

UCLA EXTENSION

Teaching AP* Chemistry (Online)

Call Number: X 394.12

Class Location: Online

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Office Hours: Online

Location: Online

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Email inquiries will be responded to within 48 hours.

Course Description:

This 45-hour equivalent course includes intensive sessions for teachers who are updating their existing AP chemistry course or exploring/designing a new course. The format of the newly-revised AP chemistry exam is explored through materials supplied by The College Board. An examination of how the exam is graded illuminates techniques used by students to maximize their success on the exam.

Four of the sessions focus on the six Big Ideas and how each can be taught in a high school class. Additionally, guided inquiry laboratory activities appropriate for each topic are explored. Questions from released AP exams are used to illustrate the level of understanding required by students and relate the course content to the final assessment. Participants develop a resource list for each topic. Participants will also alter an existing lab to be more in line with the guided inquiry laboratory activities expected in the new AP curriculum. Participants perform two of the laboratory activities at their school.

Video and online resources that the instructor has found useful are explored. The teacher participants develop a teaching calendar for their course.

While the newly revised AP chemistry curriculum and exam will be the focus of this course, many tried-and-true teaching techniques and materials are still relevant.

Professional Statements

One of the nation's largest and most comprehensive institutions of continuing higher education, UCLA Extension has served students in Southern California and beyond since 1917. Each year, Extension offers 4,500 courses, linking 60,000 adults of diverse backgrounds to enhanced career, academic, and personal growth opportunities through lifelong learning.

VISION—*What we aspire to be*

A world-class leader in lifelong learning.

MISSION—*Why we exist*

To provide knowledge and connections for people to achieve their personal and professional goals.

VALUES—*What's important to us***Excellence**

We strive for the highest quality in our programs and services to students, instructors, and partners.

Innovation

We strive to be at the leading edge in program content, format, organizational management, and our response to evolving constituent needs.

Accessibility

We provide access to a wide range of educational opportunities scheduled at times, places, and in formats that fit our student's lives.

Diversity

We embrace and invite diversity in our relationships with students, instructors, employees, and partners.

Positive Workplace

We foster an environment that values and respects people, encourages their professional development, and recognizes their accomplishments.

Professionalism

We are diligent, industrious, thorough, and expeditious in serving students, instructors, and partners, as well as co-workers who depend on us to accomplish their work.

Accountability

We act with integrity, accept responsibility for building a financially sustainable organization, and follow through on our commitments.

Services for Students with Disabilities

In accordance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, UCLA Extension provides appropriate accommodations and support services to qualified applicants and students with disabilities. These include, but are not limited to, auxiliary aids/services, such as notetakers, audiotaping of courses, sign language interpreters, assistive-listening devices for hearing-impaired individuals, extended time for and proctoring of exams, and registration assistance. Accommodations and types of support services vary and are specifically designed to

meet the disability-related needs of each student based on current, verifiable medical documentation.

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Every effort is made to locate and conduct courses that are structurally and programmatically accessible; however, prior arrangements may be necessary to provide access at Bunche Hall on the UCLA Campus. Direct any questions regarding accessibility to UCLA Extension Disabled Student Services at the telephone number or email address listed above.

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This nondiscrimination policy covers admission and access to and treatment and employment in University programs and activities, including, but not limited to academic admissions, financial aid, education services, and student employment.

Students may complain of any action which they believe discriminates against them on the grounds of race, color, national origin, religion, sex, sexual orientation, disability, or age. Contact the Office of the Director of Student Services, UCLA Extension, Suite 214, 10995 Le Conte Ave., Westwood; Voice/TTY: (310) 825-8845.

Technology

For formal admission to credential program, each student must:

1. Own or have ample access to a computer (in UCLA computer labs, at home or at work)
2. Have general knowledge of the operation of and care for a computer, computer hardware/software, and be able to implement some basic troubleshooting techniques (check connections, restart the computer, etc.)
3. Must have a valid email address.
4. Have a basic understanding of how to use the internet.

Students should anticipate that their use of these skills will be integrated into course within their program. Students who fail to meet any of the above expectations are strongly advised to take an introductory computer course before they are formally admitted to the Education Specialist Credential Program.

