

Loyola University Chicago
School of Education
CIEP 439: Teaching Science in Elementary/Middle School
Fall 2014
Tuesday, 1:30PM - 4:00PM, Cudahy Hall 314 (Lake Shore Campus)

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COURSE OVERVIEW AND OBJECTIVES

This course is designed to increase your confidence in and commitment to teaching science in grades K-9. Current understandings of best practices in the teaching and learning of science at the elementary and middle school levels will be introduced and discussed. You will have the opportunity to engage in learning activities both as a learner and as a teacher, reflecting on each experience and how one influences your thinking on the other. In doing so, you are encouraged to see yourself as a life-long learner and professional in your field.

Teacher candidates will (in no particular order):

1. Consider how various persons have defined science and scientists over time and how these changing definitions might have specific implications for science education and for the establishment of a more socially just society.
2. Identify and explain important tenets of constructivist learning theory and then design and revise instructional and assessment materials that include elements such as critical thinking, problem solving, performance skills, and collaborative group work.
3. Consider how science teaching and learning can and should intersect with aspects of youth and community culture, as they discuss what role student voice should play in the development of science curricula and instruction and grapple with questions related to what science teaching and learning should look like.
4. Design and execute inquiry-based science instruction and assessment that is aligned with state and national science standards and encompasses the NRC's 4 Strands of Science Learning.
5. Reflect on what it means to teach science in culturally responsive ways and then design and revise instructional and assessment materials that connect with diverse youth by eliciting, acknowledging, and building upon their prior knowledge, experiences, beliefs, values, etc.
6. Identify ways to incorporate practitioner inquiry into their teaching practice, set future professional development goals, and explain how they will go about meeting those goals.

At the end of this course, through large and small group instruction and discussion, hands-on learning experiences, clinical field work, and reflection, you will work toward the following *essential* IDEA 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

COURSE STANDARDS

This course is aligned to the following standards:

1. Loyola University of Chicago – School of Education – Conceptual Framework (CF) standards
 - a. CF 1: Candidates demonstrate an understanding of a current body of literature and are able to critically evaluate new practices and research in their field.
 - b. CF 5: Candidates demonstrate technological knowledge and skills that enhance education.
2. The Association for Childhood Education International (ACEI) and The National Council for the Accreditation of Teacher Education (NCATE) standards:
 - a. 2.2: *Science*: Candidates know, understand, and use fundamental concepts in the subject matter of science—including physical, life, and earth and space sciences—as well as concepts in science and technology, science in personal and social perspectives, the history and nature of science, the unifying concepts of science, and the inquiry processes scientists use in discovery of new knowledge to build a base for scientific and technological literacy.
 - b. 3.1: *Integrating and applying knowledge for instruction*: Candidates plan and implement instruction based on knowledge of students, learning theory, subject matter, curricular goals, and community.
 - c. 3.2: *Adaptation to diverse students*: Candidates understand how elementary students differ in their development and approaches to learning, and create instructional opportunities that are adapted to diverse students.
 - d. 3.3: *Development of critical thinking, problem solving and performance skills*: Candidates understand and use a variety of teaching strategies that encourage elementary students' development of critical thinking, problem solving, and performance skills.
 - e. 3.4: *Active engagement in learning*: Candidates use their knowledge and understanding of individual and group motivation and behavior among students at the K-6 level to foster active engagement in learning, self motivation, and positive social interaction and to create supportive learning environments.
 - f. 3.5: *Communication to foster learning*: Candidates use their knowledge and understanding of effective verbal, nonverbal, and media communication techniques to foster active inquiry, collaboration, and supportive interaction in the elementary classroom.

CORE ASSESSMENT REQUIREMENTS

This course includes two ACEI/NCATE Core Assessment requirements:

- #2: Assessment of content knowledge in elementary education (This will be met by the course grade.)
- #3 Assessment of candidate ability to plan instruction (This will be met in the Inquiry Unit project, which must be submitted in LiveText.)

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.

COURSE TEXTS

Required:

- Settlage, J. & Southerland, S.A. (2011). *Teaching science to every child: Using culture as the starting point, 2nd Ed.* New York: Routledge.
- Michaels, S., Shouse, A.W., & Schweingruber, H.A., (2008). *Ready, set, science! Putting research to work in K-8 science classrooms.* Washington, DC: National Academies Press.
(Available for free download at www.nap.edu)
- Fenichel, M., & Schweingruber, H. A. (2010). *Surrounded by Science: Learning Science in Informal Environments.* Washington, DC: The National Academies Press.
(Available for free download at www.nap.edu)
- Additional handouts and readings will be posted to Sakai throughout the course.

Recommended:

- Keeley, P., Eberle, F. & Dorsey, C. (2008). *Uncovering student ideas in science: Volume III.* Arlington, VA: NSTA Press.
(Several volumes of Uncovering student ideas in science (including volume III) are available through the Loyola University Library in e-book format)

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.

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 listed on this syllabus and the descriptions for the expected behaviors for the disposition(s) can be found on the rubric posted in LiveText for this course.

ATTENDANCE AND PARTICIPATION

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 meeting of the next class.
4. Be prepared for the next class.

Participation in class activities and discussions is expected. You should come to class prepared and be ready to contribute and take part in class activities. Your constructive contributions to our discussions are always welcome.

Hand held electronic/communication devices must be used discriminately and professionally per our discussion in class. Thank you.

