Teaching Science in Elementary Classrooms
Tuesday & Thursday
8:15-12:45

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Course Philosophy

One way to think about teaching science is to understand science as a culture. People who are scientifically literate can talk, think, act, and identify within the community of science. They understand the beliefs, ways of knowing, and central assumptions that constitute science. They understand how science is constructed, communicated, and used. The teachers’ job is to open the borders of the culture of science for students so they can become participants in the culture of science.

Opening the borders to science, however, is challenging. Students whose primary or home culture is similar to the culture of science can cross the borders into and out of the culture of science with relative ease. In other words, these students learn science easily. The ways that science has traditionally been taught in schools work to open the borders of science for these students. For many other students, crossing the borders of science is much more difficult. Their primary culture is different enough from the culture of science that the traditional ways of teaching science in school do not open the borders of science for them. For these students, learning science is very difficult and alienating.

One of the teacher’s jobs in teaching science, then, is to determine how to open the borders of science for all students. This means understanding the culture of science, understanding the cultures of the students, and then figuring out how closely aligned the students’ cultures are to the culture of science. Only then can the teacher work to build instructional sequences that help students think about science in ways that will help them understand science.

This course is designed to engage you in diverse experiences that will develop your professional knowledge base in order to help open borders for your students. We will spend our time together exploring what it means to learn and do science in different contexts. Our explorations will take us from school classrooms to informal learning institutions around the city to broaden our conceptions of the work of “scientists” and what it means to engage in scientific inquiry. Through these experiences, we will reflect upon the possible implications for teaching science and creating opportunities for all students to cross the borders of science.

I hope you find this course useful, meaningful and rewarding and that you will join me in making it so. Please do not hesitate to contact me with any concerns, frustrations or questions. I look forward to our semester ahead.
Course Objectives
At the end of this course, through large and small group instruction and discussion, hands-on learning experiences, fieldwork, and reflection, you will work toward the following essential instructional objectives:

• Developing specific skills, competencies, and points of view needed by teaching professionals
• Learning to apply course material in the classroom setting
• Gaining a broader understanding and appreciation of science as an intellectual and cultural activity
• Learning how to find and use resources for answering questions or solving problems

You will also work toward the following important instructional objectives:
Gaining factual knowledge
• Acquiring skills in working with others as a member of a team
• Learning fundamental principles, generalizations, or theories
• Developing creative capacities
• Developing skill in expressing oneself orally or in writing
• Developing a clearer understanding of, and commitment to, personal values
• Learning to analyze and critically evaluate ideas, arguments, and points of view
• Acquiring an interest in learning more by asking question and seeking answers

Enduring Understandings
EU 3 Candidates will understand that effective educators use research and evidence-based practices to design instruction that includes the alignment of goals, objectives, assessments and instructional strategies to meet the individual needs of students.

EU 6 Candidates will understand that effective educators apply deep understanding of both content and pedagogy to provide developmentally appropriate instruction to all students.

EU 8 Candidates will understand that effective educators explicitly integrate the teaching of reading, writing, communication and technology across content areas.

EU 11 Candidates will understand that effective educators maintain and utilize global perspectives and international-mindedness when engaging in teaching, learning and leading, including the awareness and application of the social, cultural, inter-cultural and linguistic facets of student achievement.

Conceptual Framework
This course embodies the conceptual framework –Professionalism in Service of Social Justice –of the School of Education (SOE) at Loyola University Chicago. The four components of the SOE’s conceptual framework are service, skills, knowledge, and ethics. As teachers, we recognize our connection to students as individuals and as members of a larger community. We serve others (students as well as families and communities) by creating experiences that encourage creative, moral and intellectual development. Leaders in our classrooms and larger school communities, we must consider how education can be transformational and how we might be agents of change. In this course, we will explore what it means to hold high expectations for all learners that include academically challenging, personally and socially relevant knowledge and complex learning skills. In order to successfully provide opportunities for youth to meet these
expectations, we must also be committed to reflecting on our own practice and to continually developing our own knowledge, attitudes and skills.

