EDUC552: Instructional Methods: Science Fall 2015 Syllabus

ANTIOCH UNIVERSITY SEATTLE
School of Education
Purpose of the School of Education: The School of Education promotes constructivist pedagogy, critical reflection and a commitment to social justice through transformative education and realized by positive impact on the learner's growth, in school and beyond.

Credits:	3
Day & Dates & Time:	Wednesday, 6:15-9:45 PM
Quarter/Year:	Fall 2015
Location:	Antioch Campus
Instructor:	Carolyn Colley
Contact information:	ccolley@antioch.edu
Office Hours:	Email to set up appointment

Course Description
Teacher candidates experience practice-based science learning and teaching. Learning experiences integrate the use of technology, highlight multicultural and sustainability issues present in science education, and apply current science assessment practices. Students develop practice-based, multicultural lessons that are based on Next Generation Science and Washington State Environmental and Sustainability Standards, with emphasis placed on student learning, assessing student understanding, culturally responsive teaching, and reflective teaching practices.

Course Essential Questions
This course is guided by the following essential questions:
- How do students learn science?
- What teaching practices help students make sense of science?
- How can I facilitate the learning process in my classroom?
- How can I help students make sense of science through the use of school, local, and global community resources and lived experiences? How will this help me reach all of my students?
- Why is it important to reach all learners in the science classroom and know them as individuals? How can I do this?

Course Learning Objectives
- Teacher candidates (TC) will learn how to effectively plan for, instruct, and assess K-8 standards-based science instructional plans that meet the needs of diverse learners.
    - TCs will design lessons that elicit student understandings of a scientific big idea, provide sensemaking opportunities for students, and allow students to apply their understanding to a new situation.
    - Evidence of student learning will be gathered from multiple sources of assessment and used to modify instruction in-the-moment and for consecutive lessons.
- TCs will design, reflect upon, and modify science instruction that uses students' everyday lives as the basis of learning. Student, classroom, school and community context and

students' assets will form and shape science instruction. Families and community connections will be an intricate part of lesson design and reflection.
- TCs will reflect upon how K-8 students learn and build models of science and adjust/modify instruction according to how students learn science.
- TCs will design reflect upon, and modify K-8 science lessons that are differentiated for the needs of the classroom learners.
- TCs will practice and reflect upon discourse strategies that help foster productive learning in science classrooms.

Course Requirements

1. *Attendance*: Students are expected to attend all scheduled classes. Credits may be denied for failure to attend classes. (Antioch University Seattle Catalog)
2. *Incomplete policy*. The University expects students to complete all coursework by the end of the quarter. In exceptional circumstances, students may request an exception and negotiate with the instructor for an Incomplete (Inc).
3. *Participation* in class exercises and discussions.
4. *Course Evaluations*: Students evaluate all courses during Weeks 4 and 7. The final course evaluation (Week 7) is required for all students in all courses.

Required Course Texts (will be used for Week 2)

- Rosebery, A. S. & Warren B. (2008). *Teaching Science to English Language Learners: Building on Students' Strengths*. NSTA Press: Arlington, Virginia.
- Michaels, S., Shouse, A. W., & Schweingruber, H. A. (2008). *Ready, Set, Science! Putting Research to Work in K-8 Science Classrooms*. Board on Science Education, Center for Education, Division of Behavioral and Social Sciences, and Education. Washington, DC: The National Academies Press. Available for purchase but also for free online here: http://www.nap.edu/openbook.php?record_id=11882

Recommended Texts (not required)

- Cartier, J.L., Smith, M.S., Stein, M.K., & Ross, D. K. (2013). *5 Practices for Orchestrating Productive Task-Based Discussions in Science*. The National Council of Teachers of Mathematics, Inc. Reston. VA: NSTA Press.
- Zembaul-Saul, C.L., McNeill, K.L., Hershberger, K. (2012) *What's Your Evidence? Engaging K-5 Children in Constructing Explanations in Science.* Pearson Professional Development. (Print copy includes CD-ROM with teaching examples)

Standards (bookmark and/or download to your computer)