Course Objectives

The student will be able to:

1. Describe the format of the 2014 AP chemistry exam and explain how AP questions are scored.
2. Assemble a library of past exam questions and worked out problems that will be similar to the new exam.
3. Describe non-laboratory activities associated with each of the six Big Ideas.
4. Identify exclusion statements and the rationale for their exclusion from the AP course and exam.
5. Create a list useful videos and online resources for teaching AP chemistry organized by Big Ideas.
6. Explain the levels of inquiry and classify currently-used labs according to their level of inquiry.
7. Change at least two currently used labs to make them guided-inquiry labs.
8. Network with other participants to share teaching ideas and expertise.
9. Align the chapters of your textbook to the six Big Ideas.
10. Develop a teaching calendar for their course.

Required Text/Readings/Materials: The College Board Workshop Packet supplied with this course contains much of the reading material. All other materials are offered online.

Course Requirements and Assessment Procedures

General Requirements

1. Grades will be based on evaluation of directed teaching competencies to be reviewed in class and by the quality of completed course assignments as defined in this syllabus.
2. Students are expected to participate in class. If you have an emergency and must be off-line or absent, please contact instructor.
3. Personal time management is a critical teaching competency, and your participation will bear strongly on our evaluation of your professionalism
4. Students are expected to be prepared for class. Operationally defined, preparation includes having required reading assignments read, and written work completed when due so that you can discuss, relate and apply the information. If you have questions that arise during your preparation, contact a faculty member.
5. Due dates for all assignments are final unless prior arrangements (at least one week in advance of due date) have been made.
6. All formal written work must be word processed and carefully edited.

Assignments Overview and Descriptions

Teacher participants work through modules introducing the newly-revised AP chemistry curriculum. An overview of the changes is the focus of the first week's work. Modules based on the Six Big Ideas that make up the new AP chemistry curriculum are the focus of the following four weeks. The College Board-supplied materials (some of which is online) are used extensively for practice exam questions, grading, exam format, and possible course syllabi. For each Big Idea, teachers write a brief description of a lesson that addresses one of the learning objectives of that Big Idea. Questions and problems from released exams are assigned and worked out. Laboratory activities evaluated according to their level of inquiry and are changed to increase their level of inquiry. Finally, a teaching calendar is established as a guideline for the teaching year.

I use Microsoft Word and Adobe Acrobat files that can be read by downloading the free Adobe Acrobat Reader. Assignments that are sent to me should be in Microsoft Word format or saved as Rich Text Format (.rtf).

Week 1: Introduction to the Revised AP Chemistry Curriculum and Exam Readings: see assignment page

A) **Autobiography:** Submit a brief autobiography in "Week One Forum Assignment A". Workshop participants generally vary from seasoned AP teachers to those who are exploring the idea of teaching AP chemistry. State how many years you have been teaching chemistry, how many years you have been teaching AP chemistry. Tell us what textbook you use, the number of students you have in your AP program, whether it is a first or second year program, and any unique points about your teaching situation. Finally, state the one most important thing that you are hoping to gain from this online course. Get acquainted by responding to others' autobiographies and by sharing goals. (worth 5 points) (Three posts = 5 points: your post and at least two responses to other's posts.)

B) **The New AP Chemistry Curriculum:** Read the lecture overview of the four aspects of the new AP chemistry curriculum (Course & Exam Description, new Exam Format, Guided Inquiry Labs, and the New AP Audit). Develop a handout that describes to your students the format, timing, and calculator use on the AP chemistry exam. Use the Assignment on the Course Content Week 1 page and attach your handout (use Word or Rich Text Format) by clicking the link where it says "When you are ready to submit your assignment, click the link." (worth 5 points)

C) **POGIL:** Work through the POGIL activity called "The Nuclear Atom". This is meant to be a group activity where students discuss ideas so after writing your answers, view Paul's Educreations Tutorial about this activity. Post comments about this activity in "Week One Forum Assignment C". (worth 5 points)

D) The Practice Exam: The College Board has put together a practice exam that mimics the real exam in style and format. Try this exam and post questions and comments in “Week One Forum Assignment D”. (worth 5 points)

Note: You do NOT turn in your finished practice exam.

