

**Loyola University Chicago
School of Education**

**CIEP M83-003 (Block II): Teaching Science in Elementary/Middle School
Spring 2011
Mondays, 8:15a.m.-11:15a.m., Cudahy Hall 314 (Lake Shore Campus)**

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COURSE OVERVIEW, OBJECTIVES, AND STANDARDS
COURSE OVERVIEW AND OBJECTIVES*

This course is designed to engage elementary and middle school teachers with issues, challenges, and opportunities associated with science learning and teaching. Through course activities, readings, discussions, and assignments, we will explore issues relevant to elementary and middle school science teaching, such as teaching science in ways that model scientific practice, teaching science for social justice as part of culturally responsive science teaching, and connecting science learning and teaching to youth's lives. We will have opportunities to plan instruction and assessment, practice instructional and assessment techniques, and grapple with a host of challenges that elementary and middle school science teachers face.

Course objectives include (listed in no particular order):

1. Students will explain what various stakeholders believe science education should be and then interrogate those perspectives in order to grapple with questions related to what youth should actually be doing in school science.
2. Students will reflect on various aspects of what we know about how people learn and then design and revise instructional and assessment materials that embody some of that research.
3. Students will reflect on what it means to teach culturally responsive science and then design and revise instructional and assessment materials that engage ALL youth.
4. Students will consider how science learning and teaching can and should intersect with aspects of youth and community culture by interviewing youth and reflecting on the significance of these types of data for teaching science.

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 Lesson Plan requirement, 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*. Teaching and service go hand and hand because teaching is one answer to the following question: How does my action serve others? As educators, we serve the youth in our classrooms, their families, and our communities. Teaching is an ethical act and science teaching is no exception. We will explore what it means to be an ethical teacher in the context of science learning and teaching. With respect to skills and knowledge, we will also explore current best practices in science education and some of the research undergirding those practices. We will do this and attempt to interrogate those practices in light of authentic scientific practice, social justice, and youth culture. This is all in service of becoming a community of practitioners who are committed to serving youth, their families, and our communities and committed to studying our own practice in order to continue reflecting on our teaching.

**The above overview, objectives, standards, and conceptual framework are taken from ones written by Dr. Leah Bricker, and this syllabus is closely modeled after her own.*

COURSE TEXTS AND MATERIALS

1. 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 at the LSC bookstore)
2. Abell, S.K., & Volkman, M.J. (2006). *Seamless assessment in science: A guide for elementary and middle school teachers*. Portsmouth, NH: Heinemann. (available at the LSC bookstore)
3. Additional handouts and readings will be posted to Blackboard throughout the course.
4. Each student will need one spiral notebook, which will serve dually as his/her science notebook and reflection journal.

COURSE POLICIES

1. 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

2. 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/>

3. 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/>

4. Diversity/Social Justice

It is my intention to facilitate this course in ways that acknowledge and respect all aspects of diversity. This includes respect for ideas and practices related to gender, sexuality, disability, religion, age, socio-economic status, race, ethnicity, and culture. Not only must we have respect for each other relative to diversity but we must also examine how issues of diversity interact with science learning and teaching in K-8 science classrooms. We will continuously discuss what it means to teach science in culturally responsive ways.

5. Classroom Community

Our work together relies on honest, open, and respectful dialogue so that all participants feel free to express their views. Disruptive behavior (e.g., inappropriate language, talking over others) will not be tolerated and will result in the loss of participation points. Here are a few guidelines to help facilitate our conversations and activities each week:

- a. *There is no such thing as a stupid question.* Please ask any and all questions that you have and remember that by asking your questions, you are allowing us to learn as a community because you are helping to make ideas visible.
- b. *Be respectful of others' ideas and experiences* even if they are different from your own. We

do not have to agree but we do owe it to each other to listen to and consider each other's points of view. On a related note, please *respect confidentiality* both in the class and outside of it.

c. *Listen to others* by trying not to interrupt until whoever is talking finishes and by trying not to pass judgment until you have heard and considered what others have said. Do not assume that silences are unproductive. Give others time to think, consider, and formulate ideas.

d. *Monitor your participation*. If you are outgoing and tend to dominate conversation, use this course to practice allowing others a space to participate. If you are less outgoing and tend to let others do the talking, use this course as an opportunity to practice speaking up. It is always helpful to ask others what they think in any given situation.

e. *Please either turn cell phones off or to vibrate* before each class session out of respect for our community. On a related note, *use laptops appropriately* (e.g., note taking, presentations) Please *turn off all MP3 players*.

6. Attendance, Participation, and Communication

Regular, on-time attendance and thoughtful participation during class discussions and other activities are essential not only to your individual performance but also to the success of the course.

