

**Life Sciences 73SL
Classroom Practices in High School Science**

Instructors:

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Course Description and Objectives

This course is designed to introduce you to the field of secondary education and the teaching and learning of science in high school classrooms. You will be partnered with another student and placed in a local high school classroom to observe, participate, and assist a Mentor Teacher in instruction. In concert with this field experience, you will participate in the weekly seminar and discuss learning in a high school culture, cognitive development of students at this level, and the best means to teach appropriate science concepts at this level. You will be expected to work a minimum of 30 hours (~3hrs/week) in the high school classroom during the quarter.

Prerequisites

Life Sciences 71SL (CaT1)

Life Sciences 72SL (CaT2)

Course Requirements

1. Fieldwork and Reflections: You will work in a high school classroom a minimum of 30 hours during the quarter. For every field visit, you will log your hours, descriptions and reflections on the *Science and Math Initiative* Online Information System portal (details provided).
2. Weekly Assignments: Assignments will be given on a weekly basis and include readings, detailed "Observation Assignments" to be completed during your fieldwork component, as well as topics for discussion with your Mentor Teacher. You will be expected to complete all assignments.
3. Attendance and Participation: You are expected to attend all scheduled classes and participate in discussions pertinent to your classroom experiences, assignments, and other education issues.
4. Inquiry-based Lesson Projects: Working alone or in pairs, you will develop one inquiry-based lesson plan to be critiqued by your instructors and Mentor Teacher and presented to your peers. At the discretion of your Mentor Teacher, you will present the lesson to your high school classes and assess its effectiveness by measuring student learning.

Grading

This is a Pass/No Pass course only. To pass the course, you must satisfactorily complete all of the course requirements.

Required Text

Hassard, J. (2005). *The art of teaching science: inquiry and innovation in middle school and high school*. New York: Oxford University Press

Suggestion

Please keep a binder for observations, reflections, and teaching tips. This will be helpful to you in making entries in the OIS, or as a source for discussion in class.

Placement

The Academic Coordinator will handle all scheduling and placements. Local high schools with excellent Mentor Teachers have been selected for your placement. All schools are within walking distance or one short bus ride from UCLA. Once you have been placed with a Mentor Teacher, you will be provided with the location information. Contact information for your Mentor Teacher, the high school principal, and other students working at your school will also be provided.

Preparation

This course builds on your experiences in Life Sciences 71SL (CaT1) and Life Sciences 72SL (CaT2). Before you engage in your work at the high school, we will discuss in detail and provide documentation of the roles, responsibilities, and expectations of everyone involved in the partnership between UCLA and the high schools. Principles of good campus-community partnerships include: agreed upon missions, values, and goals; a relationship characterized by mutual trust, respect, genuineness, and commitment; clear, open, and accessible communication between partners; and feedback to, among, and from all stakeholders in the partnership with the goal of continuously improving the partnership and its outcomes.

Meaningful Work: While the type of work you engage in at the high school will vary, you are expected to observe and assist your Mentor Teacher in science. Possible activities include helping your Mentor Teacher prepare for instruction or class activities, observing, assisting individual students or small groups, and teaching individuals, small groups, or the whole class. You are a guest in the assigned school and as a guest, agree to support school policies and personnel, follow all rules and regulations, and conduct yourself as a professional educator in your manner, dress and communication. You should follow the “Classroom Assistant Guidelines” (provided) at all times.

This is a “Service Learning” course and as such, requires that you have a working knowledge of service learning.

Service Learning:

1. Is a method whereby students learn and develop through active participation in thoughtfully organized service that is conducted in and meets the needs of communities;
2. Is coordinated with an elementary school, secondary school, or community-based organization;
3. Helps foster civic responsibility;
4. Is integrated into and enhances the academic curriculum of the students, or the education components of the community service program in which the participants are enrolled;
5. Provides structured time for students or participants to reflect on the service experience.

Course Schedule

NOTE: All readings are to be completed **BEFORE** the scheduled class meeting. Writing assignments are to follow APA guidelines (double-spaced, 1" margins). Please come to class prepared to discuss the content of the readings and your responses to the Key Questions.

Week 1

An introduction to high school science teaching.

