GEORGE MASON UNIVERSITY
COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT
GRADUATE SCHOOL OF EDUCATION
ELEMENTARY EDUCATION

EDCI 553 6K3: SCIENCE METHODS FOR THE ELEMENTARY CLASSROOM
3 Credits, Fall 2014
Face-to-face meetings on Wednesdays 9/3, 10/1, & 10/8 @ 5 – 9 p.m. Asynchronous online modules the weeks of 9/8 - 22 Arlington Campus, Founder's Hall Room 120

PROFESSOR(S):
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COURSE DESCRIPTION:

A. Prerequisites/Corequisites
This course is only open to students in the TFA Program of Elementary Education

B. University Catalog Course Description
Develops skills and abilities in science teaching methods, applications of technology, safety practices, and creation of integrated science curricula. Examines science teaching based on contemporary theory, practice, and standards.

C. Expanded Course Description
Not Applicable

LEARNER OUTCOMES or OBJECTIVES:
This course is designed to enable students to:

A. Further develop your content knowledge base in science and health through a hands-on, inquiry-based approach that includes investigative problem-solving
B. Develop a series of interdisciplinary lesson plans utilizing a variety of science and health education materials and technology resources
C. Predict safety issues when preparing for a hands-on classroom experience
D. Collect a variety of materials for future use in your classroom via the course, field site, and community resources
E. Examine science and health curricula and methods with respect to "Science for All" and standards documents at local, state, and national levels
F. Develop an annotated bibliography of resources aligned with Virginia's Science and Health Standards of Learning
G. Develop an assessment tool for use in the science and health classroom

NATURE OF COURES DELIVERY:

This course will be delivered using a hybrid model. Face-to-face meetings will be on Wednesdays 9/3, 10/1, & 10/8 from 5 – 9 p.m. Asynchronous online modules will be used the weeks of 9/8 – 22. Face to face meetings will be held on the Arlington Campus in Founder's Hall Room 120.

PROFESSIONAL STANDARDS (INTASC (2011)):

#1. Learner Development. The teacher understands how learners grow and develop, recognizing that patterns of learning and development vary individually within and across the cognitive, linguistic, social, emotional, and physical areas, and designs and implements developmentally appropriate and challenging learning experiences.

#2. Learning Differences. The teacher uses understanding of individual differences and diverse cultures and communities to ensure inclusive learning environments that enable each learner to meet high standards.

#3. Learning Environments. The teacher works with others to create environments that support individual and collaborative learning, and that encourage positive social interaction, active engagement in learning, and self motivation.

#4. Content Knowledge. The teacher understands the central concepts, tools of inquiry, and structures of the discipline(s) he or she teaches and creates learning experiences that make the discipline accessible and meaningful for learners to assure mastery of the content.

#5. Application of Content. The teacher understands how to connect concepts and use differing perspectives to engage learners in critical thinking, creativity, and collaborative problem solving related to authentic local and global issues.

#6. Assessment. The teacher understands and uses multiple methods of assessment to engage learners in their own growth, to monitor learner progress, and to guide the teacher's and learner's decision making.

#7. Planning for Instruction. The teacher plans instruction that supports every student in meeting rigorous learning goals by drawing upon knowledge of content areas, curriculum, cross-disciplinary skills, and pedagogy, as well as knowledge of learners and the community context.

#8. Instructional Strategies. The teacher understands and uses a variety of instructional strategies to encourage learners to develop deep understanding of content areas and their connections, and to build skills to apply knowledge in meaningful ways.

#9. Professional Learning and Ethical Practice. The teacher engages in ongoing professional learning and uses evidence to continually evaluate his/her practice, particularly the effects of his/her choices and actions on others (learners, families, other professionals, and the community), and adapts practice to meet the needs of each learner.

#10. Leadership and Collaboration. The teacher seeks appropriate leadership roles and opportunities to take responsibility for student learning, to collaborate with learners, families, colleagues, other school professionals, and community members to ensure learner growth, and to advance the profession.

ACEI:

2.2 Science— Candidates know and understand fundamental concepts of physical, life, and earth/space sciences as delineated in the National Science Education Standards. Candidates can design and implement age-appropriate inquiry lessons to teach science, to build student understanding of personal and social applications, and to convey the nature of science. (INTASC #1 Subject Matter Knowledge)

3.1 Integrating and applying knowledge for instruction— Candidates plan and implement instruction based on knowledge of students, learning theory, connection across the curriculum, curricular goals, and community. (INTASC #7 Planning)

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. (INTASC #5 Management)

3.5 Communication to foster learning— Candidates use their knowledge and understanding of effective verbal, nonverbal, and media communication techniques to foster activity inquiry, collaboration, and supportive interaction in the elementary classroom. (INTASC #6 Communication)

5.2 Professional growth, reflection, and evaluation—Candidates are aware of and reflect on their practice in light of research on teaching, professional ethics, and resources available for professional learning; they continually evaluate the effects of their professional decisions and actions on students, families, and other professionals in the learning community and actively seek out opportunities to grow professionally. (INTASC #9 Reflection)

VA Health Education Standards of Learning:

Goal 1: Knowledge and Skills: Act with skill and reason to demonstrate an understanding of the concepts and behaviors that reduce health risks and enhance the health of self and others.

Goal 2: Information Access and Use: Demonstrate the ability to access, evaluate, and use health information, products and services that influence health and well-being in a positive manner.

Goal 3: Community Health and Wellness: Demonstrate the use of appropriate health practices and behaviors to promote a safe and healthy community when alone, with family, at school, and in other group settings.

Technology (ISTE NETS):

I. Teachers use their knowledge of subject matter, teaching and learning, and technology to facilitate experiences that advance student learning, creativity, and innovation in both face-to-face and virtual environments.