Week 2: Structure and Properties of Matter—Big Ideas 1 & 2

Readings: see online assignment page

A) Study the Big Ideas: Study the Curriculum Framework / Course Description and read the pages on Big Ideas 1 & 2 (Structure & Properties of Matter). Briefly describe one assignment or activity outside the laboratory environment designed to meet one learning objective within Big Idea 1 (Structure of Matter). Briefly describe one assignment or activity outside the laboratory environment designed to meet one learning objective within Big Idea 2 (Properties of Matter). Send me a copy of your activities using the Assignment at the end of the Week 2 lecture materials. (worth 5 points)

B) Resources: Read the lecture materials about organizing these topics and a few of my favorite teaching ideas and resources. Post your ideas, comments, suggestions, and questions in the “Week 2 Resources” discussion forum. (worth 5 points)

C) FRQ’s (Free Response Questions): You are going to find that FRQ’s or “constructed response questions” are very challenging and that the only way to learn to do them is by doing them. The first time I looked at FRQ’s, I could not do them. They do, however, get easier with practice. I tell my students that each time we work a new FRQ we add something to our “bag of tricks.” By the time the AP exam arrives, the bag of tricks should be large and full. Try the assigned problems and examine the solutions. Think about what tricks are being added to your bag of tricks. Post your comments and questions in the “Week 2 FRQs” forum. (worth 5 points)

D) PES (PhotoElectron Spectroscopy): This is an idea that is new to most of us. My understanding is that it is similar to ionization energy in that the electrons are excited, but in ionization energy, the most easily-removed electron leaves the atom. In PES, any electron in the atom is able to leave. The excitation of these atoms produces a distinct spectrum that gives information about the electron configuration of an atom. View the simulation and try the two worksheets to learn about this concept. Post your comments and questions in the “Week 2 PES” forum. (worth 5 points)

E) Correlate Your Textbook with the six Big Ideas: As the course progresses, make a chart that shows how each chapter matches the six Big Ideas. This chart will be due during week 5 and is worth 10 points.

Week 3: Chemical Reactions—Big Idea 3

Readings: see online assignment page

A) Study the Big Ideas: Study the Curriculum Framework / Course Description and read the pages on Big Idea 3 (Chemical Reactions). Briefly describe one assignment or activity outside the laboratory environment designed to meet one learning objective within Big Idea 3. Send me a copy of your activity using the Assignment at the end of the Week 3 lecture materials. (worth 5 points)

B) Resources: The predicting reactions section of the AP exam is gone as its own question, but the idea will appear as parts of other questions. Read the lecture materials on how I approach this skill and the tools and ideas I use. Read my suggestions on how to incorporate it into every chapter. Post your ideas, comments, suggestions, and questions in the “Week 3 Resources” discussion forum. (worth 5 points)

C) FRQ’s (Free Response Questions): Try the assigned problems and examine the solutions. Think about what tricks are being added to your bag of tricks. Post your comments and questions in the “Week 3 FRQs” forum. (worth 5 points)

D) Correlate Your Textbook with the six Big Ideas: Continue matching the big ideas to the chapters in your textbook.

E) 16 New Guided Inquiry Labs: The College Board has produced a lab manual with 16 guided inquiry labs. These were written by experienced AP teachers, many of whom are readers for the AP exam. These 16 lab ideas were written to match the 16 Learning Objectives that require laboratory work. Your task is to review the 16 labs and choose six that you might be willing to try. My suggestion is NOT to begin with the published lab manual, but with the Flinn description of the lab kits they sell. This document gives a concise description of the lab, the materials in the kit and the materials you will need to provide. I found that this description gives me a good idea of what the lab is all about. Next, you can go to the College Board lab manual and start reading. You should list the six labs as well as the Science Practices involved in each lab. This can be turned in at any time, but don’t procrastinate. Your list of six labs will be posted in the “Week 3-6 Lab Write-Up Forum.” (worth 10 points)

F) Guided Inquiry Activities for the Classroom: This slim curriculum module was written for the summer AP workshops by college chemistry professors and high school AP chemistry teachers who implement guided inquiry in their classrooms. Read the introductions and then work through Lesson 1: Representing Chemical Equations and Stoichiometry. Post your comments and questions in the “Week 3 Guided Inquiry” forum. (worth 5 points)

Week 4: Rates of Chemical Reactions and Thermodynamics – Big Ideas 4 & 5
Readings: see online assignment page