Collaboration in every phase of the course is absolutely necessary if we are to form a learning and teaching community. We all share responsibility for the learning and teaching in this course and beyond. Because you will not be able to participate in the class community if you are not present, *absences will result in you receiving a lower grade in the course*, except in the case of extreme circumstances (e.g., family emergency, illness). If you know that you have to miss a class session, please notify me *prior* to your absence and be prepared to supply the proper documentation to support your absence. I expect excellent communication (e.g., notifying me prior to any absence, notifying me about any issues regarding assignments) because excellent communication is part of what it means to be a professional.

7. Late Work and Extension Requests

All assignments are due on the dates listed in the syllabus. I will only accept late work in the event of special circumstances (e.g., family emergency, illness). Please talk with me in person or contact me via email or phone to discuss assignment extensions. *Make sure you contact me prior to any given due date*. Failure to do so will result in significant point deductions.

8. Format for Assignments

Unless otherwise noted, all assignments must be typed. Please double-space your work and use 12 point Times New Roman font. As with all assignments, I expect you to 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>.

Also note that I expect you to attend to the feedback I give you on assignments. If I give you a particular piece of feedback and you choose not to attend to it on subsequent assignments, your point total will be impacted.

9. Technology

It is important that we spend time thinking about how to integrate technology into science learning and teaching. Various forms of technology are crucial to many aspects of scientific work (e.g., instrumentation, analyses) and therefore, youth should have the opportunity to engage with appropriate technology, used for specific purposes, when learning science. Furthermore, technology is arguably a significant part of youth culture – youth are used to learning with it and learning from it. As educators, we need to use that to our advantage when applicable and to that end, we will discuss and practice how to effectively utilize technology in science learning and teaching.

COURSE EVALUATION

Grades are based on total points earned. No curve is used. The course grading scale is as follows:

| Point Range | Percent Range | Corresponding Grade |
|-------------|---------------|---------------------|
| 232-250 | 93% - 100% | A |
| 224-231 | 90% - 92% | A- |
| 217-223 | 87% - 89% | B+ |
| 207-216 | 83% - 86% | B |
| 199-206 | 80% - 82% | B- |
| 192-198 | 77% - 79% | C+ |
| 182-191 | 73% - 76% | C |
| 174-181 | 70% - 72% | C- |
| 167-173 | 67% - 69% | D+ |
| 157-166 | 63% - 66% | D |
| 149-156 | 60% - 62% | D- |
| 0-148 | Below 60% | F |

COURSE ASSIGNMENTS AND PROJECTS*

*NOTE: More information (i.e., detailed assignments with rubrics when applicable) will be discussed during class sessions and posted on Blackboard in a timely fashion. Unless otherwise discussed, you will submit all assignments to me via Blackboard's Assignment tool. (If you need assistance navigating this tool, you can access Blackboard's Help Resources at the following link: http://luc.edu/blackboard/Student_Resources.shtml). You must name your uploaded files in the following manner: **Last name_assignment name**. For example, when submitting the student interview, I would name the file: Coleman_StudentInterview. Also, as a reminder, the lesson plan is a Core assessment, and will be submitted via LiveText. Please make certain you have activated your LiveText account if you have not already done so.

1. **Course Participation and Blackboard Discussion Forum** – 30 points – earned throughout the course

As noted above, you are expected to participate in all aspects of this course. This will take many different forms, including, but not limited to, on-time attendance at every class, completing all reading assignments before coming to class, actively participating in class activities and discussions, asking and answering questions, as well as listening to and respecting the views, thoughts, and opinions of your classmates. In addition, I might ask you to bring questions to class, design an activity that relates to the readings, find various web sites, etc. Throughout the course, as part of your participation, you will also keep a science notebook/reflection journal containing questions you have, resources you have collected, as well as reflections on the various ideas with which we will engage. At times, these reflections will be written in class, but some you will be expected to complete outside of class, which will also be considered part of your participation grade. For each class session, you can earn up to two participation points. The following guidelines will determine the points you earn: 2 points = On-time to class with full-participation (given the guidelines described above); 1 point = Late to class and/or limited participation (given the guidelines described above); 0 points = Did not attend class or did not participate at all (given the guidelines described above).

For the period of time that you are in the field completing your clinical hours, you will receive your participation points for posting, on Blackboard, at least one question about the group of readings assigned for class each week OR a question that has arisen as a result of your field experience. Your question should refer to a particular part of the text or a specific

issue you are grappling with in your clinical experience. In addition, each week you must post a response to one of the questions your classmates have posed. Your response should make an explicit connection between some aspect of the course (draw on ideas from the readings we have already done) and your collective experiences in the field. This will be our way of maintaining class discussions regarding specific course themes, so when making your connections, you must be specific and use at least one quotation from the assigned readings (properly referenced/cited using APA). *You must post questions according to the schedule (provided at a later date) in order to receive points for your posts.*

2. **Field-Based Student Interview- 40 points – due on or before March 14th**

During this course, we will discuss the need to hear more youth voice regarding issues of learning and teaching. You will interview a student during your field experience about his/her learning experiences in school and his/her thoughts about science. You will then summarize your questions and the student's responses in a short paper, where you will also reflect on the responses in light of how they might inform your science teaching (and your teaching in general). The following is a summary list of the interview topics and example questions you might choose to ask.