II. Teachers design, develop, and evaluate authentic learning experiences and assessments incorporating contemporary tools and resources to maximize content learning in context and to develop the knowledge, skills, and attitudes identified in the NETS•S.

III. Teachers exhibit knowledge, skills, and work processes representative of an innovative professional in a global and digital society.

IV. Teachers understand local and global societal issues and responsibilities in an evolving digital culture and exhibit legal and ethical behavior in their professional practices.

V. Teachers continuously improve their professional practice, model lifelong learning, and exhibit leadership in their school and professional community by promoting and demonstrating the effective use of digital tools and resources.

Student Outcomes Referenced to Selected National Standards

Learning Outcomes	**INTASC Standards**	**ACEI**	**VA Health**	**ISTE NETS**
A	4	2.2, 2.6	1, 2, 3	I, II, III, IV, V
B	1, 2, 3, 4, 5, 6, 7, 8, 9	2.2, 2.6, 3.1, 3.4, 3.5, 5.2	1, 2, 3	I, II, III, IV, V
C	1, 2, 8, 9	2.2, 2.6, 3.5, 5.2	1, 2, 3	I, II, III, IV, V
D	5, 7, 10	2.2, 2.6, 3.1	1, 2, 3	I, II, III, IV, V
E	1, 2, 5, 7, 9, 10	2.2, 2.6, 3.1, 5.2	1, 2, 3	I, II, III, IV, V
F	1, 2, 3, 4, 5, 7, 9, 10	2.2, 2.6, 3.1, 3.4, 5.2	1, 2, 3	I, II, III, IV, V
G	4, 6, 7, 9	2.2, 2.6, 3.1	1, 2, 3	I, II, III, IV, V

Key: ISTE NETS = International Society for Technology in Education National Education Technology Standards 2010; INTASC = Interstate New Teacher Assessment and Support Consortium 2011; ACEI = Association for Childhood Education International; VA Health = Virginia Health Education Standards

REQUIRED TEXTS:

Course readings and related materials (handouts and e-reserves as necessary).

Achieve, Inc. (2013). *Next generation science standards*. Available online: http://www.nextgenscience.org/print/121 DO NOT PRINT.

Board of Education, Commonwealth of Virginia. (2010). *Standards of learning for Virginia Public Schools: Science* Available online: http://www.doe.virginia.gov/testing/sol/standards_docs/science/complete/stds_sciencek-12.doc COPY DISTRIBUTED IN CLASS.

Board of Education, Commonwealth of Virginia. (2010). *Science standards of learning curriculum framework.* Available online: http://www.doe.virginia.gov/testing/sol/standards_docs/science DO NOT PRINT.

Board of Education, Commonwealth of Virginia. (2008). *Standards of learning for Virginia Public Schools: Health.* Available online: http://www.doe.virginia.gov/testing/sol/standards_docs/health/complete/stds_healthk-10.doc COPY DISTRIBUTED IN CLASS.

Board of Education, Commonwealth of Virginia. (2003). *K-10 health education technical assistance guide*. Available online: http://www.doe.virginia.gov/instruction/health/technical_assistance_guide/index.shtml DO NOT PRINT.

National Research Council (1996). *National science education standards.* Washington, DC: National Academy Press. Available Online: http://www.nap.edu/openbook.php?record_id=4962&page=R1# DO NOT PRINT.

One* of these two texts:

Bass, J., Contant, T., & Carin, A. (2009). *Teaching science as inquiry, 11th edition.* Upper Saddle River, NJ: Pearson. OTHER EDITIONS ARE FINE.

Bass, J., Carin, A., & Contant, T. (2009). *Methods for teaching science as inquiry, 10th edition.* Upper Saddle River, NJ: Pearson. OTHER EDITIONS ARE FINE.

***Please note that the first option is more expensive, but contains lots of activity examples of science activities in the appendix. The second text is cheaper, but lacks the appendix of examples.**

Student Products Referenced to Learning Outcomes and Selected National Standards

Products	Learning Outcomes	INTASC Standards	ACEI	VA Health	ISTE NETS
Inquiry-Based Unit Project	A, B, C, D, E, G	3, 4, 5, 7, 8, 9	2.2, 2.6, 3.1, 3.4, 3.5, 5.2	1, 2, 3	I, II, III, IV, V
Investigation Project	A, C, D, E	1, 4	2.2, 2.6, 3.4	1, 2, 3	I, II, III, IV, V
Annotated Bibliography Project	D, F	1, 2, 4	2.2, 2.6, 3.1	1, 2, 3	I, II, III, IV, V

COURSE ASSIGNMENTS AND EXAMINATIONS:

Science and health are everywhere around us. Turning on our lights at night, baking a cake, throwing a basketball while expecting someone to catch it, and taking care of our bodies are just a few examples of how we use concepts in science and health on a daily basis. Research on student learning and motivation shows that effective teaching is *grounded in students' prior experiences* and provides ample opportunities for students to *explore* more of their natural world in a *social* context. Through these opportunities, students gain new conceptual knowledge and skills while increasing their overall interest in the science/health disciplines. In this course you will be exposed to a variety of content, curricula, and methods designed to shape your future teaching practices so that your future students will be motivated learners in your classroom.

Further research on the effects of increased conceptual knowledge and skills shows that education is a tool of empowerment. The aim of this course is to provide you with numerous experiences in science/health teaching to empower you as you strive to become an effective elementary classroom teacher. As you utilize experiences gained in this course while continuing in your life-long learning and development of your teaching practices, you will become more and more capable of providing experiences in your classroom that, in turn, will empower your own students to make informed decisions, seek new opportunities, and continue in their progress as life-long learners.