- Common Core Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects: http://www.corestandards.org/assets/CCSSI_ELA%20Standards.pdf
- Common Core for Mathematics: http://www.corestandards.org/assets/CCSSI_Math%20Standards.pdf
- Next Generation Science Standards (NGSS): http://www.nextgenscience.org/search-standards-dci (can download dci version)

- English Language Proficiency (ELPs): http://www.k12.wa.us/MigrantBilingual/ELD.aspx
- Environmental & Sustainability Education (ESE) Learning Standards: http://www.k12.wa.us/EnvironmentSustainability/default.aspx

Recommended Resources

- AAAS, *Benchmarks for Science Literacy*, 1993. http://www.project2061.org/publications/bsl/online/index.php
- AAAS, *Science for All Americans* (Project 2061), 1990. http://www.project2061.org/publications/sfaa/online/sfaatoc.htm
- Science and Children and Science Scope: These are NSTA practitioner journals aimed for elementary and middle school science teachers. See http://www.nsta.org/publications/journals.aspx for information.

Websites for lesson plans and instructional resources:

- http://ambitiousscienceteaching.org/
- http://www.nsta.org/ (National Science Teachers Association)
- http://dev.nsta.org/ssc/ (High School NSTA units)
- http://www.accessexcellence.org/ (Access Excellence)
- http://cse.edc.org/ (Center for Science Education)
- http://www.sciencenetlinks.com/ (AAAS)
- http://www.project2061.org/default_flash.htm (AAAS)
- http://www.nationalgeographic.com/education/ (National Geographic)
- http://www.lhs.berkeley.edu/ (Lawrence Hall of Science)
- http://school.discovery.com/ (Discovery Channel)

Assignments:

1. **Attendance and active participation and reading reflections**:
    - **Reading:** Weekly reading assignments are noted on the class schedule. Additional readings may be assigned in class. Reflective discussions will take place during class. Students should be an active reader by making notes and writing down questions, thoughts, and reflections.
    - **Active participation**: We are all responsible for making this class an engaging and safe environment. Effective participation means *being prepared for class, having completed assignments, and engaging in class discussions.* Participating also means creating safe spaces, monitoring our airtime, listening to and valuing others, being sensitive to who gets to speak, assuming "best intentions" and being mindful of impact, and also being able to challenge each other. We will make norms our first week and continue to modify them as needed.

2. **Teaching Enactments (TE) - Occur during weeks 3, 5, and 7:** Students will plan, teach, experience, and reflect on three teaching enactment sessions throughout the quarter that hang together as lessons that would be found within the scope of one science instructional unit. Each student will teach three 20-minute lessons. Teaching enactment details will be provided in class.

Class Schedule and Summary of Assignment Due Dates

The schedule, assignments, and course content are subject to change at the discretion of faculty member.

Class	Class overview	Assignment(s) Due	Reading(s) Due
Week 1 10/07/15	1) Introductions, Norms, & Syllabus 2) Differentiation focus: Multicultural perspectives in science 3) Social justice science teaching (SJST) 4) Science & you 5) Anchoring a unit: Developing a central focus (action-oriented event or phenomenon) for 3-lesson sequence (TE I, II, III) 6) School, classroom, community contexts	None ☺	
Week 2 10/14/15	1) Discussion of Readings 2) Teaching Enactment (TE) overview 3) Example TE I lesson - Eliciting Students' Ideas 4) ELPs & focus on language acquisition	Draft of TE I lesson plan (eliciting ideas)	Rosebery & Warren (R&W): Ch. 1, 2, 20, 21 *Ready, Set, Science! (RSS)* Ch. 1 & 2
Week 3 10/21/15	*1)* ***TE I enactment*** 2) TE I analysis of student voice and positive impact on student learning (PISL) reflection 3) TE II planning time	Reviewed, revised, & practiced final TEI lesson plan	R&W: Ch.4, 5, 6 *RSS:* Ch. 3
Week 4 10/28/15	1) Discussion of Readings 2) Example TE II sense making lesson 3) Revisiting central focus & planning for TE II 4) SJST & Differentiation focus	TEI reflection Draft of TE II lesson plan	R&W: Ch.10, 11, 12 *RSS:* Ch. 4 & 5
Week 5 11/4/15	*1)* ***TE II Sense making enactment*** 2) TE II analysis: student voice & PISL 3) TE III planning	Reviewed, revised, & practiced final TE II lesson plan	R&W: Ch. 7, 8, 9
Week 6 11/11/15	1) Discussion of Readings 2) TE III Pressing for explanation lesson example 3) Accommodating all learners 4) TE III planning and practice	TE II reflection Draft of TE III lesson	R&W: Ch.13, 14, 15
Week 7 11/18/15	*1)* ***TE III: Pressing for explanation: application of learning enactment*** 2) Reflecting on Growth in TE I→II→III 3) What is next for you? Professional disposition and instructional reflection 4) Final Course Evaluation	Reviewed, revised, & practiced TE III lesson Theory of Action	R&W: Ch. 18, 19 *RSS* Ch. 6 & 7

