an Electrode Potential  Oxidation-Reduction Reactions  **ASSIGNMENTS:**  Electrochem AP FR Worksheet |
| 5 &19 | 16 days | ***Thermochemistryand Thermodynamics***   * Calorimetry & ∆H * Enthalpy, Hess’s Law, Bond Energy * Entropy ∆S * Free Energy ∆G | **LAB:**  Hydrates and Their Thermal Decompositions  Thermochemistry and Hess’s law  **ASSIGNMENTS:**  Thermodynamics AP FR Worksheet  **DEMO:** Elephant Toothpaste |
| 14 | 14 days | ***Kinetics***   * Instaneous & Relative Rates, Intro to differential rate law * Integrated rate law & mechanics | **LAB:**  Rate of an Iodine Clock Reaction  Spontaneity  The Decomposition of Potassium Chlorate  **ASSIGNMENTS:**  Kinetics AP FR Worksheet |
| 14 | 14 days | ***General and Solubility Equilibrium***  General Kc, Kp, LeChatelier  Solubility Ksp | **LAB:**  LeChatelier Principle  Determining an Equilibrium Constant  **ASSIGNMENTS:**  Equilibrium AP FR Worksheet |

**SECOND SEMESTER:**

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| **CH.** | **TIME (45 minute days)** | **CONCEPT** | **LAB/ASSIGNMENTS** |
| 16 | 14 days | ***Acid-Base Buffer Equilibrium***   * Acid-Base Theory & pH * Weak Acid-Base pH calculations * Buffers Made Easy | **LAB:**  Equilibria with Weak Acids and Weak Bases  How Much Acetic Acid is in Vinegar?  An Acid-Base Titration Curve  The Relative Strengths of Some Acids  The Strength of Laundry Bleach  **ASSIGNMENTS:**  Equilibrium AP FR Worksheet |
| 6 & 7 | 10  days | ***Atomic Structure***   * Atomic Theory * PES, Electron Configurations & Orbital Notation * Periodic Trends | **LAB:**  Solubilities within a Family  **ASSIGNMENTS:**  Atomic Structure & Periodicity AP FR Worksheet |
| 8 & 9 | 10 days | ***Bonding***   * Coulomb’s Law, Ionic Bonding & Lewis Structures * Resonance Structures, Bond Order, π and σ bonds, & ∆H * VSEPR, Molecular Geometry, Dipole Moment, & Formal Charge * Valence Bond Theory (Hybridization) | **LAB:**  The Identity of an Insoluble Precipitate (differences in covalent bonds in molecules)  Molecular Architecture of Tetrahedral Molecules  Geometric Isomers  Molecular geometry structures models |
| 10 | 8 days | ***Gases***   * Kinetic Theory of Matter & Gas Laws * Gas Stoichiometry | **LAB:**  Boyle’s Law and the Empty Space in Air |
| 11, 12, & 13 | 16 days | ***Matter and Intermolecular Forces***   * States of Matter: Intermolecular Forces * States of Matter: Types of Solids/Metallic Structure/Ionic Solids * States of Matter: Vapor Pressure, Phase Change Energetics | **LAB:**  A Student’s View of Liquids and Solids  A Molar Mass from Freezing-Point Depression  Softening of Hard Water  Exploration of hydrophobic and hydrophilic properties |