1. Inquiry-Based Unit Project (INDIVIDUAL): 25%

Utilizing problem-based learning with local to global relevance, develop the detailed lesson plans for an integrated unit (at least five lessons) that includes the content areas of science, health, and one additional content area. Use the lesson plan format located in your program manual. You will also need to develop the student sheets and any other supporting materials needed for each of your lesson plans. Do not use student sheets "as is" because you will need to tailor these to fit the particular theme of your unit. Additionally, you will complete either a NEW webpage or PowerPoint presentation to be used during the unit and a culminating assessment of student learning for your unit.

During EDCI 553, you will teach 5 minutes of a lesson plan from your unit (the hands-on science/health portion of the lesson) and will be evaluated by the course instructor using the "Summary Observation Report." The lesson that you select to teach must use hands-on science/health materials.

As your *Performance-Based Assessment* for EDCI 553, the following chart can be used to track your mastery of competencies as documented by your work on this assignment:

Standard	**Rubric Item**
INTASC 1. Learner Development	Not Applicable
INTASC 2. Learning Differences	Not Applicable
INTASC 3. Learning Environments (ACEI 3.4)	H, K, S, T
INTASC 4. Content Knowledge (ACEI 2.2, 2.6)	I1, I2, J1, J2, L1, L2, M
INTASC 5. Application of Content	I1, I2
INTASC 6. Assessment	Not Applicable
INTASC 7. Planning for Instruction (ACEI 3.1)	A, B, C, D, E, F
INTASC 8. Instructional Strategies (ACEI 3.5)	N, O, P, R
INTASC 9. Professional Learning and Ethical Practice (ACEI 5.2)	G, Q, U
INTASC 10. Leadership and Collaboration	Not Applicable
INTASC 9. Reflection (ACEI 5.2)	G, Q, U
INTASC 10. Community	Not Applicable

2. Investigation Project (COMBINATION OF GROUP AND INDIVIDUAL) 25%

The academic year provides opportunity for you to explore science instruction in elementary schools. Additionally, you will participate in our in-class investigation experiences in EDCI 553 and submit an experiment report based on the experience. Additionally, for one elementary grade level, answer the following questions:

- What are the investigative skills that students are to learn during your selected grade level according to the grade level's science SOLs?
- How are each of these particular skills used during the design, performance, and/or reporting of a controlled experiment?
- According to local curriculum information you are able to find online or through other resources for that grade level, describe the opportunities students have to learn and practice these skills during the school year.
- To what extent did you observe children learning and practicing these skills? A. Describe what you saw OR B. Describe opportunities in which the instruction you observed could be modified to enhance students' learning of investigative skills described in the grade level's SOLs or local curriculum guide.
- Based on your response to the fourth bullet, A. What were the safety hazards involved and how did you see the teacher prevent them? OR B. What would be the safety hazards involved and how could you prevent them?
- For the science investigation in EDCI 553 that you wrote an experiment report on, what are the safety hazards involved and what could you do to prevent them?

Detailed project descriptions and rubric expectations (including length of essays) can be found on Blackboard.

3. Annotated Bibliography Project (INDIVIDUAL): 25%

Select one science or health SOL for a particular grade level. For the SOL you selected, find one example of a developmentally-appropriate book to use during the teaching of that particular topic/theme. For the book you select, you will need to provide the following information:

a. Topic and SOL:
b. APA citation:
c. Summary of the book:
d. Summary of the science/health concepts addressed via the book including your assessment of its accuracy using a reputable science/health content resource text (cite your resource):
e. Your ideas about HOW the book can be used in the classroom to teach the science/health concepts:
f. One example of an anticipated naïve theory or misconception of students regarding these science/health concepts that the book might propagate:
g. Your strategy for how to prevent this:
h. Your description of how the content of the book relates to a cross-cutting concept in science (see NGSS):
i. Your description of how the content of the book relates to the nature of science (see VMSC/NGSS):
j. Your name:

Detailed project descriptions and rubric expectations (including length of essays) can be found on Blackboard.

4. Online Participation (INDIVIDUAL): 25%

Throughout the course you will participate in a variety of online learning modules designed to support your professional learning with regards to science and health instruction at the PK-6 level. Please see each online module for instructions, requirements, and associated rubrics. Your participation in each online module is required for all tasks and discussions according to rubric expectations.

Special Note for All Projects:

Descriptions of expectations for each project can be found in course documents on Blackboard. Project work will be evaluated according to rubric expectations. All products must be submitted in word-processed format via the method described in the syllabus. *With exception of the PBA, projects may be resubmitted based on instructor feedback and resubmitted once for re-scoring. Project grade of A+ is indicative of performance consistent with "exceeds expectations" for all rows of project's scoring rubric. Project grade of A is indicative of performance consistent with "meets expectations" for all rows of project's scoring rubric. Project grade of B is indicative of performance consistent with no less than 80% of rows in the scoring rubric scored as at least "meets expectations." Please note that you may be required to resubmit projects.* Correct grammar and mechanics are expected of graduate students; work submitted with numerous errors may be returned to the student for editing before grading. APA style is required. All work must be submitted on the date due as identified in the syllabus unless prior arrangements are made with the instructor due to a documented excused reason (illness, illness in family, etc.). The faculty coordinates due dates, so extensions should only be requested when absolutely necessary. Work that is submitted late without consulting the instructor or due to unexcused reason will have 10 percent subtracted per day.