- a. [*Thoughts about Science*] What is science? Who are scientists? What should science look like in school?
- b. [*Thoughts about Learning and Teaching*] What are you expert at doing? How did you learn how to do whatever you are expert at doing? How would you teach whatever you are expert at doing to someone else? How would you like to learn science and why? What do you wish your teacher knew about you but doesn't? What advice do you have for anyone wanting to teach young people your age?

3. **Inquiry Investigation and Presentation- 50 points**

In order for us, as science educators, to understand inquiry and incorporate scientific practices into our teaching, we must experience what it is like to inquire into something of interest to us. Working in groups of three or four, you will identify a topic of interest, generate a question, propose a plan to examine that question, collect and analyze data, and report your results to the rest of us. We will also use this assignment as an opportunity to discuss issues associated with group work.

- a. Inquiry Project Proposal – 10 points – due on or before February 7th
- b. Presentation of Study – 20 points – due on April 18th in class
- c. Reflections on the Process – 20 points – due on or before April 25th

4. **Self-Documentation Assignment- 40 points - due on or before March 28th**

I will ask you to take digital photographs (if you do not have a digital camera, I will provide one for you) of a variety of objects related to your school experience but also your out-of-school experiences. These photographs will be related to your images of science, your hobbies and perceived areas of expertise, as well as anything else you care to share about yourself and who you are. In addition, you will write a narrative about the significance of each picture and reflect on the importance of learning about your students' lives and experiences.

5. **Lesson Plan- 50 points - due on or before April 5th (by 11pm) via LiveText**

The lesson plan portion of this assignment is a Core Assessment for standards CF1 and CF5, which are both written out in their entirety at the beginning of this syllabus. Please see the last pages of this syllabus for the requirements that need to be included in your lesson plan, as

well as the rubric I will use to evaluate your plan. You can also access the rubric through your LiveText account.

6. **End-of-Course Reflection** – 40 points – due on or before May 2nd

You will write an end-of-course reflection. The goals of this reflection are to: (a) give you the opportunity to become a reflective practitioner by reflecting on the course and your field experience in general, on course themes in particular, and on your own personal science teaching professional development plan; and (b) give you the opportunity to critique the course so that I can improve the course and my teaching.

IMPORTANT: *Information about Clinicals*

Please be aware that there is a clinical experience requirement for this course. Please note that this does not simply involve observing classroom teachers. You should be working directly with the cooperating teacher to assist in planning and/or instruction and should be interacting with students, either as individuals or in groups. Note that several of the assignments listed above (Blackboard discussion postings, young person interview, lesson design, and a reflection that includes your thoughts on your field experience, as well as connections you made between the ideas in this course and your experience with the science program at your school) will take place while you are in the field. The course objectives listed at the beginning of this syllabus are aligned with these field-based assignments. Therefore, it is **MANDATORY THAT YOU ATTEND CLINICALS**. As you can tell from the point totals listed for these assignments (as noted, you will receive in a timely fashion detailed assignment guidelines and rubrics in class and they will be posted on Blackboard), if you fail to complete these assignments, your grade in the course will be impacted. In addition, while in the field and in class, I expect that *you will conduct yourself in a professional manner at all times*, which includes appropriate dress, communication, and interactions with adults and K-8 students. Participation points will be negatively impacted if you choose to engage in unprofessional conduct. In addition, I will complete a disposition form so that your behavior is officially documented.

* You will receive additional information about clinical placements from Dr. Riggs later in the semester. In addition, she will distribute a handbook that outlines important procedures and processes associated with clinicals, including documenting your clinical hours.

COURSE SCHEDULE*

*I reserve the right to revise this schedule as needed.

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| Week 1: January 24th | Introduction to Science Learning and Teaching |
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We will begin to explore the questions: What is science? What does it mean to learn science (and learn in general)? What does it mean to teach science? What does it mean to teach science for social justice and teach science in culturally responsive ways?

ASSIGNED READINGS TO BE COMPLETED BEFORE THIS CLASS

1. Read *Ready, Set, Science!* Chapters 1 and 2 – “A New Vision of Science in Education” (pp. 1-16); “Four Strands of Science Learning” (pp. 17-36).

ASSIGNMENTS DUE ON THIS DAY

1. Bring to class an outline of a science lesson you have taught or a lesson plan from the Internet or another source that you would be comfortable teaching.

ASSIGNMENTS TO WORK ON/COMPLETE BEFORE THE NEXT CLASS

1. Draw a Science Teacher Test and questionnaire

Week 2: January 31st What is science? What does it mean to teach science through inquiry?

