2019 Advanced Placement® Chemistry

About the AP® Chemistry Summer Institute
The Advanced Placement Summer Institute in Chemistry at the University of Georgia is designed for both new and experienced teachers. 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. In addition, the College Board’s new program AP Insight will be discussed and showcased. 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.

AP Chemistry Course Description:

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 (an introduction)

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.
  (second 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
- Discussion of audit requirements
- 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

*College Board, AP, Advanced Placement and the acorn logo are registered trademarks of the College Board. Used with permission.
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**
Second 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.

Discussion of syllabus requirements and samples
Focus on Oxidation-Reduction Chemistry
Discussion of demonstrations for electro-chemistry
Focus on Lab: Electro-chemistry of metals: two demos

Review and round-up

**What to bring:**
- A personal laptop computer & a flash drive to help share the materials from other participants
- A TI graphing calculator
- Your AP textbook
- Closed-toed shoes, goggles and clothing appropriate for working in the laboratory
- Comfortable clothes and shoes for walking in the summer heat
- A light sweatshirt or sweater in case you get chilly in the AC

*College Board, AP, Advanced Placement and the acorn logo are registered trademarks of the College Board. Used with permission.*
**Instructors:**

**Jim Cortez** is a recently retired AP Chemistry teacher with over 37 years’ experience in presenting chemical concepts using simple measurements and using easily available chemical supplies. He has been a reader for the exam and a question leader and has been a College Board consultant since 1990, presenting one-day conferences and one-week AP Summer Institutes. Currently, he is using this time to redefine his skills of using technology in the chemical lab and writing presentations to enhance lab success.

**Penney Sconzo** Working since 1983 in both public and private high schools, Penney has taught all levels of chemistry as well as occasional classes in biology, microbiology, biochemistry, and organic chemistry. After teaching 27 years at the Westminster Schools in Atlanta, Georgia, Penney retired and moved on to Kennesaw State University where she is currently teaching freshman chemists. She has been honored as a two-time recipient of the Georgia Science Teacher of the Year award, the Chemical Manufacturers Association Regional Catalyst Award, a state winner for the Presidential Award for Science, the Reg Friesen Award, and a national Tandy Award winner. Penney worked as a lead teacher in chemistry for the Woodrow Wilson TORCH program, served as co-chair/instructor of the T3 CHEMBIO program, served as a member of the ACS test writing committee, and led one of the Flinn Scientific Foundation teams that presented summer workshops across the country. Today, her favorite element is gallium!