SCED 570: TEACHING SCIENCE IN THE ELEMENTARY SCHOOL

FALL, 2015

CREDITS - 3

DR. MEGHAN QUIRK
MRS. BRENDA RAMTHUN

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Schedule:  Tuesdays 5:00-9:00 pm, 8/25-10/27; Saturdays 8:00 am-5:00 pm 11/7 (Ramthun)
Thursdays 5:00-9:00 pm, 8/27-10/29; Saturdays 8:00 am-5:00 pm 11/7 (Quirk)

A. COURSE DESCRIPTION
SCED 570 is a study of the underlying models of science instruction and learning, curriculum, instructional methods, materials, science classroom safety, technology, and assessment for teaching in grades K-8. The course is a practical approach to developing a community of learners and thinkers, and evaluating and designing student-centered, inquiry-based learning activities, lessons, and curricular units.

B. RELATIONSHIP OF THE COURSE TO THE PROGRAM KNOWLEDGE BASE
The major goal of this course is to provide graduate students with an overview of science education: what it is, the content, and how it is orchestrated within a regular classroom setting.

C. COURSE GOALS AND OBJECTIVES
Upon completing this course, students will:

1. Describe and value science and scientific inquiry as a methodology for exploring and explaining the natural world.
2. Recognize that all children can perform scientific inquiry and are natural scientists.
3. Analyze and describe the research foundations for best practices in teaching science.
4. Coordinate student-centered curriculum that focuses on students’ needs, interests, community, culture and local environment.
5. Work collaboratively both in the classroom and on projects.
6. Apply national and state science standards to designed lesson plans.
7. Design, perform and analyze an experiment incorporating the use of technology.
8. Describe science/inquiry process skills and identify process skills in course activities and experiences.
9. Describe the basic tenets of constructivism and the learning cycle.
10. Analyze and write a lesson plan based on the learning cycle.
11. Teach science lesson that reflects the learning cycle.
12. Evaluate instructional materials using criteria based on research-informed criteria.
13. Evaluate the uses of different types of assessments.
14. Create a vision statement of a student who is scientifically literate and a classroom that promotes scientific literacy.
15. Describe why good teachers are flexible, reflective and focus on students first.
16. Be able to understand and conduct classroom research as a teacher researcher.
17. Be confident in their ability to teach science.
18. Describe the appropriate uses of three types of lesson delivery: direct instruction, demonstrations, and student centered inquiry.
19. Evaluate instructional materials using criteria based on research-informed criteria.

D. COURSE CONTENT
Instruction will take on a variety of forms. Lectures, simulations, whole and small group class discussions, cooperative learning activities, and demonstrations are among the teaching strategies used to engage students.

E. COURSE REQUIREMENTS
When thinking about course requirements, please be aware that there are five responsibilities that The University of Northern Colorado has established for students. Students have the responsibility to:

1. Inquire about course requirements if they do not understand them or are in doubt about them.
2. Maintain the standards of academic performance established for individual courses and for programs of study.
3. Initiate an investigation if they believe their academic rights have been violated.
4. Learn the content of any course of study.
5. Act in accordance with commonly accepted standards of academic conduct.

1. Course Materials: Purchase the required text and read assigned reading BEFORE each class session. Bring your text to every class session.

2. Class Attendance and Participation: Attend EVERY class session on time and ready to participate. You will complete numerous activities related to the course readings, each designed to further your understanding of course content. Time is limited so please be punctual and be ready to engage with others. You are expected to attend every class session. Each absence will result in the deduction of points.
F. GRADING CRITERIA
The following criteria will be used to determine your course grade. In determining your final grade, I will also consider your professionalism and your participation in assignments and discussions. Please submit all assignments on time. Late assignments will not be accepted.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Points Possible</th>
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<tbody>
<tr>
<td>Science Teaching Project</td>
<td>50</td>
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<tr>
<td>Science Notebook (to include weekly Chapter reflections and class notes)</td>
<td>20</td>
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<tr>
<td>Attendance/Active Participation/Lesson Reflections</td>
<td>20</td>
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<tr>
<td>Project Wet/Wild</td>
<td>10</td>
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<tr>
<td>TOTAL</td>
<td>100</td>
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<table>
<thead>
<tr>
<th>Letter grade</th>
<th>Percentage Range</th>
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<tbody>
<tr>
<td>A</td>
<td>90 - 100</td>
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<tr>
<td>B</td>
<td>80 - 89</td>
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<tr>
<td>C</td>
<td>70 - 79</td>
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<tr>
<td>D</td>
<td>60 - 69</td>
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<tr>
<td>F</td>
<td>below 59</td>
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G. REQUIRED READINGS
2. *Project WET / Project Learning Tree / Project Wild* – this will be acquired in workshop assignment
6. *Colorado Department of Education*, http://www.cde.state.co.us/index_home.htm. Connect to this site particularly for information on:
   - performance based standards for educators
   - K-12 science standards
   - K-12 grade level expectations for science