Readings

The Art of Teaching Science (Chapter 1: A Reconnaissance)

Key Questions

1. Why do you want to teach science? What is science, and why is it important to you? Is science education necessary in grades K-12?
2. From your own experience, how do high school cultures, campuses, students, teachers, and curriculum differ from elementary and middle schools? What challenges do these differences present?
3. Think back to your high school experience. Describe the qualities of your best teachers. Are there commonalities? Describe the qualities of your worst teachers. Why were they ineffective? Were there any teachers whom you found to be effective, yet other students did not? Why might this be the case?
4. What are your biggest questions about teaching high school science?

Homework

Interview one similar-aged friend (not in this class), and one adult family member (preferably a parent or grandparent) about their experiences in high school science classes. What did they like and dislike about the classes, and how did their experiences affect them? Ask what advice they would give to a new science teacher. Write a one-page summary of the two interviews along with your reflections.

Week 2

An education in science is important for all members of a community.

DUE: Summary of interviews.

Readings

1. *The Art of Teaching Science* (Chapter 2: Science for All)
2. *California Standards for the Teaching Profession*
<http://www.btsa.ca.gov/ba/pubs/pdf/cstpreport.pdf>

Key Questions

1. How has globalization changed education? Why is it important to encourage students to "Think Globally, Act Locally?"

2. In your classroom, you will have students of varied abilities, yet you will be expected to ensure that all of them learn. What challenges will this pose, and what strategies will you employ to develop an equitable classroom?
3. Does the race, gender, or national background of a teacher influence their effectiveness? If so, how?

Homework

Initiate a conversation with your mentor teacher regarding their willingness to let you teach a lesson. If they are open to the proposition, discuss where they could fit you in to their pacing plan, and what content you would be most comfortable teaching. On one sheet of paper, list the 1) Topic to be taught, 2) State Standard(s) to be addressed, 3) Approximate date the lesson will be delivered during week 8 or 9. In one or two short paragraphs, describe the classroom you will be teaching in and the student demographics.

Week 3

How the goals of science education have changed through time.

DUE: One-page summary of lesson and classroom.

Readings

The Art of Teaching Science (Chapter 3: The Goals and History of Science Education)

Key Questions

1. Historically, science and mathematics have been professions dominated by males of European ancestry. Why was this the case? How is this changing, and what is responsible for the change?
2. How are today's schools and job markets different from when your parents, grandparents, and great-grandparents were in school? What role has science and technology had in influencing these changes? Predict future trends in schools and the job markets.
3. Think about how much the world has changed in the past 100 years. Advances in transportation, communication, and trade have significantly altered our perceptions of self, community, culture, nationhood, and society. Why is it important to ensure that science education is available to all?

Homework

Create an outline of your lesson plan. Format for the lesson plan will be discussed in class.

Week 4

How science curriculum is developed for the high school classroom.

DUE: Outline of lesson plan.

Readings

1. *The Art of Teaching Science* (Chapter 4: Science in the School Curriculum)

2. *Science Framework for California Public Schools*
<http://www.cde.ca.gov/re/pn/fd/documents/sci-stnd.pdf>

Key Questions

1. Why is it necessary to have standards in science education? What problems might arise in the absence of standards? How are standards especially useful for new teachers?
2. From looking at the California science standards, are they a) broad in scope, yet not detailed, or b) narrow in scope, yet very detailed? Which of these is better?
3. Frequently the sequence of courses through high school is physical science → biology → chemistry → physics. Is this the best way of sequencing instruction? Does it matter?
4. Some schools offer “Integrated” instruction, where earth science, biology, chemistry, and physics are all combined into one class and taught at four levels (IS1, IS2, IS3, and IS4). What are the benefits and drawbacks to this type of instruction?
5. How does science education differ in other countries when compared to the USA? What challenges exist in educating students in the USA that may not exist in other countries? Is it fair to compare science education programs of other countries to those in the USA?

Homework

Create a rough draft of your lesson plan. Use digital drop box (Blackboard) to turn in one copy before class, and bring one copy to class.

Week 5

How students learn science.

DUE: Rough draft of lesson plan.

Readings

The Art of Teaching Science (Chapter 5: How Students Learn Science)

Key Questions

1. Do people learn in a “one size fits all” manner? If not, then why do so many teachers have one mode of instruction? Is this equitable for all students in their classes?
2. Different students learn best in different ways. One may learn best by taking notes, another by reading the textbook, another by watching a movie. How do you learn the content for your classes? Does it depend on the class?
3. What are the steps involved in learning? Why do some students learn more than others? Can all students learn?