Expectations for Learners and Instructor:

- Comply with the syllabus.
- Log into our course Blackboard at least once a day.
- Check Mason email at least once a day.
- Attend all face-to-face class meetings and complete all module work during the scheduled week.
- Correspondence with the instructor beyond face-to-face is available via email (preferred), phone, and skype. Regarding email correspondence, it is expected that students will respond to emails within 24 hrs Mon-Fri and within 48 hours weekends and holidays (the instructor will abide by this as well).
- If you need help with Blackboard:
    - Check out the Blackboard On Demand Learning Center: http://ondemand.blackboard.com
    - Visit Course Support at http://coursessupport.gmu.edu/
    - The folks in the Collaborative Learning Hub (CLUB) can help M-F (10AM-4PM); phone them at 703-993-3141 or stop by in person (3rd floor of the Johnson Center, Fairfax campus).
- In instances when the Blackboard server is not available, your instructor will modify due dates based on notices received and length of server unavailability.

- Strive to uphold professional dispositions in all communication with others during face-to-face meetings as well as online (the instructor will abide by this as well).

TASKSTREAM REQUIREMENTS

Every student registered for any Elementary Education course with a required performance-based assessment is required to submit this assessment, (Inquiry-Based Unit Project) to TaskStream (regardless of whether a course is an elective, a onetime course or part of an undergraduate minor). Evaluation of the performance-based assessment by the course instructor will also be completed in TaskStream. Failure to submit the assessment to TaskStream will result in the course instructor reporting the course grade as Incomplete (IN). Unless the IN grade is changed upon completion of the required TaskStream submission, the IN will convert to an F nine weeks into the following semester.

GMU POLICIES AND RESOURCES FOR STUDENTS

a. Students must adhere to the guidelines of the George Mason University Honor Code (See **http://oai.gmu.edu/the-mason-honor-code/**).

b. Students must follow the university policy for Responsible Use of Computing (See **http://universitypolicy.gmu.edu/policies/responsible-use-of-computing/**).

c. Students are responsible for the content of university communications sent to their George Mason University email account and are required to activate their account and check it regularly. All communication from the university, college, school, and program will be sent to students solely through their Mason email account.

d. The George Mason University Counseling and Psychological Services (CAPS) staff consists of professional counseling and clinical psychologists, social workers, and counselors who offer a wide range of services (e.g., individual and group counseling, workshops and outreach programs) to enhance students' personal experience and academic performance (See **http://caps.gmu.edu/**).

e. Students with disabilities who seek accommodations in a course must be registered with the George Mason University Office of Disability Services (ODS) and inform their instructor, in writing, at the beginning of the semester (See **http://ods.gmu.edu/**).

f. Students must follow the university policy stating that all sound emitting devices shall be turned off during class unless otherwise authorized by the instructor.

g. The George Mason University Writing Center staff provides a variety of resources and services (e.g., tutoring, workshops, writing guides, handbooks) intended to support students as they work to construct and share knowledge through writing (See **http://writingcenter.gmu.edu/**).

PROFESSIONAL DISPOSITIONS

Students are expected to exhibit professional behaviors and dispositions at all times.

CORE VALUES COMMITMENT

The College of Education & Human Development is committed to collaboration, ethical leadership, innovation, research-based practice, and social justice. Students are expected to adhere to these principles: **http://cehd.gmu.edu/values/**.

For additional information on the College of Education and Human Development, Graduate School of Education, please visit our website http://gse.gmu.edu/.

PROPOSED CLASS SCHEDULE:

ELEM TFA-GMU PROGRAM – FALL 2014 CALENDAR

Week 1 8-31-2014 to 9-6-2014	**Learning Objectives** • Further develop your content knowledge base in science and health through a hands-on, inquiry-based approach that includes investigative problem-solving • Examine science and health curricula and methods with respect to "Science for All" and standards documents at local, state, and national levels • Predict safety issues when preparing for a hands-on classroom experience **Scheduled events** • Face to Face (f2f) meeting on Wednesday, 9-3-2014, 5 – 9 p.m. **Assignments during f2f meeting** • Investigation: Mealworms and poetry • Discussion: How are the mealworm activities aligned with the Virginia science SOLs? (Introduce science SOLs and curriculum framework website) • Discussion: Investigation at the elementary level, Next Generation Science Standards (National Science Standards) • Discussion: Safety • Discussion: Nature of science • Discussion: Technology and science • Investigation: Cornstarch putty • Discussion: Parts of controlled experiment (Introduce Investigation Project) • Investigation continued: Group cornstarch putty or mealworms experiments • Share: Findings from group experiments **Assignments after f2f meeting** • Read: o Chapter 1 (Children, Science, and Inquiry: Some Preliminary Questions) o Chapter 2 (Processes and Strategies for Inquiry) o Chapter 5 (Planning and Managing Inquiry Instruction)
Week 2 9-7-2014 to 9-13-2014	**Learning Objectives** • Further develop your content knowledge base in science and health through a hands-on, inquiry-based approach that includes investigative problem-solving • Examine science and health curricula and methods with respect to "Science for All" and standards documents at local, state, and national levels • Predict safety issues when preparing for a hands-on classroom experience • Develop a series of interdisciplinary lesson plans utilizing a variety of science and health education materials and technology resources **Scheduled events** • Asynchronous online module **Assignments**

	• Module Part 1:
	  o Reading and discussion: “Science Poetry in Two Voices: Poetry and the Nature of Science”
	  o Reading and discussion: Chapter 4 (Teaching Science for Understanding: The 5-E Model of Instruction)
	• Module Part 2:
	  o Nature of science: Why hands-on? Why inquiry-based?
	  o Reading and discussion: Representation of nature of science in NGSS
	  o Explore: Explicit instruction in nature of science
	  o Reading and discussion: Chapter 8 (Technology Tools & Resources for Inquiry Science)
	• ***Submit: Investigation Project due via email by 11:59pm 9-14-2014***