- A) Study the Big Ideas: Study the Curriculum Framework / Course Description and read the pages on Big Ideas 4 & 5 (Rates & Thermodynamics). Briefly describe one assignment or activity outside the laboratory environment designed to meet one learning objective within Big Idea 4 (Rates). Briefly describe one assignment or activity outside the laboratory environment designed to meet one learning objective within Big Idea 5 (Thermodynamics). Send me a copy of your activities using the Assignment at the end of the Week 4 lecture materials. (worth 5 points)
- B) Resources: Read the lecture materials about organizing these topics and a few of my favorite teaching ideas and resources. Post your ideas, comments, suggestions, and questions in the “Week 4 Resources” discussion forum. (worth 5 points)
- C) FRQ’s (Free Response Questions): Try the assigned problems and examine the solutions. Think about what tricks are being added to your bag of tricks. Post your comments and questions in the “Week 4 FRQs” forum. (worth 5 points)
- D) Correlate Your Textbook with the six Big Ideas: Continue matching the big ideas to the chapters in your textbook.
- E) 16 New Guided Inquiry Labs: Continue reviewing the “sweet 16” guided inquiry labs. You should list the six labs as well as the Science Practices involved in each lab. This can be turned in at any time, but don’t procrastinate. Your list of six labs will be posted in the “Week 3-6 Lab Write-Up Forum.”
- F) Guided Inquiry Activities for the Classroom: Work through Lesson 2: Acid-Base Neutralization Reactions. Post your comments and questions in the “Week 4 Guided Inquiry” forum. (worth 5 points)
- G) Convert a Lab: Take a traditional (conformational or structured inquiry) lab and suggest a way to change it into a guided-inquiry lab. Example labs are shown. This is not due until the end of Week 5, but don’t procrastinate. Send me a copy of your converted lab idea using the Assignment at the end of the Week 5 lecture materials. (worth 10 points)
- H) Teaching Calendar: One of the biggest questions teachers have is “How am I going to teach all of this material in the time that I have?” The solution begins with creating a teaching calendar that shows how much time you can spend on each topic. Read the lecture material, study the sample class syllabi in the College Board Workshop materials, and the example teaching calendar posted. Begin to develop a teaching calendar for your own course. This will be due during week 5 and will be worth 15 points.

Week 5: Equilibrium – Big Idea 6
Readings: see online assignment page

A) Study the Big Ideas: Study the Curriculum Framework / Course Description and read the pages on Big Idea 6 (Equilibrium). Briefly describe one assignment or activity outside the laboratory environment designed to meet one learning objective within Big Idea 6. Send me a copy of your activity using the Assignment at the end of the Week 5 lecture materials. (worth 5 points)

B) Resources: Read the lecture materials about organizing these topics and a few of my favorite teaching ideas and resources. Post your ideas, comments, suggestions, and questions in the “Week 5 Resources” discussion forum. (worth 5 points)

C) FRQ’s (Free Response Questions): Try the assigned problems and examine the solutions. Think about what tricks are being added to your bag of tricks. Post your comments and questions in the “Week 5 FRQs” forum. (worth 5 points)

D) Correlate Your Textbook with the six Big Ideas: Finish matching the big ideas to the chapters in your textbook. Send me a copy of your correlation chart using the Assignment at the end of the Week 5 lecture materials. (worth 10 points)

E) 16 New Guided Inquiry Labs: Finish reviewing the “sweet 16” guided inquiry labs. You should list the six labs as well as the Science Practices involved in each lab. This can be turned in at any time, but don’t procrastinate. Your list of six labs will be posted in the “Week 3-6 Lab Write-Up Forum.” (worth 10 points)

F) Guided Inquiry Activities for the Classroom: Work through Lesson 3: Valence Shell Electron Pair Repulsion (VSEPR) Model. Post your comments and questions in the “Week 5 Guided Inquiry” forum. (worth 5 points)

G) Convert a Lab: Finish your conversion ideas for making a traditional lab more guided inquiry. Send me a copy of your converted lab idea using the Assignment at the end of the Week 5 lecture materials. (worth 10 points)

H) Teaching Calendar: Finish your teaching calendar and send a copy to me using the Assignment at the end of Week 5. (worth 15 points)

Grading

Grade	Credential Candidate Performance
A	90% - 100%
B	80% - 89%
C	70% - 79%
D	60% - 69%
F	<60%

Introduce Yourself	Exam Format Handout	POGIL & Guided Inquiry	PES	Resources & Discussion
Total = 5	Total = 5	Total = 20	Total = 5	Total = 20
Practice Exam & FRQs	Study the Big Ideas	Textbook Correlation	Guided Inquiry Labs	Teaching Calendar
Total = 25	Total = 20	Total = 10	Total = 20	Total = 15
Grand Total = 145 points				

