

Advanced Placement CHEMISTRY

This course is designed for teachers who have less than five years experience teaching AP Chemistry. The discussions will center on the use of the *Big Ideas* and *Science Practices* to enhance student responses on the AP Chemistry exam. It will include discussion of the chemistry content that goes beyond a first year chemistry course, the common misconceptions that need to be addressed for student success, and the importance of the AP laboratory requirement to aid student understanding of the necessary information for the AP exam. A review of the new concept AP Exam questions will be used to highlight important student understandings. Lab experiences will be connected to topics to enhance the discussion and promote student inquiry and discussion. This is a tentative schedule. We will expand or shrink topics as necessary to complete our discussions.

Monday: First Session: Introductions: Instructor and participants.

Introduction to Advanced Placement Chemistry as defined by The College Board

Introduction to Acorn Book and course resources

Course Outline and Resources for Classwork

Course Description and Textbook Selection

A P Exam Construction and Comments

Sample Time-lines and topics covered for the audit syllabus

Monday: Second Session

Introduction to Big ideas and Science Practices with examples

Guided inquiry and the learning cycle

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...how it fits into what we teach.

Sample multiple choice questions

Do a lab to collect data (Bicarbonate and acid) typical data Plan how it fits the learning cycle

Use of TI graphing calculator or excel spreadsheets to analyze Lab data

Print graph and write questions exploring student learning.

(Lab report to be completed by participants)

Explain use of Big Ideas and Science Practices in this experiment
and experiment 2: Gravimetric analysis

Tuesday: Third Session

Questions and Comments from Participants

Topic: Thermo-chemistry

Comments on timing of the course and material coverage

Big Idea 5: The laws of thermodynamics describe the essential role of energy and explain and predict the direction of changes in matter

Focus on Lab: fundamentals of thermodynamics (Complete Data analysis from lab) analysis and lab report. Three simple labs to highlight topics in thermo-chemistry.

Suggested summary lab: **Chemistry of Hand warmers: Guided inquiry lab**

Analysis of data and lab report

Introduction to Textbook Examples and coverage

Analysis of Typical AP problems from practice exam

Big Idea 4: Rates of chemical reactions are determined by details of the molecular collisions

Typical outline for Kinetics and sample multiple choice problems

Tuesday: Fourth Session

Continue the focus on Thermo-chemistry and kinetics

Focus on Lab: factors affecting reaction rate:

(Change in Chemical Reactions.) guided inquiry in rates

(Complete Data analysis from lab) analysis and lab report

Wednesday: Fifth Session

Third Day Refresher...

Question and Comments from Participants

Comments on topic coverage and importance of acid-base chemistry

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

Big Idea 3: Changes in matter involve the rearrangement and/or reorganization of atoms and/or the transfer of electrons

Wednesday: Sixth session

Focus on lab: acids-base chemistry (continued)

Analysis of more AP problems from practice exam.

Sample Lab: How do structure and Concentration influence the pH of the resultant solution in a titration
(Complete Data analysis from lab)

Thursday: Seventh Session:

Questions and comments from participants

Typical Lab to Collect Data:

Prep of a buffered solution

Complete Data analysis from lab

Guiding the inquiry

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

Thursday: Eighth Session

Focus on

Analysis of typical AP problems from practice exam.

Focus on lab: Equilibrium situations:

Examining change through Chemical Reactions.

Complete Data analysis from lab

Depth of problems and examples of typical questions.

Commentary and Hints. Suggested summary lab Colors of the rainbow through Equilibrium.

Friday: Ninth session

Discussion of syllabus requirements and samples

As time allows: Focus on Oxidation-Reduction Chemistry

Discussion of demonstrations for electro-chemistry

Focus on Lab: Electro-chemistry of metals: two demos

Review and round-up