Week 3 9-14-2014 to 9-20-2014	**Learning Objectives** • Develop an annotated bibliography of resources aligned with Virginia's Science and Health Standards of Learning • Develop a series of interdisciplinary lesson plans utilizing a variety of science and health education materials and technology resources • Examine science and health curricula and methods with respect to "Science for All" and standards documents at local, state, and national levels **Scheduled events** • Asynchronous online module **Assignments** • Module Part 1: o Learning cycles in science and the role of children's literature o Introduce Annotated Bibliography Project • ***Submit: Annotated Bibliography Project due via blog entry by 11:59pm 9-21-2014*** • Module Part 2: o Problem-based learning as a strategy for integrated curriculum planning o Reading and discussion: "Weather Tamers" o Read: Chapter 9 (Connecting Science With Other Subjects) • Module Part 3: o Population Connection website (http://www.populationconnection.org) as example of integrated social studies and science instruction o Introduce Inquiry-Based Unit Project o Work on units and plan for micro-teaching (explore resources available; schedule Skype/phone call with instructor to support your initial planning and work)
Week 4 9-21-2014 to 9-27-2014	**Learning Objectives** • Develop a series of interdisciplinary lesson plans utilizing a variety of science and health education materials and technology resources • Examine science and health curricula and methods with respect to "Science for All" and standards documents at local, state, and national levels • Develop an assessment tool for use in the science and health classroom **Scheduled events** • Asynchronous online module **Assignments** • Module Part 1: o Reading and discussion: two articles on differentiation in science at the lower and upper elementary grades ("Ladybugs Across the Curriculum" and "Multiple Intelligences and Lab Groups") o Read: Chapter 10 (Science for All Learners) o Investigation: Mentos • Module Part 2:

	o Read: Chapter 7 (Effective Questioning) o Read: Handout on Guide to Science Talks (Classroom discourse strategies) o Read: Article on assessment in science ("No Wrong Answers") o Read: Chapter 6 (Assessing Science Learning) o Discussion: Questions, discourse, and assessment in science o Work on your unit's culminating assessment and plan for micro-teaching (explore resources available)

Week 5 9-28-2014 to 10-4-2014	**Learning Objectives** • Further develop your content knowledge base in science and health through a hands-on, inquiry-based approach that includes investigative problem-solving • Develop a series of interdisciplinary lesson plans utilizing a variety of science and health education materials and technology resources • Predict safety issues when preparing for a hands-on classroom experience • Examine science and health curricula and methods with respect to "Science for All" and standards documents at local, state, and national levels **Scheduled events** • f2f meeting on Wednesday, 10-1-2014, 5-9 p.m. **Assignments during f2f meeting** • ***Perform: Micro-teaching due during class on 10-1-2014 or 10-8-2014*** • Discussion: The practicalities of science in the elementary classroom (Fitting it in at unexpected times!) • Work on Inquiry-Based Unit Project (explore resources available) **Assignments after f2f meeting** • Read: o Chapter 3 (Learning Science with Understanding)
Week 6 10-5-2014 to 10-11-2014	**Learning Objectives** • Further develop your content knowledge base in science and health through a hands-on, inquiry-based approach that includes investigative problem-solving • Develop a series of interdisciplinary lesson plans utilizing a variety of science and health education materials and technology resources • Predict safety issues when preparing for a hands-on classroom experience • Examine science and health curricula and methods with respect to "Science for All" and standards documents at local, state, and national levels **Scheduled events** • f2f meeting on Wednesday, 10-8-2014, 5-9 p.m. **Assignments during f2f meeting** • ***Perform: Micro-teaching due during class on 10-1-2014 or 10-8-2014*** • Discussion: The practicalities of science in the elementary classroom (Fitting it in at unexpected times!) • Work on Inquiry-Based Unit Project (explore resources available) • ***Submit: Course evaluations DUE DURING CLASS ON 10-8-2014*** **Assignments after f2f meeting** • ***Submit: Inquiry-Based Unit Project due via Taskstream by 11:59pm 10-12-2014***

ASSESSMENT RUBRIC(S):

Overview:

Utilizing problem-based learning with local to global relevance, develop the detailed lesson plans for an integrated unit (at least five lessons) that includes the content areas of science, health, and one additional content area. Use the lesson plan format located in your program manual. You will also need to develop the student sheets and any other supporting materials needed for each of your lesson plans. Do not use student sheets "as is" because you will need to tailor these to fit the particular theme of your unit. Additionally, you will complete either a NEW webpage or PowerPoint presentation to be used during the unit and a culminating assessment of student learning for your unit.

During EDCI 553, you will teach 5 minutes of a lesson plan from your unit (the hands-on science/health portion of the lesson) and will be evaluated by the course instructor using the "Summary Observation Report." The lesson that you select to teach must use hands-on science/health materials.

Activities:

After you have worked with the course instructor to establish a unit theme (integrates one grade level's SOL in science, health, and one other content area), perform the following tasks:

- Utilizing problem-based learning with local to global relevance, develop lesson plans (at least five) for your unit based on your integrated unit's theme. Use the lesson plan format and project rubric to guide you. Develop/modify student sheets needed for each lesson plan. Be sure that your student sheets are customized for the actual lesson plan for which they will be used and are modified to fit the theme.
- Develop a NEW web page or PowerPoint presentation for use during the unit. If designing a web page, include at least 3 links. If designing a PowerPoint presentation, include at least two slides. Submit your work electronically via email to your course instructor.
- Develop a culminating assessment of student learning for your unit and develop a rubric that can be used to score student performance on the culminating assessment. Consider using http://rubistar.4teachers.org to help you. The rubric needs to contain **descriptions** of student performance of various items at varying levels of performance.
- Select a hands-on science/health activity from your unit that you would like to teach during EDCI 553. This hands-on science/health activity should teach a concept defined in one grade level of the Virginia Standards of Learning in Science/Health.
- Bring enough copies of the student sheet that accompanies your activity to distribute in class when you teach your activity.
- Teach 5 minutes of your hands-on science/health activity during EDCI 553 class. At this time, share a photocopy of your student sheet with your fellow classmates. Your instructor will complete a "Summary Observation Report" based on your teaching.
- After you have taught the five-minute activity during EDCI 553 class, lead a brief discussion on what it was like to teach this activity.
- Formal Reflection: Reflect on the experience of teaching the hands-on science/health activity during EDCI 553 (and at your school, if applicable). Include in your reflection: What worked well; what did not work well; and ideas for how the activity, teaching strategies, or student sheet could be improved to better support student learning of concepts via inquiry. Finally, reflect on how your preparation level to teach hands-on science/health has changed over the semester. Support your reflections by specific references to what occurred during the teaching of your hands-on activity during EDCI 553 (and at your school, if applicable). Use the project rubric to guide you. (Minimum length: one double-spaced page)