We will begin our own project in class to serve as a model for using an interactive approach when teaching through inquiry, as well as examine exemplar case studies of inquiry-based teaching and learning.

ASSIGNED READINGS TO BE COMPLETED BEFORE THIS CLASS

1. Alberts, B. (2000). Some thoughts of a scientist on inquiry. In J. Minstrell and E.H. van Zee (Eds.), *Inquiring into inquiry learning and teaching in science* (pp. 3-13). Washington, DC: American Association for the Advancement of Science.
2. Feynman, R. (1969). What is science? *The Physics Teacher*, 7(6), 313-320.
3. National Research Council. (2000). *Inquiry and the National Science Education Standards: A guide for teaching and learning*. Washington, DC: National Academy Press.

ASSIGNMENTS DUE ON THIS DAY

1. Draw-A-Science-Teacher Test and questionnaire

ASSIGNMENTS TO WORK ON/COMPLETE BEFORE THE NEXT CLASS

1. Form your inquiry project groups and write a proposal for your inquiry. Email the proposal to me before the next class period.

Week 3: February 7th What are the big ideas in science? How are these connected to the Standards?

We will examine science learning standards promoted by various organizations, look for evidence of alignment in sample lessons, and develop objectives and assessments promoting AAAS's core concepts and habits of mind.

ASSIGNED READINGS TO BE COMPLETED BEFORE THIS CLASS

1. Read *Ready, Set, Science* Chapter 4 – “Organizing Science Education around Core Concepts” (pp. 59-86).
2. AAAS/Project 2061 (1989). Common Themes. In *Science for all Americans* (pp. 165-181). New York, NY: Oxford University Press.
3. AAAS/Project 2061 (1989). Habits of mind. In *Science for all Americans* (pp. 183-194). New York, NY: Oxford University Press.

****NOTE:** Readings 2 and 3 are posted on Blackboard as a single PDF.

ASSIGNMENTS DUE ON THIS DAY

1. Inquiry project proposal

ASSIGNMENTS TO WORK ON/COMPLETE BEFORE THE NEXT CLASS

1. Reflection journal entry: In your science notebook, write one or two paragraphs about how you think you learn best. Use the following questions to guide you:
 - What is your ideal way to learn and why do you prefer to learn this way?
 - Related to your learning, what do you wish your teachers knew about you but do not?
 - Do you think having your teachers know this about you might affect your learning? How?

- How do you think teachers should find out more about their students?
2. Identify a student to interview and contact his/her parent/guardian to obtain consent and set up an interview date/time. The interview write up is due on or before March 14th.
 3. Begin thinking about ideas for your lesson plan (due April 5th).

Week 4: February 14th What does it mean to learn something?

We will analyze a case study of a science lesson and seek to identify evidence that students are learning.

ASSIGNED READINGS TO BE COMPLETED BEFORE THIS CLASS

1. Read *Ready, Set, Science!* Chapter 3 – “Foundational Knowledge and Conceptual Change” (pp. 37-58).
2. Nasir, N.S., Rosebery, A.S., Warren, B., & Lee, C.D. (2006). Learning as a cultural process: Achieving equity through diversity. In R. K. Sawyer (Ed.), *The Cambridge handbook of the learning sciences* (pp. 489-504). Cambridge, UK: Cambridge University Press.
3. Hammer, D., & van Zee, E. (2006). The beginnings of scientific reasoning. In *Seeing the science in children’s thinking: Case studies of student inquiry in physical science* (pp. 13-37). Portsmouth, NH: Heinemann.

ASSIGNMENTS DUE ON THIS DAY

1. Reflection journal entry

ASSIGNMENTS TO WORK ON/COMPLETE BEFORE THE NEXT CLASS

1. Blackboard Discussion Forum: Find at least four web sites, TV programs, magazines (or a combination of these) that young people could use to learn more about science. Post these under the Blackboard discussion forum (sometime before the next class session) along with a brief description of each item you found. Be ready to discuss in class.
2. Identify a student to interview and contact his/her parent/guardian to obtain consent and set up an interview date/time. The interview write up is due on or before March 14th.
3. Begin thinking about ideas for your lesson plan (due April 5th).
4. Work on your group inquiry project (due April 18th).

Week 5: February 21st Why should we listen to our students?

We will examine sample self-documentations conducted by youth and begin to design science learning experiences that draw on this knowledge.

ASSIGNED READINGS TO BE COMPLETED BEFORE THIS CLASS

1. Nasir, N.S., Rosebery, A.S., Warren, B., & Lee, C.D. (2006). Learning as a cultural process: Achieving equity through diversity. In R. K. Sawyer (Ed.), *The Cambridge handbook of the learning sciences* (pp. 489-504). Cambridge, UK: Cambridge University Press. ****NOTE:** We have already done this reading, but we will refer back to it, so please review it and bring a copy with you to class.