LATE WORK AND EXTENSION REQUESTS

All assignments are due on the dates listed in the syllabus. Please *contact me* in person *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.

REQUIREMENTS FOR ALL WRITTEN ASSIGNMENTS

Unless otherwise instructed, all written assignments completed outside of class must be double spaced, with one inch margins, word-processed in Times New Roman, 12 point font, and saved electronically. You must have the capability to produce the assignment again. **Computer problems are not an excuse for late work.**

Unless otherwise noted, all assignments should be submitted via LiveText. Uploaded files must be named using the following format: **LastName_AssignmentName**.

References should be cited where applicable, following American Psychological Association style guidelines (APA – 6th edition). Please access the APA style manual through Loyola University Chicago’s libraries or online at <http://www.apastyle.org>.

Written assignments will be graded for accurate mechanics and English grammar usage as well as thoughtful, pertinent, and clear content.

ELECTRONIC COMMUNICATION POLICIES AND GUIDELINES

The School of Education faculty, students and staff respect each other’s rights, privacy and access to electronic resources, services, and communications while in the pursuit of academic and professional growth, networking and research. All members of the university community are expected to demonstrate the highest standards of integrity, communication, and responsibility while accessing and utilizing technology, information resources, and computing facilities. A link to the Loyola University Chicago and School of Education official policies and guidelines can be found at: http://www.luc.edu/media/lucedu/education/pdfs/SOE_Cyberbullying_Policy.pdf

COURSE EVALUATION

GRADING

All assignments will be graded using the rubrics provided during class and posted on Blackboard. Each assignment will be calculated into the total number of points for the course. The number of points earned will then be divided by the number of points possible, and a letter grade will be assigned using the scale below.

Grading Scale

Percent Range	Letter Grade
93% - 100%	A
90% - 92%	A-
87% - 89%	B+
83% - 86%	B
80% - 82%	B-
77% - 79%	C+
73% - 76%	C
70% - 72%	C-
67% - 69%	D+
63% - 66%	D
62% and Below	F

ASSIGNMENTS

Greater detail and rubrics will be provided for all assignments on the course Sakai site.

1. Course Participation – 10%

The following guidelines for participation will be considered:

Professional Attitude and Demeanor Part I

- 2-Always prompt and regularly attend sessions.
- 1-Rarely late and regularly attend sessions (No more than 1 absence).
- 0-Often late and/or poor attendance at sessions (More than 2 absences).

Professional Attitude and Demeanor Part II

- 2-Always prepared for sessions with assignments and required materials.
- 1-Rarely unprepared for sessions with assignments and required materials.
- 0- Often unprepared for sessions with assignments and required materials.

Level of Engagement in Class

- 2-Always a willing participant. Contributes by offering ideas and asking questions in sessions, small groups and the whole class.
- 1-Often a willing participant. Contributes by offering ideas and asking questions in sessions, small groups or the whole class.
- 0-Rarely a willing participant. Rarely contributes to sessions by offering ideas or asking questions.

Integration of Readings into Classroom Participation

- 2-Often cite from readings; use readings to support points.
- 1-Occasionally cite from readings; sometimes use readings to support points.
- 0-Rarely cite from readings; rarely use readings to support points.

Listening Skills

- 2-Listen when others talk, both in groups and in sessions. Incorporate or build off of the ideas of others.
- 1-Listen when others talk, both in groups and in sessions
- 0-Rarely listen when others talk, both in groups and in sessions.

2. Course Reflection Journal – 15%

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.

3. Discussion Facilitation – 10%

You will have the opportunity to facilitate a class discussion for a pre-assigned class session about a reading that you select for the class. You will prepare guiding questions, which you will submit at the start of class. Then, as the facilitator, you will pose questions to your peers, promote dialogue, and offer your synthesis of the reading in relation to other course readings and experiences. You are encouraged to draw from additional resources to help you to facilitate the discussion.

4. Self-Documentation Project – 15%

You will complete a self-documentation project to represent your experience with science outside of the classroom and more deeply probe your conceptions of the discipline of science, as well as science teaching and learning.

5. Field-Based Formative Assessments – 15%

During the clinical component of the course, you will have an opportunity to converse with students and elicit their ideas and reasoning about specific science topics and phenomena. As part

of this assignment, you will administer a formative assessment probe either to your class or to a small group of students. Then, you will reflect upon what you learned about students' understandings and thought processes as well as about your own teaching.

6. Micro-Teaching – 10%

You will execute and reflect on a mini-lesson for your peers in the form of microteaching. This mini-lesson will highlight a portion of a full lesson you are developing for your clinical placement (or student teaching) as well as a particular instructional strategy discussed in the course. You will receive written feedback from your classmates following the execution of the mini-lesson and also complete a written reflection and self-assessment of the mini-lesson. In all, the microteaching and reflection experience is designed to assist you in refining your lesson for use with students this semester or during student teaching.

7. Interdisciplinary Inquiry Project & Reflection – 25%

You will design an interdisciplinary inquiry unit plan for your field-work class. The topic you select should have local and global connections, as well as personal meaning for your students. The inquiry project itself should allow students the opportunity to engage in the four strands of science learning and also be aligned with the NGSS. The project also asks you to reflect on the how this assignment has influenced your thinking about your own teaching practice, and on the process of practitioner inquiry.