Homework

Revise your lesson plan based on peer editing comments made in class.

Week 6

An introduction to the models of science teaching.

DUE: Revised lesson plan

Readings

The Art of Teaching Science (Chapter 6: Models of Science Teaching)

Key Questions

1. Think back to your high school experience. How did your science teacher model what you were expected to learn? What are some characteristics of effective modeling by a science teacher?
2. During group activities, how would you group the students? Should students be able to group themselves with their friends? Why or why not?
3. How can you scaffold the material for students to remain motivated?
4. How will you address individual learning strengths and weaknesses when performing inquiry based lessons?
5. What are the suggested models of teaching in science? How does collaboration play a role in the suggested models?

Homework

Identify all the models of teaching (page 255 may help). For each model of teaching, write a brief narrative of how you could possibly apply the model to your lesson plan.

Observe your mentor teacher and document evidence for the models of teaching used in the classroom.

Week 7

How to design science units.

DUE: Application of models of teaching to your lesson plan and observation of mentor teacher and models of teaching

Readings

The Art of Teaching Science (Chapter 7: Designing Science Units and Courses of Study)

Key Questions

1. Imagine that you had to take my place teaching biology for the next 3 weeks. What would you need from me to effectively teach the curriculum?
2. Some teachers “teach to the test”. Other teachers create assessments after covering the material. What are the pros and cons for each scenario? Which style would you choose to emulate? Why?
3. How would you apply Bloom’s taxonomy in your lesson?

Homework

How will you know if a student reaches each level of Bloom’s taxonomy? Create a chart listing the various levels of Bloom’s taxonomy and give an example of how your students will reach each level according to your lesson plan. Observe your mentor teacher and create a chart to document evidence of the levels in Bloom’s taxonomy.

Week 8

How to assess science learning.

DUE: Bloom's Taxonomy chart applied to your lesson plan and observation of mentor teacher.

Readings

The Art of Teaching Science (Chapter 8: Assessing Active Science Learning)

Key Questions

1. Think back to your high school experience. How did your teachers assess your knowledge of the content? How often did your teacher give assessments?
2. You work for an education accreditation organization (ex. WASC). You are assigned to observe a high school classroom for one day. No test or quiz is given on the day that you observe. How would you know that the students understand the day's curriculum? What evidence would you collect?
3. How can rubrics help students gauge their performance? Should students take an active role in the creation of a rubric? Why or why not?

Homework

Create a rubric for one of the components of your lesson plan. Create a grading scale or rating system to separate scores. Interview teacher and document how he/she assesses student learning.

Week 9

How to foster thinking in a science classroom

DUE: Rubric for a component of the lesson plan with grading scale and interview of mentor teacher concerning assessments

Readings

The Art of Teaching Science (Chapter 9: Strategies Fostering Thinking in the Science Classroom)

Key Questions

1. Think back to your high school experience. How did your science teachers encourage inquiry within the classroom?
2. You are hired as a full time high school teacher. On the first day of school, you go over the expectations for the class. What expectations would you give to the class that would foster a learning community? How will you revisit these expectations on a daily basis?
3. How can concept maps and KWL's help guide your lessons?
4. How will students play a role in guiding the curriculum and shaping the classroom culture?

Homework

Once you have taught the lesson, write a reflection including thoughts on what did and did not succeed, what you would do different next time, unforeseen pitfalls, etc., but feel free to

elaborate. Also, discuss how effective your assessment was in evaluating your instruction. Reflection should be two pages long, and will be turned in with the lesson plan.

Week 10

How to facilitate learning in a science classroom

DUE: Finalized lesson plan and reflection.

Readings

The Art of Teaching Science (Chapter 10: Facilitating Learning in the Science Classroom)

Key Questions

1. On the first day of school, most teachers go over the rules for the classroom. What classroom rules will help facilitate learning?
2. A school administrator asked, “What is your usual classroom routine?” What would be your response?
3. As you finish your lesson for the day, you notice that the class still has about 15 minutes left before the bell rings. How can you use the last 15 minutes to continue the learning?

Presentations

During this class, everyone will share highlights of their lessons and will turn in their final lesson plan with reflections.