**Core Assessment Requirements**
While completing the modules in this sequence, teacher candidates will engage in a semi-structured interdisciplinary inquiry with specific connections to science and civic issues. Teacher candidates will have the opportunity to engage in both scientific and historical inquiry, while utilizing relevant literacy practices. This inquiry will highlight common themes between and across the disciplines of science and social studies that have local, national and global connections.

**Professional Expectations and Responsibilities**

**Attendance is required.** If you are unable to attend class, it is your responsibility to:
1. Notify the instructor in advance. Please note that informing the instructor does not excuse your absence.
2. Send assignments that are due.
3. Get handouts, assignments, class notes, and information about activities from a classmate prior to the next meeting of the class.
4. Be prepared for the next class.

**Participation in Class:** I expect you to make regular and thoughtful contributions to class activities, discussions, and group projects for your own learning and those of others. Thoroughly preparing for class by careful reading and reflection, timely completion of assignments, and thoughtful in-class participation is necessary for all students to have a productive learning experience in this course.

Communication in this course should be open, honest and respectful. Monitor your own participation to assure that you are participating actively but not dominating the conversation. Further, I will aim to create an environment where students can respectfully and thoughtfully disagree; learning to question, argue, support one’s viewpoints, compromise, and consider alternative perspectives are all part of effective class participation.

In order for the classroom learning community to work effectively, I ask to ensure that as few distractions as possible interfere with everyone’s learning. *Hand held electronic/communication devices and laptop computers* must be used discriminately and professionally. Please turn off or silence all cell phones and music players prior to entering the classroom. There will be a ten-minute break during every class period during which you will be able to check email and use cell phones.

**Written Assignments:**
Unless otherwise noted, all assignments must be typed. Please double-space your work and use 12 point Times New Roman font. Attend closely and carefully to spelling and grammar. If referencing course or other textual materials, please follow American Psychological Association style guidelines (APA – 6th edition). You can access the APA style manual through Loyola University Chicago’s libraries or online at [http://www.apastyle.org](http://www.apastyle.org).

Also, as a reminder, selected assignments in this course will be submitted via LiveText. Please make certain you have activated your LiveText account if you have not already
done so. Assignments that are not submitted via LiveText will be submitted through Sakai. Uploaded files must be named using the following format:

**TLSC231LastName_AssignmentName.**

Keep in mind that scholarly work is more than opinion and the simple description of readings. It requires reflection and inquiry as well as citation of readings and the literature as evidence in support of your position(s). You should proofread your writing and get help on your writing as needed. Please attend to the feedback given to you on assignments and use it to improve subsequent assignments. Failure to attend to feedback will impact your point total.

**Late Assignments:** Conflicts with an assignment deadline should be discussed and resolved before the assignment’s due date. All assignments are due on the dates listed in the course calendar. Late work will only be accepted under special circumstances (e.g., family emergency, illness). Please contact me in person or by phone or email prior to any given due date to discuss assignment extensions requests. Failure to do so in a timely manner will result in significant grade deductions. Computer or technical problems are not an acceptable excuse for late work.

**Course Evaluation**

**Grading**
All assignments will be graded using the rubrics posted on Sakai and Livetext throughout the semester. Each assignment will be calculated into the total number of points for the course. The number of points earned will be divided by the number of points possible, and a letter grade will be assigned using the scale below.

**Grading Scale:**
- A: 94% and above; A-: 93-90%
- B+: 89 -88%; B: 87-84%; B-: 83-80%
- C+: 79 -78; C: 77-74%; C-: 73-70%
- D+: 69 -68%; D: 67 -64%; D-: 63-60%
- F: Below 60%

**Assignments**
Greater detail and rubrics will be provided on all assignments and posted to the course Sakai page.

**Course Participation – 10%**
I expect you will attend each class session and arrive on time. I expect you to make regular and thoughtful contributions to class activities, discussions, and group projects for your own learning and those of others. I also expect you to arrive prepared for class through careful reading and reflection and timely completion of assignments. During each course session you will earn points for your participation. Lack of participation, late arrival, and lack of preparation will impact your earned points. You will not be able to earn participation points if absent.

**Science Talk – 25%**
This assignment will ask you to formatively assess your students on their understanding of specific science topics (connected to your inquiry project), the types of experiences or
knowledge bases they draw upon to make sense of the world, and what they wonder about or have questions about in connection to science. This assignment is a great opportunity to learn about and from your students and think about how what they know and want to know can inform your science lessons/units.