H. ACCOMMODATIONS
Students who believe that they may need accommodations in this class are encouraged to contact the Disability Support Services, Voice/TTY (970) 351-2289, or fax (970) 351-4166, or visit www.unco.edu/dss as soon as possible to ensure that accommodations are implemented in a timely fashion.

I. INCLUSIVITY
The College of Education and Behavioral Sciences (CEBS) supports an inclusive learning environment where diversity and individual differences are understood, respected, appreciated, and recognized as a source of strength. We expect that students, faculty, administrators and staff within CEBS will respect differences and demonstrate diligence in understanding how other peoples’ perspectives, behaviors, and worldviews may be different from their own.

J. OTHER INFORMATION
*Honor Code* - All members of the University of Northern Colorado community are entrusted with the responsibility to uphold and promote five fundamental values: Honesty, Trust, Respect, Fairness, and Responsibility. These core elements Foster an atmosphere, inside and outside of the classroom, which serves as a foundation and guides the UNC community’s academic, professional, and personal growth. Endorsement of these core elements by students, faculty, staff, administration, and trustees strengthens the integrity and value of our academic climate.

UNC Honor Code: www.unco.edu/dos/honor_code.htm

*UNC’s Policies* - UNC’s policies and recommendations for academic misconduct will be followed. For additional information, please see the Dean of Student’s website, Student Handbook link
http://www.unco.edu/dos/handbook/index.html
**Portable Electronic Devices** - Please extend courtesy to your instructor and fellow students by turning off your portable electronic devices such as: cell phones, pagers, and iPods. Although not an audio issue, text messaging is a distraction to other students and prevents you from full participation in class. You should keep your portable electronic devices in your backpack or purse during class. Your personal electronic devices should not be on your desks. If you know that you may need to accept an emergency phone call during class or if you have children in childcare or school, please let the instructor know. If you need to take a phone call during class, please step out of the classroom while you complete your call. Thank you for your cooperation.