- Gay, G. (2000). Power pedagogy through cultural responsiveness. In *Culturally responsive teaching: Theory, research, & practice*. (pp. 21-44). New York: Teacher's College Press.
- Emdin, C. (2009). Reality pedagogy: Hip hop culture and the urban science classroom. In W-M. Roth (Ed.), *Science education from people for people: Taking a stand(point)* (pp. 70-89). New York, NY: Routledge.

ASSIGNMENTS DUE ON THIS DAY

- Science resources posted on Blackboard discussion forum

ASSIGNMENTS TO WORK ON/COMPLETE BEFORE THE NEXT CLASS

- Interview a student and work on the write up your findings. It is due on or before March 14th.
- Work on your self-documentation assignment (due March 28th).
- Begin work on your lesson plan (due April 5th).
- Work on your group inquiry project (due April 18th)

Week 6: February 28th**Where do youth learn about science?**

***NOTE: This class will meet at the Lincoln Park Zoo.**

We will brainstorm ways to elicit scientific thinking and talking around field trip experiences, as well as how to connect these experiences to the classroom in a meaningful way.

ASSIGNED READINGS TO BE COMPLETED BEFORE THIS CLASS

- Fenichel, M., & Schweingruber, H.A., (2010). *Surrounded by science: Learning science in informal environments*. Washington, DC: National Academies Press.

ASSIGNMENTS TO WORK ON/COMPLETE BEFORE THE NEXT CLASS

- Interview a student and finish the write up your findings (due March 14th).
- Work on your self-documentation assignment (due March 28th)
- Begin work on your lesson plan (due April 5th).
- Work on your group inquiry project (due April 18th)

Week 7: March 7th**No Class – Spring Break****Week 8: March 14th****No Class Meeting – Clinicals (Tentative)****ASSIGNED READINGS TO BE COMPLETED BEFORE THIS CLASS**

- Calabrese Barton, A., Ermer, J.L., Burkett, T.A., & Osborne, M.D. (2003). Relevant science: Activating resources in nonstandard ways. In *Teaching science for social justice* (pp. 93-119). New York, NY: Teachers College Press.
- Ladson-Billings, G. (2009). Culturally relevant teaching. In *The dream keepers: Successful teachers of African American children* (2nd ed.) (pp. 111-137). San Francisco, CA: Jossey-Bass.

ASSIGNMENTS DUE ON THIS DAY

- Student interview

ASSIGNMENTS TO WORK ON/COMPLETE BEFORE THE NEXT CLASS

1. Post question and response on Blackboard.
2. Work on self-documentation assignment (due March 28th).
3. Work on your lesson plan (due April 5th).
4. Work on your group inquiry project (due April 18th).

Week 9: March 21st No Class Meeting – Clinicals (Tentative)

ASSIGNED READINGS TO BE COMPLETED BEFORE THIS CLASS

1. Abell, S.K., & Volkmann, M.J. (2006). *Seamless assessment in science: A guide for elementary and middle school teachers*. Portsmouth, NH: Heinemann.

Read Chapters 1 and 2 – “Seamless Assessment: An Introduction” (pp. 1-10); “Seamless Assessment and the 5Es” (pp. 11-27). *NOTE*: Chapters 3, 4, and 5 present examples in life science, physical science, and earth and space science respectively. In addition to the first two chapters, select **one of these chapters to read based on your area and grade level of interest.

ASSIGNMENTS DUE ON THIS DAY

1. Blackboard question and response

ASSIGNMENTS TO WORK ON/COMPLETE BEFORE THE NEXT CLASS

1. Post question and response on Blackboard.
2. Finish self-documentation assignment (due March 28th).
3. Work on your lesson plan (due April 5th).
4. Work on your group inquiry project (due April 18th).

Week 10: March 28th No Class Meeting – Clinicals (Tentative)

ASSIGNED READINGS TO BE COMPLETED BEFORE THIS CLASS

1. Klentschy, M.P. (2008). *Using science notebooks in elementary classrooms*. Arlington, VA: NSTA press.
2. Fulwiler, B.R. (2007). *Writing in science: How to scaffold instruction to support learning*. Portsmouth, NH: Heinemann.

ASSIGNMENTS DUE ON THIS DAY

1. Self-documentation assignment
2. Blackboard question and response

ASSIGNMENTS TO WORK ON/COMPLETE BEFORE THE NEXT CLASS

1. Post question and response on Blackboard.
2. Work on your lesson plan (due April 5th by 11pm via LiveText).
3. Work on your group inquiry project (due April 18th)

Week 11: April 4th**No Class Meeting – Clinicals (Tentative)****ASSIGNED READINGS TO BE COMPLETED BEFORE THIS CLASS**

1. Read *Ready, Set, Science!* Chapter 5 – “Making Thinking Visible: Talk and Argument” (pp. 87-108).
2. Gallas, K. (1995). Science talks: An overview. In *Talking their way into science: Hearing children's questions and theories and responding with curricula* (pp. 17-31). New York, NY: Teachers College Press.