- Submit REVISED/ FINAL VERSION of lesson plans, student sheets, webpage/PowerPoint, overall assessment with rubric for your unit (noting the lesson that was taught during EDCI 553), and formal reflection.

NOTE: Please email this assignment to me in one file if possible, and send me your file as .docx or .pdf

Checklist for when you lead a class discussion on what it was like to teach the science/health activity:

___ discuss at least two successes

___ discuss at least two areas that need improvement

___ reflect on students' learning of science/health content via the curriculum strategy you selected

___ reflect on students' learning of science/health skills via the curriculum strategy you selected

Rubric for EDCI 553's PBA: Unit Project (You must earn at least 2 for all items or you will be required to resubmit!)

For each lesson plan:

	Exceeds Expectations – 3	Meets Expectations – 2 (Grade = A)	Does Not Meet Expectations – 1	Does Not Meet Expectations – 0
A. Lesson Format (NCATE PLANNING #7; ACEI INTGRT & APPLY KNOWLDGE FOR INSTRCTN #3.1) [*2 pages or less each]*	Utilizes an innovative arrangement of components to make the plan more usable; easy to follow and use; has all required components; self-explanatory	Easy to follow and use; has all required components; self-explanatory	Difficult to use; does not have complete components; OR is not self-explanatory	No consistent format
B. Objectives (NCATE PLANNING #7; ACEI INTGRT & APPLY KNOWLDGE FOR INSTRCTN #3.1)	All are student-oriented objectives and stated in observable student learning outcomes; spans all levels of Bloom's taxonomy; just the perfect amount of objectives; all are appropriate for the lesson	All are student-oriented objectives and stated in observable student learning outcomes; covers some levels of Bloom's taxonomy; has a couple of extra objectives or too few objectives; a few seem somewhat inappropriate for lesson	A mix of student- and teacher-oriented objectives or not stated in terms of observable student learning outcomes; has only minimal levels of Bloom's taxonomy; has way too little or many objectives; OR several seem inappropriate for lesson	Missing
C. Standards (NCATE PLANNING #7; ACEI INTGRT & APPLY KNOWLDGE FOR INSTRCTN #3.1) *[Type out the first time used]*	Lesson addresses all standards that are listed; no standards are missing; incorporates standard into real-life examples; utilizes standards in science, health, and one more content area; utilizes national, state, and local standards	Lesson only addresses some standards that it purports to address and/or some standards are missing; utilizes standards in science, health, and one more content area; utilizes national and state standards	Lesson fails to adequately address standards listed and several of the standards are missing; lesson fails to address standards in science, health or one more content area; OR fails to utilize national or state standards	Missing
D. Materials for Learning Activities (NCATE PLANNING #7; ACEI INTGRT & APPLY KNOWLDGE FOR INSTRCTN #3.1)	List of materials is complete for both teacher and students; includes technology materials	List of materials is complete for both teacher and students [*Target: Five or less materials for teacher, five materials or less for students]*	List of materials is incomplete for teachers AND/ OR students	Missing

E. Procedures for Learning Activities (NCATE PLANNING #7; ACEI INTGRT & APPLY KNOWLDGE FOR INSTRCTN #3.1)	Orderly with steps numbered; easy to understand; steps are detailed enough so that someone else could run the lesson; fits with lesson; includes introduction, instructional strategies, and summary as described in the PDS manual; steps are aligned with the 5-E's or other approved inquiry-based learning cycle model to create an inquiry-based learning experience for students throughout the entire time allotted in the procedure; provides some information regarding connections/extensions to other lessons	Somewhat orderly with steps numbered; contains a section that is slightly difficult to understand; needs more details for someone else to lead instruction; not exactly appropriate for lesson; includes introduction, instructional strategies, and summary as described in the PDS manual; steps are aligned with the 5-E's or other approved inquiry-based learning cycle model with few steps incorrectly identified so that an inquiry-based learning experience is created for students 50% of the time allotted in the procedure	Not orderly; hard to follow; has too little detail; not appropriate for lesson; OR steps are aligned with the 5-E's or other approved inquiry-based learning cycle model but they are incorrectly identified/ordered so that the lesson fails to provide an inquiry-based learning experience for students during the time allotted in the procedure	Missing
F. Time Designations (NCATE PLANNING #7; ACEI INTGRT & APPLY KNOWLDGE FOR INSTRCTN #3.1) [*20-40 minutes each, longer is fine, each lesson should have a definite open and close even if activities continue to the next lesson]*	Time designations are provided for each phase of the experience (introduction, instruction, summary); time designations are appropriate; extra activities are defined in case of extra time; notes activities that could be left out if less time	Time designations are provided for each phase of the experience (introduction, instruction, summary); time designations are off; uses time appropriately	Time designations are not provided for each phase of the experience (introduction, instruction, summary) OR time designations are really off	Missing
G. Assessment (NCATE REFLECTION #9; ACEI PRSNL GRWTH, REFL., & EVALTN # 5.2)	Assessment clearly linked to objectives with procedures and criteria described for each objective; copies of written assessments are attached; interesting assessment that is innovative	Assessment clearly linked to objectives with procedures and criteria described for each objective; copies of written assessments are attached	Assessment is not linked to objectives; fails to define procedures and criteria for each objective; OR copies of written assessments are not attached	Missing