Rubrics for assignments

Assignment	Expectations Unmet	Expectations Met	Expectations Met High
Attendance and completion of reading	More than 2 absences, or make-up assignments for absences were not completed, or did not meet expectations; Not prepared for class	One-two absence(s) during quarter, and make-up assignment met expectations; prepared for class	No absences during quarter; Prepared for and engaged in class
Teaching Enactment I: Eliciting student ideas	TE I LP not completed according to AUS standards.	TE I LP completed according to AUS and course standards. Lesson elicited student understanding of scientific big idea. Candidate linked assessment to learning objective.Student learning guided lesson.Active participant in peer's lessons and reflection.Lesson reflection complete. Level 1 or 2 on EdTPA rubric distributed in class.	Met requirements. Candidate preplanned back pocket questions and used student responses to inform instruction and direction of lesson. Lesson plan reflection reflected deep knowledge of positive impact on student learning and student voice. Level 3, 4 or 5 on EdTPA rubric distributed in class.
Teaching Enactment II: Sense making opportunities	TE II LP not completed according to AUS standards.	TE II LP completed according to AUS and course standards. Lesson based on elicitation of student understanding obtained in TE I. Lesson provided students with sense making opportunities of the scientific big idea. Candidate linked assessment to learning objective.Student learning guided lesson.Active participant in peer's lessons and reflection.Lesson reflection complete. Level 1 or 2 on EdTPA rubric distributed in class.	Met requirements. Candidate preplanned back pocket questions and used student responses to inform instruction and direction of lesson.Candidate's lesson allowed for student understanding to be exposed through classroom dialogue. Opportunities for students to reflect upon learning objective and self-assessment were provided. Lesson plan reflection reflected deep knowledge of positive impact on student learning and student voice. Level 3, 4 or 5 on EdTPA rubric distributed in class.
Teaching Enactment III: Application of learning	TE III LP not completed according to AUS standards.	TE III LP completed according to AUS and course standards. Students provided with opportunities to apply scientific big idea to a new situation. Candidate linked assessment to learning objective. Active participant in peer's lessons and reflection. Student learning guided lesson. Lesson reflection complete. Growth over three lesson sequence. Level 1 or 2 on EdTPA rubric distributed in class.	Met requirements. Candidate preplanned back pocket questions and used student responses to inform instruction and direction of lesson. Significant growth over three-microteaching lessons--attention to specific instructional practices that pushed candidate to focus on student learning. Lesson plan reflection reflected deep knowledge of positive impact on student learning and student voice. Level 3, 4 or 5 on EdTPA rubric distributed in class.
Theory of Action	ToA not completed according to AUS standards	ToA completed to AUS and course standards. Students show how they are applying knowledge from course readings and field experiences to their theory of action in teaching science to diverse students.	Met requirements. Candidates demonstrated growth in understanding of science teaching and learning practices over the quarter by using specific examples, connections to research, and naming practices that focus on student learning.
Overall course outcome	One or more of class assignments or expectations were not met.	All class assignments or expectations were met.	All class assignments or expectations met at a high level.

Antioch University Policies

Antioch University is committed to building a vibrant and inclusive educational environment that promotes learning and the free exchange of ideas. Our academic and learning communities are based upon the expectation that their members uphold the shared goal of academic excellence through honesty, integrity, and pride in one's own academic efforts and respectful treatment of the academic efforts of others.

All students are expected to comply with Antioch University policies, including the Title IX Sexual Harassment and Sexual Violence Policy and the Student Conduct Policy. To access academic, student, and other university policies are available online: http://aura.antioch.edu/au_policies/.