**Plagiarism** - [www.unco.edu/dos/plagiarism.htm](http://www.unco.edu/dos/plagiarism.htm)
<table>
<thead>
<tr>
<th>Week</th>
<th>TOPICS</th>
<th>Read BEFORE class</th>
<th>ASSIGNMENT DUE</th>
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<tbody>
<tr>
<td>1</td>
<td><strong>Orientation</strong>&lt;br&gt;<strong>Ch. 1 – Framing Science and Science Education</strong>&lt;br&gt;<strong>Rubric Overview</strong>&lt;br&gt;<strong>Science Lesson Demonstration and expectations</strong></td>
<td>Ch. 1</td>
<td><strong>Ch. 1 Reflection</strong>&lt;br&gt;<strong>TOPIC OF THE WEEK: Compose a short summary of what you hope to get from this class.</strong>&lt;br&gt;<strong><a href="http://www.dmn2s.org/teachers/events-programs/scfd-educator-night/">http://www.dmn2s.org/teachers/events-programs/scfd-educator-night/</a></strong>&lt;br&gt;<strong>Go to the above website and register for the Museum of Nature and Science Educator Night (this will be in replace of class the week of Sept. 21 and is REQUIRED)</strong></td>
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<td>Aug. 25 &amp; 27</td>
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<td>2</td>
<td><strong>Ch. 2 – Involving Learners in Doing Science</strong>&lt;br&gt;<strong>Investigation Strategies/Observation Strategies/Scientific Method/Engineering Design Process</strong>&lt;br&gt;<strong>Introduce Science Unit and Lessons</strong></td>
<td>Ch. 2</td>
<td><strong>Ch. 2 Reflection</strong>&lt;br&gt;<strong>TOPIC OF THE WEEK: Compose a summary about what strengths you will bring to the classroom.</strong>&lt;br&gt;<strong>Find the Colorado State Science Standards, National Science Education Standards, Next Generation Science Standards using websites provided. Bring one topic for discussion for each field of study. (Life, Earth, Physical)</strong></td>
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<td>Sept. 1 &amp; 3</td>
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<tr>
<td>Week</td>
<td>Topic</td>
<td>Assignments</td>
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<td>3</td>
<td>Ch. 3 - Learning Science with Understanding</td>
<td>• Ch. 3 Reflection&lt;br&gt;*TOPIC OF THE WEEK: As a learner what differentiation practices had the most impact on your learning, either positive or negative?&lt;br&gt;• Bring in any valuable resources to enhance science instruction that you have seen used, or questions about what you would like to find</td>
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<td>Sept. 8 &amp; 10</td>
<td>Differentiation</td>
<td>Ch. 3</td>
<td>• Notebook due&lt;br&gt;• Ch. 3 Reflection&lt;br&gt;*TOPIC OF THE WEEK: As a learner what differentiation practices had the most impact on your learning, either positive or negative?&lt;br&gt;• Bring in any valuable resources to enhance science instruction that you have seen used, or questions about what you would like to find</td>
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<tr>
<td>4</td>
<td>Ch. 4 Engaging in Inquiry-Based Instruction and Using the 5-E Model</td>
<td>• Ch. 4 Reflection&lt;br&gt;*TOPIC OF THE WEEK: What does classroom management look like in your classroom?&lt;br&gt;• Group 1 &amp; 2 Lesson Plan due</td>
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<td>Sept. 15 &amp; 17</td>
<td>Group 1 &amp; 2 Lesson (60 min)</td>
<td>Ch. 4</td>
<td>• Ch. 4 Reflection&lt;br&gt;*TOPIC OF THE WEEK: What does classroom management look like in your classroom?&lt;br&gt;• Group 1 &amp; 2 Lesson Plan due</td>
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<td>5</td>
<td>Monday, September 21 from 6-9 pm @ Denver Museum of Nature and Science – Educator Night</td>
<td>Monday, September 21 from 6-9 pm @ Denver Museum of Nature and Science – Educator Night&lt;br&gt;You should have registered for this on or before the first week of class.</td>
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<td>6</td>
<td>Ch. 5 Assessing Science Learning and Ch. 6 Planning and Managing Inquiry Instruction</td>
<td>• Ch. 5 &amp; 6 Reflection&lt;br&gt;• Reflection of your Museum experience including 3 things you would use in your classroom. Be sure to explain why and how.&lt;br&gt;*Group 3 Lesson Plan due</td>
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<td>Sept. 29 &amp; Oct. 1</td>
<td>PARCC practice test</td>
<td>Ch. 5 &amp; 6</td>
<td>• Ch. 5 &amp; 6 Reflection&lt;br&gt;• Reflection of your Museum experience including 3 things you would use in your classroom. Be sure to explain why and how.&lt;br&gt;*Group 3 Lesson Plan due</td>
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<td>7</td>
<td>Ch. 7 Questioning Effectively</td>
<td>• Ch. 7 Reflection&lt;br&gt;*TOPIC OF THE WEEK: Compose one open ended and one close ended question about the life cycle of a butterfly.&lt;br&gt;• Group 4 Lesson Plan due</td>
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<tr>
<td>Oct. 6 &amp; 8</td>
<td>Group 4 Lesson (60 min)</td>
<td>Ch. 7</td>
<td>• Ch. 7 Reflection&lt;br&gt;*TOPIC OF THE WEEK: Compose one open ended and one close ended question about the life cycle of a butterfly.&lt;br&gt;• Group 4 Lesson Plan due</td>
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**Saturday, November 7, 2015 from 8:00 am – 5:00 pm, Colorado Parks and Wildlife Northeast Region, 6060 Broadway, Denver, CO 80216 – Project Wet/Wild (REQUIRED)**

**For those needing to take the PLACE test on this date you need to notify your instructor ASAP and plan to attend an alternate session on Saturday, November 14 in Colorado Springs.**