H. Differentiation (NCATE MANAGEMENT #5; ACEI ACTV ENGMT IN LRNG #3.4)	Lists adaptations that will be made for individual learners; based on assessment data; _____ (provide description)	Lists adaptations that will be made for individual learners; based on assessment data	Does not list adaptations that will be made for individual learners OR is not based on assessment data	Missing
I1. Predicted Level of Student Interest (NCATE CONTENT #1; ACEI SCIENCE #2.2)	Fun-filled; student learning experience; relates science to real life, personal needs, and interests; provides opportunity for exploration and application in local to global contexts	Somewhat fun-filled; student learning experience; relates science to real life, personal needs, and interests; provides opportunity for exploration and application in local to global contexts	Somewhat fun-filled; limited student learning experience; does not relate science to real life, personal needs and interests; OR does not provide opportunity for exploration and application in local to global contexts	Missing
I2. Predicted Level of Student Interest (NCATE CONTENT #1; ACEI HEALTH #2.6)	Fun-filled; student learning experience; relates health to real life, personal needs, and interests; provides opportunity for exploration and application in local to global contexts	Somewhat fun-filled; student learning experience; relates health to real life, personal needs, and interests; provides opportunity for exploration and application in local to global contexts	Somewhat fun-filled; limited student learning experience; OR does not relate health to real life, personal needs and interests; OR does not provide opportunity for exploration and application in local to global contexts	Missing
J1. Appropriateness of Activities with Respect to Objectives (NCATE CONTENT #1; ACEI SCIENCE #2.2)	Appropriate to objectives; can accomplish activity; answers and accomplishes objectives; and _____ (provide description	Appropriate to objectives; can accomplish activity; answers and accomplishes objectives	Not appropriate to objectives; can ’t accomplish activity; OR doesn’t answer or accomplish objectives	Missing
J2. Appropriateness of Activities with Respect to Objectives (NCATE CONTENT #1; ACEI HEALTH #2.6)	Appropriate to objectives; can accomplish activity; answers and accomplishes objectives; and _____ (provide description)	Appropriate to objectives; can accomplish activity; answers and accomplishes objectives	Not appropriate to objectives; can ’t accomplish activity; OR doesn’t answer or accomplish objectives	Missing

K. Safety and Ethical Treatment of Living Organisms (NCATE MANAGEMENT #5; ACEI ACTV ENGMT IN LRNG #3.4)	Safety risks identified that include management of materials and activities *[Target: at least one per lesson plan]*; prevention strategies identified *[Target: at least one per lesson plan]*; resolution strategies identified in case mishap should occur *[Target: at least one per lesson plan]*; lesson involves use of living organisms (if any) in an ethical manner; and _____ (provide description)	Safety risks identified that include management of materials and activities *[Target: at least one per lesson plan]*; prevention strategies identified *[Target: at least one per lesson plan]*; resolution strategies identified in case mishap should occur *[Target: at least one per lesson plan]*; lesson involves use of living organisms (if any) in an ethical manner	Fails to identify safety risks including management of materials and activities; fails to identify prevention strategies; fails to identify resolution strategies; OR lesson details a procedure involving unethical use of living organisms	Missing
L1. Science Content in Earth science, space science, life science, physical science, and health (NCATE CONTENT #1; ACEI SCIENCE #2.2)	Content utilized in lesson plan is accurate, complete (as defined by SOLs, local, and national standards); incorporates all four science disciplines; and multiple connections are made between science areas via cross-cutting concepts (as defined by NGSS)	Content utilized in lesson plans includes at least three of the four following sciences: Earth and space science, life science, and physical science; content utilized in lesson plans for at least 3 of the four sciences is accurate and complete (as defined by SOLs, local and national standards)	Content utilized in lesson plan does not include at least three of the four following sciences: Earth science, space science, life science, and physical science; OR content utilized in lesson plan for at least three of the four sciences is not accurate or is not complete (as defined by SOLs, local, and national standards	Missing

L2. Health Content (NCATE CONTENT #1; ACEI HEALTH #2.6)	Content utilized in lesson plan is accurate, complete (as defined by SOLs, local, and national standards); incorporates the health discipline to create opportunities for student development and practice of skills that contribute to good health; and multiple connections are made between health and science via cross-cutting concepts (as defined by NGSS)	Content utilized in lesson incorporates the health discipline to create opportunities for student development and practice of skills that contribute to good health; health content is accurate	Does not address health content to create opportunities for student development and practice of skills that contribute to good health OR health content utilized is not accurate	Missing
M. Nature of Science (NCATE CONTENT #1; ACEI SCIENCE #2.2)	Lesson supports students' learning of science consistent with the nature of science, promotes students' understanding of the nature of science with explicit instruction and students' use of language from NGSS and SOLs to describe the characteristics of nature of science	Lesson supports students' learning of science consistent with the nature of science and promotes students' understanding of the nature of science at some point during the lesson with attention to characteristics of nature of science as identified by NGSS and SOLs	Lesson fails to support student learning of science consistent with the nature of science as identified by NGSS and SOLs	Missing
N. Student sheet developed or modified by the candidate (NCATE COMMUNICATION #6; ACEI COMMUNICATION TO FOSTER COLLABORATION #3.5)	Modified or developed by candidate; supports inquiry-based approach (5-Es or other inquiry-based cycle); supports the use of hands-on science/health materials; vocabulary matches particular SOL/POS objective; format used is student-friendly and teacher-friendly; sheet documents student learning related to the SOL/POS topic	Modified or developed by candidate; supports inquiry-based learning (5-Es or other inquiry-based cycle); supports the use of hands-on science/health materials; vocabulary matches particular SOL/POS objective; format used is student-friendly and somewhat teacher-friendly; sheet documents student learning related to the SOL/POS topic	Student sheet is not suitable for a particular class/group of students that the candidate is teaching this semester OR does not fit the particular lesson plan	Missing