Antioch University Seattle Procedures

In addition to the above Course Requirements, students are responsible for abiding by the description of professional behavior as well as the following guidelines. Refer to the current Antioch University Seattle Catalog and the current Antioch University Student Handbook for full descriptions and procedures.

1. Attendance: Students are expected to attend all scheduled classes. Credits may be denied for failure to attend classes. Refer to the current Antioch University Seattle Catalog for full description.
2. Plagiarism: Plagiarism is defined as the presentation of an idea or a product as one's own, when that idea or product is derived from another source and presented without credit to the original source. "Idea or product" includes not only written work but also artworks, images, performances or ideas expressed orally of via any electronic, or other medium. Refer to the current Antioch University Seattle Catalog for full description and procedures.
3. Student Suspension, Dismissal, or Exclusion from Class Procedures. Refer to the current Antioch University Seattle Student Handbook for full description and procedures.
4. Communication Protocol: All students must have access to computer technology. AUS maintains a computer laboratory as well as computer access in the AUS Library.
   E-mail accounts and addresses are assigned for all Antioch Seattle students. Students are required to check their e-mail accounts at least weekly and are responsible for being aware of information posted as official announcements and through their programs.
   To comply with students' record confidentiality and security requirements, official e-mail communication with Antioch Seattle, including e-mail between students and instructors, should originate from and be conducted within the Antioch University Seattle e-mail system. Refer to the current Antioch University Seattle Catalog for full description and procedures.
5. Incomplete Policy and In Progress. The University expects students to complete all coursework by the end of the quarter. In exceptional circumstances, students may request an exception and negotiate with the instructor for an Incomplete (Inc). An Incomplete may be granted solely at the discretion of the instructor. Classroom courses may be allowed up to one additional quarter. Other courses may be allowed up to two additional quarters to complete the Inc. If the work is not completed by the final deadline set by the instructor and an assessment has not been submitted, a No Credit (NC) will be assigned, not subject to change. To earn credit for a course deemed No Credit or permanently incomplete, the student must reenroll in and repay for the course. Incomplete contracts are not available to non-matriculated/visiting students. Upon withdrawal from Antioch, outstanding courses incomplete are converted to NC (No Credit). An NC is permanent and not subject to change. Students must complete all course and degree requirements prior to or on the last day of classes of a term to be eligible to graduate that term. Refer to the current Antioch University Seattle Catalog for full description and procedures.

Reasonable Accommodation of Students with Disabilities

Antioch University is committed to providing reasonable accommodations to qualified students with disabilities in accordance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 2008.

Students with disabilities may contact the Disability Support Services office to initiate the process and request accommodations that will enable them to have an equal opportunity to benefit from and participate in the institution's programs and services. Students are encouraged to do this as early in the term as possible, since reasonable accommodations are not retroactive. The Disability Support Services office is available to address questions regarding reasonable accommodations at any point in the term.

Students in need of accommodation should contact the Disability Support Services (DSS) Office 206-268-4151 or TTY: 206-728-5745 or dss@antioch.edu to request reasonable accommodations.

Students are responsible for giving their faculty members a Letter of Accommodation from the DSS office as soon as possible in the quarter. In cases that the disability accommodation of extended time on assignments is granted, each assignment must be discussed and specific due dates agreed upon in advance between student and faculty.

All assignments align with AUS GTP Program Outcomes and AUS School of Education's conceptual framework

Program outcomes:

1. Multicultural Competency and Sensitivity, and a Commitment to Social Justice
2. Reflective Practice
3. Personal Qualities as a Leader
4. Knowledge of the Learner
5. Content Area Expertise
6. Student-centered Curriculum and Instruction
7. Personal Qualities as a Teacher
8. Sensitivity to the Community Context of Teaching and Learning
9. Responsibility to Washington State Standards

Conceptual Framework

1) Promotion of constructivist pedagogy
2) Promotion of critical reflection
3) Promotion of deep commitment to social justice through transformative education
4) Promotion of dedication to the learner's growth, in school and beyond