**Inquiry Plan Defense – 25%**

The first step of the sequence four summative assessment is to develop and present a plan to your peers with the goal of getting productive feedback. The plan must include a researchable question, a rationale for how it addresses an issue of both scientific and civic importance and initial designs for data collection (including sources and modes of collection). The inquiry plan will be presented to peers and the course instructor to receive constructive feedback regarding the feasibility of their investigation and discussion of other possible data or resources that might assist their investigation.

**Weekly Course Reflections – 20%**

This assignment will ask you to reflect on or make sense of the experiences you have during this module. Each week, you will be asked to respond to broad questions or ideas and how they pertain to learning, doing and teaching science.

**Sequence Four Summative Assessment – 20%**

Candidates will choose an interdisciplinary topic of interest and importance to them to investigate. They will use the inquiry-based approaches of Modules 4.2 and 4.3 to investigate their particular issue of scientific and civic import, and they will pull from a range of informational texts and the skills of argumentation emphasized in Module 4.1, as well as in Modules 4.2 and 4.3. The goal of this assessment is to demonstrate a strong command of the content areas of science and social studies and the skills of academic writing.

**Teacher Candidate Dispositions**

Each course in the School of Education focuses on one or more professional dispositions. Students are offered opportunities to receive feedback on their dispositional growth in the areas of professionalism, fairness and/or the belief that all students can learn. The specific disposition or dispositions for each course are found on our Sakai site and the descriptions for the expected behaviors for the disposition(s) can be found on the rubric posted in LiveText for this course.

**Technology**

Throughout this course, we will consider how technology can support and enhance science teaching and learning. Class readings, assignments and discussions are intended to help you develop your own technological pedagogical content knowledge (TPACK) and informed opinions about technology integration specific to the elementary/middle school science classroom.

**Course Policies**

**Academic Honesty**

Academic honesty is an expression of interpersonal justice, responsibility and care, applicable to Loyola University faculty, students, and staff, which demands that the pursuit of knowledge in the university community be carried out with sincerity and integrity. The School of Education’s Policy on Academic Integrity can be found at:
http://www.luc.edu/education/academics_policies_integrity.shtml. For additional academic policies and procedures refer to: http://www.luc.edu/education/academics_policies_main.shtml

**Accessibility**
Students who have disabilities which they believe entitle them to accommodations under the Americans with Disabilities Act should register with the Services for Students with Disabilities (SSWD) office. To request accommodations, students must schedule an appointment with an SSWD coordinator. Students should contact SSWD at least four weeks before their first semester or term at Loyola. Returning students should schedule an appointment within the first two weeks of the semester or term. The University policy on accommodations and participation in courses is available at: http://www.luc.edu/sswd/

**Harassment (Bias Reporting)**
It is unacceptable and a violation of university policy to harass, discriminate against or abuse any person because of his or her race, color, national origin, gender, sexual orientation, disability, religion, age or any other characteristic protected by applicable law. Such behavior threatens to destroy the environment of tolerance and mutual respect that must prevail for this university to fulfill its educational and health care mission. For this reason, every incident of harassment, discrimination or abuse undermines the aspirations and attacks the ideals of our community. The university qualifies these incidents as incidents of bias. In order to uphold our mission of being Chicago’s Jesuit Catholic University -- a diverse community seeking God in all things and working to expand knowledge in the service of humanity through learning, justice and faith, any incident(s) of bias must be reported and appropriately addressed. Therefore, the Bias Response (BR) Team was created to assist members of the Loyola University Chicago community in bringing incidents of bias to the attention of the university. If you believe you are subject to such bias, you should notify the Bias Response Team at this link: http://webapps.luc.edu/biasreporting/

**Diversity**
I strive to facilitate an inclusive environment respectful of all cultures and people regardless of race, sex, gender identity, religion, ethnic background, socio-economic class, sexual orientation, and abilities. If you are a student who requires any special considerations, please inform the instructor during the first week of class.

*The philosophy, overview and objectives are influenced by Danny Birmingham, Ph.D., Elizabeth Coleman and Lara Smetana, Ph.D.. This syllabus is modeled after their work.*