<table>
<thead>
<tr>
<th>Date</th>
<th>Activity</th>
<th>Chapter</th>
<th>Notes</th>
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<tr>
<td>Oct. 13 &amp; 15</td>
<td>• Ch. 8 Using Technology Tools and Resources for Science Learning</td>
<td>Ch. 8</td>
<td>• Ch. 8 Reflection&lt;br&gt;*TOPIC OF THE WEEK: How will you address the achievement gap in your classroom. &lt;br&gt;• Group 5 Lesson Plan due</td>
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<td></td>
<td>• Sample questions and resources</td>
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<td></td>
<td>• Group 5 Lesson (60 min)</td>
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<td>Oct. 20 &amp; 22</td>
<td>• Ch. 9 Connecting Science with Other Subjects</td>
<td>Ch. 9</td>
<td>• Notebook Check&lt;br&gt;• Ch. 9 Reflection&lt;br&gt;• Group 6 &amp; 7 Lesson Plan due</td>
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<td>• Discuss the importance of nonfiction reading and writing vs fiction</td>
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<td></td>
<td>• Group 6 &amp; 7 Lesson (60 min)</td>
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<td>Oct. 27 &amp; 29</td>
<td>• Ch. 10 Making Science Accessible for All Learners</td>
<td>Ch. 10</td>
<td>• Ch. 10 Reflection&lt;br&gt;*Bring in your Resume if you have started one</td>
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<td></td>
<td>• Formal Observations and Interviewing Skills</td>
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<td></td>
<td>• Communicating with Parents and Colleagues</td>
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**NOTE:** This syllabus and Course Outline Table is subject to change. Any changes will be announced in class.

If you believe that you need accommodations in this class, please contact the Disability Support Services (970) 351-2289 ([www.unco.edu/dss/](http://www.unco.edu/dss/)) by the end of this week to ensure that
Mastery Teaching Lesson Plan Format
(Madeline Hunter)

Lesson Title

In addition to the title of the lesson, include your name, the grade level of the students you are targeting, and the subject area.

Colorado Academic Standards

Determine which standards will be addressed in this lesson. For reference, use the CDE website at: http://www.cde.state.co.us/cdeassess/UAS/CoAcademicStandards.html

Objective

The objective of the lesson must be written in terms of what the students will do. Be sure to use appropriate active verbs which can be measured, observed or assessed in some way. The objective must be linked to the standards used.

Materials List

All supplies, books, technology and handouts needed to complete this lesson are stated in a bulleted list format.

(NOTE: The instructions for what to do the remainder of the lesson must be written in SECOND PERSON as if you are telling a substitute teacher exactly what to do. Example: Have the students sit in a circle. OR Pass out the crayons before beginning the story.)

Teacher Preparation

What must be done before the lesson (even before coming to class) in order to successfully present this lesson? Will you have to make copies of handouts, have the students collect rocks or leaves, read several selected books to the class before introducing the lesson, informally assess the students to be sure where the lesson should begin, pre-teach how to graph data? Student performance on the pre-assessment may compel changes to the planned unit and lesson plans. Carefully think through what is needed and list that here.

Instructional Procedures and Activities

List, step by step, the things the teacher will do to present this lesson to the students in order to accomplish the objectives. Remember that the lesson is written in second person (i.e. Hand out the worksheets; Ask the students to write in their journals). It is sometimes helpful to number each so that the sequence is clear. This is usually the longest section of a lesson plan. Be sure that you include opportunities to check for understanding (formative assessment) before continuing to a new concept. This could be simple questions, observations or student signals. How do you know whether to reteach, explain further or to go on?
Student Evaluation/Assessment

How will you assess the students to be sure that the objectives are met? This can be an observation, a test, homework, an activity, a project…anything that provides evidence of learning. The assessment must be directly linked to the content standards and the objectives. The post or summative assessment is measurement conducted at the conclusion of the lesson to assess the level of student competence regarding the standards for the lesson and the aligned lesson objectives.

Accommodations and Modifications

Accommodations are for students who are learning English and need support in your lesson. Modifications are for special needs students who need your lesson adapted or changed in order for them to be successful. What accommodations will you suggest for those students who need more support? Consider your ELL students, students on IEP’s or ILP’s, or students who need extra time or assistance. Be sure to consult the WIDA standards http://www.wida.us/standards/. This can apply to your objective, lesson steps and/or the assessment.

Extension Activities

Extension activities are additional activities designed to extend the learning process for learners beyond the walls of the classroom. What activities will you suggest to apply the newly acquired skills, thoughts, and attitudes to the students’ world? These activities should require higher-order thinking skills, such as analysis, synthesis and evaluation and be applicable to unique problem situations in the real world. They often will occur outside the classroom (i.e. calculating costs at the supermarket).

Citations

If you have used any resources, websites, books, or other sources in the preparation of this plan, be sure to cite these here. Failure to cite is plagiarism.

Lesson Reflection Expectations

- Name
- Date
- Title of Lesson
- Name of students presenting
- Lesson highlights
- Areas for growth
- What did you learn and what skill or technique would you use in a classroom?