ASSIGNMENTS DUE ON THIS DAY

1. Blackboard question and response

ASSIGNMENTS TO WORK ON/COMPLETE BEFORE THE NEXT CLASS

1. Post question and response on Blackboard.
2. Finish your lesson plan (due by 11pm on April 5th via LiveText).
3. Work on your group inquiry presentation (due April 18th)

Week 12: April 11th**No Class Meeting – Clinicals (Tentative)****ASSIGNED READINGS TO BE COMPLETED BEFORE THIS CLASS**

1. Read *Ready, Set, Science!* Chapter 7 – “Learning from Science Investigations” (pp. 127-148).
2. Beeman-Cadwallader, N., Quigley C., & Buck, G. (2010). Fix the potholes! Helping students translate their interests and life experiences into scientific investigations. *Science Scope*, 33(8), 42-46.

ASSIGNMENTS DUE ON THIS DAY

1. Blackboard question and response

ASSIGNMENTS TO WORK ON/COMPLETE BEFORE THE NEXT CLASS

1. Finish your group inquiry presentation (due April 18th)

Week 13: April 18th**What have we learned? What new questions do we have?****ASSIGNED READINGS TO BE COMPLETED BEFORE THIS CLASS**

1. Read *Ready, Set, Science!* Chapter 8 – “A System that Supports Science Learning” (pp. 149-166).

LESSON PLAN ASSIGNMENT RUBRIC

| | Target | Acceptable | Unacceptable |
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| <p><u>Target Grade/ Subject</u></p> <p>Identify the target grade and describe the target population and the relevance of the lesson for this population. This should be a full paragraph that describes the population’s likes, dislikes, their developmental stage, etc.</p> <p>(4 pts)</p> | <p>The unique attributes of your target population are very clear <u>and</u> the appropriateness of the lesson (for this group) is obvious.</p> <p>(4 pts)</p> | <p>Description of target population is general <u>and</u> the appropriateness of the lesson (for this group) is clear.</p> <p>(3-2 pts)</p> | <p>Description of target population is vague and/or, the appropriateness of the lesson (for this group) is not convincing.</p> <p>(1-0 pts)</p> |
| <p><u>Objective(s)</u></p> <p>Describe the specific behavior that the students will perform, the conditions under which it will be performed, and the criteria for assessing mastery.</p> <p>Connections to both local (<u>Illinois</u>) and national (<u>National Science Education Standards</u>) standards are included</p> <p>(5 pts)</p> <p><u>Relevant NSTA Standards:</u></p> <p>6a. Understand the curricular recommendations of the National Science Education Standards, and can identify, access, and/or create resources and activities for science education that are consistent with the standards.</p> <p>6b. Plan and implement internally consistent units of study that address the diverse goals of the National Science Education Standards and the needs and abilities of students.</p> <p><u>Relevant IL Standards:</u></p> <p>16A. understands the alignment of student learning standards, instructional strategies, and local curriculum in the development of assessment tools and strategies.</p> <p>16D. understands the importance and impact of state and local assessment policies.</p> | <p>Behavior, criteria, and conditions are clearly communicated and clearly <u>and</u> concisely written.</p> <p>Connections to both local and national standards are included</p> <p>(5 pts)</p> | <p>Two of the three (behavior, criteria, and/or conditions) are apparent.</p> <p>Connections to either the local or the national standards are included</p> <p>(4-3 pts)</p> | <p>Behavior, criteria, and/or conditions are unclear or missing.</p> <p>Connections to local and national standards are not included</p> <p>(2-0 pts)</p> |

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| <p><u>Content</u></p> <p>Present fundamental science concepts that are accurate. Design a lesson that is inquiry-oriented and conveys the nature of science</p> <p>(4 pts)</p> <p><u>Relevant NSTA Standards:</u> 1a, 1b, 1c</p> <p><u>Relevant IPTS Standards:</u> 1A</p> <p><u>Relevant ACEI Standards:</u> Standard 2.2 Science— Candidates know, understand, and use fundamental concepts of physical, life, and earth/space sciences. Candidates can design and implement age-appropriate inquiry lessons to teach science, to build student understanding for personal and social applications, and to convey the nature of science;</p> | <p>Science concepts presented are accurate. The lesson is inquiry-oriented and conveys the nature of science.</p> <p>(4 pts)</p> | <p>Science concepts presented are generally accurate. The lesson is generally inquiry-oriented and conveys the nature of science.</p> <p>(3-2 pts)</p> | <p>Science concepts presented contain inaccuracies. The lesson is generally not inquiry-oriented and does not convey the nature of science.</p> <p>(1-0 pts)</p> |
| <p><u>Materials and Safety</u></p> <p>Include all materials (and explanations if necessary) including electronic files that are needed for lesson. A safety plan or safety precautions are taken care of</p> <p>(4 pts)</p> <p><u>Relevant NSTA Standards:</u></p> <p>9a. Understand the legal and ethical responsibilities of science teachers for the welfare of their students, the proper treatment of animals, and the maintenance and disposal of materials.</p> <p>9b. Know and practice safe and proper techniques for the preparation, storage, dispensing, supervision, and disposal of all materials used in science instruction.</p> <p>9c. Know and follow emergency procedures, maintain safety equipment, and</p> | <p>Materials are provided and explained. A detailed safety plan is enclosed</p> <p>(4 pts)</p> | <p>All materials are included but how they are to be used is a bit unclear. Some safety guidelines are provided</p> <p>(3-2 pts)</p> | <p>All materials are not included and/or are poorly organized. No safety guidelines are provided</p> <p>(1-0 pts)</p> |