Course assignment alignment with State and University Standards

Standard V (WAC 181-78A-270(1))	edTPA Washington rubric (language from Elem. Math TPA)	Course assignments
a. Effective teaching		
(i)Using multiple instructional strategies, including the principles of second language acquisition, to address student academic language ability levels and cultural and linguistic backgrounds	EM10: How does the candidate use knowledge of students' language development to identify a key language demand central to content learning? EM11: How does the candidate support academic language development associated with content learning? EM12: How does the candidate reveal students' understanding and use of academic language associated with content learning?	Teaching Enactment
(ii) Applying principles of differentiated instruction, including theories of language acquisition, stages of language, and academic language development, in the integration of subject matter across the content areas	EM10: How does the candidate use knowledge of students' language development to identify a key language demand central to content learning? EM11: How does the candidate support academic language development associated with content learning?	Teaching Enactment Readings Class discussion

of reading, mathematical, scientific, and aesthetic reasoning	EM12: How does the candidate reveal students' understanding and use of academic language associated with content learning?	
(iii) Using standards-based assessment that is systematically analyzed using multiple formative, summative, and self-assessment strategies to monitor and improve instruction	EM3: How are the informal and formal assessments selected or designed to provide evidence of student progress toward the standards/learning targets? EM6: How does the candidate demonstrate an understanding of student performance with respect to standards/learning targets? EM8: How does the candidate use conclusions about what students know and are able to do to plan next steps in instruction? EM7: How does the candidate provide students feedback to guide their further learning? EM9: How does the candidate use evidence to evaluate and change teaching practice to meet the varied learning needs?	Teaching Enactment
(iv) Implementing classroom/school centered instruction, including sheltered instruction that is connected to communities within the classroom and the school, and includes knowledge and skills for working with others	EM4: How does the candidate actively engage students in developing understandings of mathematical concepts?	Teaching Enactment Readings Class discussion
(v) Planning and/or adapting standards-based curricula that are personalized to the diverse needs of each student	EM2: How does the candidate use knowledge of his/her students to target support for students' development of conceptual understanding, computational/procedural fluency, and mathematical reasoning/problem solving skills?	Teaching Enactment Readings Class discussion
(vi) Aligning instruction to the learning standards and outcomes so all students know the learning targets and their progress toward meeting them	EM13: How does the candidate focus student attention on the learning targets? EM14: How does the candidate support students to access resources for learning and to monitor their own learning progress? EM15: How does the candidate use student-voice evidence to identify instructional improvements?	Teaching Enactment
(vii) Planning and/or adapting curricula that are standards driven so students develop understanding and problem-solving expertise in the content area(s) using reading, written and oral communication, and technology	EM1: How do the candidate's plans build conceptual understanding, computational/procedural fluency, and mathematical reasoning/problem solving skills? EM4: How does the candidate actively engage students in developing understandings of mathematical concepts? EM5: How does the candidate elicit and monitor students' responses to deepen their understanding of mathematical concepts?	Teaching Enactment
(viii) Preparing students to be responsible citizens for an environmentally sustainable, globally interconnected, and diverse society		Teaching Enactment
(ix) Using technology that is		Teaching Enactment

effectively integrated to create technologically proficient learners		Discussion Forum
(x) Informing, involving, and collaborating with families/neighborhoods, and communities in each student's educational process, including using information about student cultural identity, achievement and performance	EM2: How does the candidate use knowledge of his/her students to target support for students' development of conceptual understanding, computational/procedural fluency, and mathematical reasoning/problem solving skills?	Teaching Enactment
b. Professional development		
Developing reflective, collaborative, professional growth-centered practices through regularly evaluating the effects of his/her teaching through feedback and reflection	EM8: How does the candidate use conclusions about what students know and are able to do to plan next steps in instruction EM9: How does the candidate use evidence to evaluate and change teaching practice to meet the varied learning needs?	Teaching Enactment
c. Teaching as a profession		
(i)Participating collaboratively and professionally in school activities and using appropriate and respectful verbal and written communication	NA	Pre-internships Class discussion
(ii)Demonstrating knowledge of professional, legal, and ethical responsibilities and policies	NA	Pre-internships

Course Acknowledgements
I would like to acknowledge the work of Dr. Sara Hagenah for her support and feedback on this syllabus and assignments based on her previous experiences designing and facilitating this course over the past several years.