O. Resources (NCATE COMMUNICATION #6; ACEI COMMUNICATION TO FOSTER COLLABORATION #3.5) [*Reference source on student and sheet and in lesson plan; you can use the same resource in more than one lesson plan as much as you need to]*	Sources of lesson plan ideas clearly identified so that someone else could locate the sources; more than two sources used to write each lesson plan or develop student materials; uses more than one non-paper resource (electronic media, audiovisual, etc) per lesson plan	Sources of lesson plan ideas clearly identified so that someone else could locate the source; at least two sources used to write each lesson plan and develop student materials; uses at least one non-paper resource (electronic media, audiovisual, etc.) per lesson plan	Source of lesson plan ideas not clearly identified so that someone else could locate the source OR fails to use at least two sources to write each lesson plan and develop student materials OR does not use at least one non-paper resource per lesson plan	Missing

For entire assignment:

	Exceeds Expectations – 3	Meets Expectations – 2	Does Not Meet Expectations – 1	Does Not Meet Expectations – 0
P. Web page / PowerPoint Presentation (NCATE COMMUNICATION #6; ACEI COMMUNICATION TO FOSTER COLLABORATION #3.5)	Includes at least 3 links if a web page; includes at least two slides if a PowerPoint presentation; is included in the procedure for at least one lesson plan and clearly relates to the content and activities of that lesson plan; is supportive of student learning; and uses technological features to enhance learning via improved communication of ideas	Includes at least 3 links if a web page; includes at least two slides if a PowerPoint presentation; is included in the procedure for at least one lesson plan and clearly relates to the content and activities of that lesson plan; is supportive of student learning	Does not include at least 3 links if a web page; does not include at least two slides if a PowerPoint presentation; is not included in the procedure for at least one lesson plan; does not clearly relate to the content and activities of at least one lesson plan; OR is not supportive of student learning	Missing
Q. Overall Unit Assessment of Student Learning (NCATE REFLECTION #9; ACEI PRSNL GRWTH, REFL., & EVALTN # 5.2)	Is aligned with unit theme, guiding questions, unit objectives, and national and SOL/POS standards; is appropriate with the procedures outlined in the set of lesson plans; allows for documentation of student learning of unit objectives; and includes student outcomes data	Is aligned with unit theme, guiding questions, unit objectives, and national and SOL/POS standards; is appropriate with the procedures outlined in the set of lesson plans; allows for documentation of student learning of unit objectives	Is not aligned with unit theme, guiding questions, and national and SOL/POS standards OR is not appropriate with respect to the procedures outlined in the set of lesson plans OR does not allow for documentation of student learning of unit objectives	Missing

For hands-on teaching assignment (referred to as "Micro-Teaching"):

	Exceeds Expectations – 3	Meets Expectations – 2	Does Not Meet Expectations – 1	Does Not Meet Expectations – 0
R. Documentation (NCATE COMMUNICATION #6; ACEI COMMUNICATION TO FOSTER COLLABORATION #3.5) [*You do not need to submit this since your instructor has record of it in their files]*		Includes Summary Observation Report from Clinical Faculty, Camp Director, or Loudoun Course Instructor; Summary Observation Report from EDCI instructor; student sheet used during teaching of the hands-on activity	Summary Observation Report from Clinical Faculty, Camp Director, or Loudoun Course Instructor; Summary Observation Report from EDCI instructor; OR student sheet used during teaching of the hands-on activity is missing	Missing
S. Summary Observation Report from Inservice Teacher/Administrator, Camp Director, or EDCI Instructor (NCATE MANAGEMENT #5; ACEI ACTV ENGMT IN LRNG #3.4) [*You do not need to submit this since your instructor has record of it in their files]*	Statements indicative of going beyond expectations for performance in preparation and planning, instructional methods and management, assessment, and professionalism	Statements indicative of entirely satisfactory performance in preparation and planning, instructional methods and management, assessment, and professionalism	Statements indicative of less than satisfactory performance in preparation and planning, instructional methods and management, assessment, and/or professionalism	Missing
T. Summary Observation Report from EDCI Instructor (NCATE MANAGEMENT #5; ACEI ACTV ENGMT IN LRNG #3.4) [*You do not need to submit this since your instructor has record of it in their files]*	Statements indicative of going beyond expectations for performance in preparation and planning, instructional methods and management, assessment, and professionalism	Statements indicative of entirely satisfactory performance in preparation and planning, instructional methods and management, assessment, and professionalism	Statements indicative of less than satisfactory performance in preparation and planning, instructional methods and management, assessment, and/or professionalism	Missing
U. Formal Reflection (at least one double-spaced page in length) (NCATE REFLECTION #9; ACEI PRSNL GRWTH, REFL., & EVALTN # 5.2)	Formal reflection is clearly articulated; addresses all items fully; and makes many specific references to the experience of teaching the hands-on activity during EDCI 553 and at the teaching site (if applicable).	Formal reflection is mostly clear; addresses all items adequately; and makes a few specific references to the experience of teaching the hands-on activity during EDCI 553 and at the teaching site (if applicable).	Formal reflection is not clear; does not address all items adequately; OR does not make specific reference to the experience of teaching the hands-on activity during EDCI 553 and at the teaching site (if applicable).	Missing