Weekly Grid

Session with dates	Topic	Assignments	Due Date
Week 1 6/24	Course Introduction The Revised AP Chemistry Curriculum	Autobiography/Introduction Exam Format Handout POGIL: The Nuclear Atom Practice Exam	6/30
Week 2 7/1	Big Ideas 1 & 2 Structure & Properties of Matter	Study the Big Ideas Resources/Discussion FRQs/Discussion PES (Photoelectron Spectroscopy) Correlate Textbook w/Big Ideas (ongoing)	7/7
Week 3 7/8	Big Idea 3 Chemical Reactions	Study the Big Ideas Resources/Discussion FRQs/Discussion Correlate Textbook (ongoing) 16 New Labs (ongoing) Guided Inquiry Activities—Lesson 1	7/14
Week 4 7/15	Big Ideas 4 & 5 Rates of Reactions Thermodynamics	Study the Big Ideas Resources/Discussion FRQs/Discussion Correlate Textbook (ongoing) 16 New Labs (ongoing) Guided Inquiry Activities—Lesson 2 Convert a Lab (ongoing) Teaching Calendar (ongoing)	7/21
Week 5 7/22	Big Idea 6 Equilibrium	Study the Big Ideas Resources/Discussion FRQs/Discussion Correlate Textbook (Due) 16 New Labs (Due) Guided Inquiry Activities—Lesson 3 Convert a Lab (Due) Teaching Calendar (Due)	7/29

FINAL PROJECT INSTRUCTIONS

Laboratory Write-ups:

The newly-revised AP chemistry curriculum emphasizes guided inquiry, in the class lessons and in some of the labs. Review the 16 new labs (the Sweet 16) developed and published by the College Board and find six that you might want to explore in more detail throughout the year. List the six labs along with the Science Practices associated with each lab. A second assignment is to take a traditional lab and suggest how it can be turned into a guided-inquiry lab. These two assignments are due during week 5 and are worth 10 points each.

Teaching Calendar:

One of the biggest questions teachers have is “How am I going to teach all of this material in the time that I have?” The solution begins with creating a teaching calendar that shows how much time you can spend on each topic. Read the lecture material, study the sample class syllabi in the College Board Workshop materials, and the example teaching calendar posted. Begin to develop a teaching calendar for your own course. This will be due during week 5 and will be worth 15 points.

Rubrics for Grading

Weekly Discussion Group Rubric (5 points per topic per week)

Criteria Quality	
Outstanding 5 point	Participation involves bring up ideas, responding to others' ideas, and asking questions. This is an opportunity to share, clarify and learn.
Average 3 points	Participant makes two or three contributions that comment on threads begun by the instructor or other participants.
Adequate 1 points	Participant makes one comment on ideas presented in the discussion group.
Inadequate 0 points	Participant makes no contributions to the discussions going on in the groups. No questions are asked or viewpoints expressed.

General Assignment Rubric (5 point example)

Criteria Quality	Completeness	Usefulness	Clarity
Outstanding (A) 5 points	All aspects of the assignment are addressed.	Enough thought and detail are included to make the assignment useful to you and to others. Complete thoughts are used rather than key words or incomplete ideas.	The assignment is written in a clear style that is easily understood by others. When the assignment is read again later by the participant, it can be easily understood.
Above Average (B) 4 points	Most aspects of the assignment are addressed.	Assignment contains quite a bit of detail but will require a little further work to be effectively implemented in the classroom.	Most of the assignment is written in a clear style. One or two phrases need clarification or interpretation.
Adequate (C) 3 points	Many aspects of the assignment are addressed. Note: Student should read over the assignment before submitting it to make certain portions are not left out.	Assignment is written to earn the points but the reader does not get the sense that the ideas are intended to be applied in a classroom context.	Much of the assignment is written clearly, but several portions need work to get the point across. Rereading is necessary.
Inadequate (D) 2 points	Some aspects of the assignment are addressed. See above note.	The ideas are rather vague and lack the detail needed to implement the ideas in the classroom effectively.	Much of the assignment requires attention and rereading to get the sense of the answer. Drastic editing is needed to improve clarity.
Significantly Inadequate (F) 1point	Few aspects of the assignment are addressed. See above note.	A very sketchy answer is given that might make sense in context of recent online discussions, but will probably not be useful later in the year.	The assignment is almost impossible to understand except in context of other assignments. If this were read later in the year, it would be unintelligible.