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| <p>ensure safety procedures appropriate for the activities and the abilities of students.</p> | | | |
| <p><u>Lesson Description</u></p> <p>Describe how the lesson will work. All segments of the lesson with the estimated time of each are included and there is consistency among different segments. You will describe the lesson so that another teacher could understand it and implement it without your presence. (Note - use a bulleted or numbered list to clearly organize the procedures to follow.). The lesson includes multiple teaching and learning strategies that will promote development of critical thinking and problem solving.</p> <p>You will also (a) include all your planned questions in the lesson, (b) specify what you will do with student responses and (c) consider of what you will do if desired response is not received</p> <p>(10 pts)</p> <p><u>Relevant ACEI Standards: 3.3 Development of critical thinking and problem solving</u>—Candidates understand and use a variety of teaching strategies that encourage elementary students’ development of critical thinking and problem solving.</p> | <p>Description is sufficiently clear to enable a third party to try the lesson out. Description is clear yet economically written.</p> <p>All the required elements are explicitly and clearly covered</p> <p>The lesson includes multiple teaching and learning strategies that will promote development of critical thinking and problem solving.</p> <p>(10-9 pts)</p> | <p>Description is fairly clear. It may be a bit wordy and/or repetitive.</p> <p>Two or more required components are present and explicitly covered.</p> <p>The lesson includes multiple teaching and learning strategies that do not promote development of critical thinking and problem solving.</p> <p>(8-6 pts)</p> | <p>Description is unclear and difficult to follow.</p> <p>Less than two components of the lesson plan are present.</p> <p>The lesson does not include multiple teaching and learning strategies</p> <p>(5-0 pts)</p> |
| <p><u>Evaluation Procedure</u></p> <p>Describe the assessment measure for determining whether the lesson's objective(s) were met.</p> <p>(5 pts)</p> <p><u>Relevant IL Standards:</u> 16H. plans and conducts</p> | <p>The behavior assessed exactly matches the behavior described in the objective and description of the lesson.</p> <p>(5 pts)</p> | <p>The behavior assessed closely resembles the behavior described in the objective and description of the lesson.</p> <p>(4 -3 pts)</p> | <p>The behavior assessed is inconsistent with the behavior described in the objective and description of the lesson.</p> <p>(2-0 pts)</p> |

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| <p>assessment to evaluate student understanding using a variety of tools and strategies.</p> <p><u>Relevant ACEI Standards:</u> Standard 4. Assessment for instruction—Candidates know, understand, and use formal and informal assessment strategies to plan, evaluate and strengthen instruction that will promote continuous intellectual, social, emotional, and physical development of each elementary student.</p> | | | |
| <p><u>Technology Support</u></p> <p>Does technology SUPPORT instructional activity? Technology should not BE the lesson. Do not teach students how to use a word processor for example. Use technology as a tool. Is the use of technology transparent? Students should learn how to use the application without being aware of it. It is a means to an end, not an end in and of itself.</p> <p>(4 pts)</p> <p><u>Relevant NSTA Standards:</u></p> <p>5d. Successfully use technological tools, including but not limited to computer technology, to access resources, collect and process data, and facilitate the learning of science.</p> <p><u>Relevant IPT Standards:</u></p> <p>4E. Understands how to integrate technology into classroom instruction</p> <p>4H. Understands the uses of technology to address student needs.</p> <p>CF-5: Candidates demonstrate technological knowledge and skills which enhance education.</p> | <p>The technology supports the instructional objective in a meaningful way. It enhances it and possibly facilitates additional beneficial outcomes not directly measured.</p> <p>(4 pts)</p> | <p>The technology does support the lesson but may "get in the way" somewhat, e.g., when students need to "learn" to use the software as a separate endeavor.</p> <p>(3-2 pts)</p> | <p>Technology tends to be the focus of the lesson. Technology intrudes into the lesson or becomes the activity itself, e.g., teaching students how to use a spreadsheet.</p> <p>(1-0 pts)</p> |
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| <p><u>Motivating Lesson?</u></p> <p>Is the lesson/activity intrinsically motivating? Does it build upon students' prior beliefs, knowledge, experiences, and interests? The activity must engage and motivate. Ask yourself the question "Why will students care?"</p> <p>(5 pts)</p> <p><u>Relevant NSTA Standards:</u></p> <p>5e. Understand and build effectively upon the prior beliefs, knowledge, experiences, and interests of students.</p> <p><u>Relevant IPT Standards:</u></p> <p>5D. Understands factors that influence motivation and engagement and how to help students become self-motivated.</p> <p><u>Relevant ACEI Standards:</u></p> <p>Standard 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;</p> <p>Standard 1. Development, Learning, and Motivation— Candidates know, understand, and use the major concepts, principles, theories, and research related to development of children and young adolescents to construct learning opportunities that support individual students' development, acquisition of knowledge, and motivation.</p> | <p>Activity is interesting and engaging for the target population. It builds upon students' prior beliefs and experiences. It is fun, even goofy enough to motivate students to do whatever it takes to accomplish it and would want to do it again.</p> <p>(5 pts)</p> | <p>Activity is reasonably different from students' normal classroom activities. It builds upon students' prior beliefs and experiences. Students are motivated to try the activity.</p> <p>(4-3 pts)</p> | <p>The activity is dry and boring. The activity does not build upon students' prior knowledge and experiences.</p> <p>(2-0 pts)</p> |
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| <p><u>Accommodations</u></p> <p>Lesson includes accommodations designed to achieve maximum congruity with the learning styles, abilities, and cultural factors of students. (5 pts)</p> <p><u>Relevant NSTA Standards:</u></p> <p>5a. Vary their teaching actions, strategies, and methods to promote the development of multiple student skills and levels of understanding.</p> <p>5b. Successfully promote the learning of science by students with different abilities, needs, interests, and backgrounds.</p> <p><u>Relevant IPT Standards:</u></p> <p>3A. Understands the areas of exceptionality in learning as defined in the Individuals with Disabilities Act (IDEA) and the Illinois Administrative Code.</p> <p>3B. Understands the process of second language acquisition and strategies to support the learning of students whose first language is not English.</p> <p>3C. Understands how students' learning is influenced by individual experiences, talents, and prior learning, as well as language, culture, family, and community values.</p> <p>3D. Understands and identifies differences in approaches to learning and performance, including different learning styles, multiple intelligences, and performance modes.</p> <p>3E. Understands cultural and community diversity through a well-grounded framework and understands how to learn about and incorporate students' experiences, cultures, and community resources into instruction.</p> <p><u>Relevant ACEI Standards:</u> 3.2 Adaptation to diverse students—Candidates</p> | <p>Lesson includes several accommodations to address different learning styles, abilities, and cultural factors of students. (5 pts)</p> | <p>Lesson includes few accommodations to address different learning styles, abilities, and cultural factors of students. (4-3 pts)</p> | <p>Lesson does not include any accommodations to address different learning styles, abilities, and cultural factors of students. (2-0 pts)</p> |
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| <p>understand how elementary students differ in their development and approaches to learning, and create instructional opportunities that are adapted to diverse students.</p> | | | |
| <p>Interdisciplinary Connections Lesson includes connections to other disciplines.</p> <p>(4 pts)</p> <p>IPTS 1L</p> <p><u>Relevant ACEI Standards:</u> Standard 2.3 Mathematics—Candidates know, understand, and use the major concepts and procedures that define number and operations, algebra, geometry, measurement, and data analysis and probability. In doing so they consistently engage problem solving, reasoning and proof, communication, connections, and representation;</p> <p>Standard 2.4 Social studies—Candidates know, understand, and use the major concepts and modes of inquiry from the social studies—the integrated study of history, geography, the social sciences, and other related areas—to promote elementary students’ abilities to make informed decisions as citizens of a culturally diverse democratic society and interdependent world;</p> <p>Standard 2.5 The arts—Candidates know, understand, and use—as appropriate to their own understanding and skills—the content, functions, and achievements of the performing arts (dance, music, theater) and the visual arts as primary media for</p> | <p>Interdisciplinary connections are highly appropriate, meaningful and relevant.</p> <p>(4 pts)</p> | <p>Interdisciplinary connections are appropriate, meaningful and relevant.</p> <p>(3-2 pts)</p> | <p>Interdisciplinary connections are not appropriate, meaningful and/or relevant.</p> <p>(1-0 pts)</p> |

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| <p>communication, inquiry, and engagement among elementary students;</p> <p>Standard 2.6 Health education—Candidates know, understand, and use the major concepts in the subject matter of health education to create opportunities for student development and practice of skills that contribute to good health;</p> <p>Standard 2.7 Physical education—Candidates know, understand, and use—as appropriate to their own understanding and skills—human movement and physical activity as central elements to foster active, healthy life styles and enhanced quality of life for elementary students.</p> | | | |
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