

Science Education in the Elementary Schools (SCED 322) Master Syllabus

Quarter, Year

Instructor Information

Instructor:

Office:

Email:

Meeting Time:

Office Hours:

Phone:

Course Description

This 3-credit course is part of the elementary education major or minor, to be taken by students already admitted to the education program. The course includes techniques, selection of materials, and appropriate subject matter to teach science in grades K-5. It is strongly recommended that students take EDCS 311 prior to enrollment in this course. This course meets RWAC 180-78A-165.

Prerequisites

Enrollment is subject to being fully admitted to the Teacher Education Program.

Course Rationale

The purpose of this course is to help you become an effective elementary science teacher. I will not continually lecture about the specific things you need to do to become a good science teacher because: a) I don't know them all, b) you probably wouldn't remember them for very long, and c) most people learn best by seeing and doing. Instead, we will spend great deal of class time doing and discussing inquiry science activities. During the first part of the course, you'll experience inquiry science for yourself through instructor modeling and various hands-on activities. In the second part of the course you'll have the opportunity to apply what you have learned about inquiry science during a K-5 practicum experience.

I believe that students construct new knowledge based on interactions with their environment. This course is an essential part of the Elementary Education Program and, like other courses and experiences at Central, will help you become "facilitators of learning in a diverse world". This course is organized around the 5-E learning cycle, which provides a framework that will help you construct science teaching knowledge and skill. This course meets the goals of the CWU Science Education Program, with course content based on the Washington State Essential Academic Learning Requirements in Science (EALRs), Grade Level Expectations (GLEs), and the National Science Education Standards (NSES).

Course Materials

Required:

- Blackboard account with enrollment in SCED 322 (section 2)
- LiveText account
- A hard copy of the WA Grade Level Expectations for Science (CWU Bookstore)
- Access to National Science Education Standards for Teachers at <http://www.nap.edu/readingroom/books/nses/>.

Learning Objectives

The objectives of this course are based on the National Science Education Standards for Teachers of science, the WA Elementary Education competencies, and the CWU Center for Teaching and Learning standards. This course will give you considerable opportunity to develop knowledge and skills that address these objectives

and corresponding standards.

Objective 1: Experience inquiry science and develop science knowledge, skills, and values

- Standards addressed: NSES-A; WA EIED K 2.4.1, 2.4.3, 2.4.4, 2.4.5, S 2.4.1, 2.4.2, 2.4.3; CTL 1.1, 1.3

Objective 2: Facilitate and guide inquiry experiences for elementary learners

- Standards addressed: NSES-B; WA EIED K 2.4.2; CTL 1.2

Objective 3: Design learning environments that support inquiry, collaboration, and content integration

- Standards addressed: NSES-D, E; WA EIED K 2.4.3; CTL 1.2

Objective 4: Assess and evaluate diverse student learning and teaching effectiveness

- Standards addressed: NSES-C; WA EIED K 2.4.6, S 2.4.4; CTL 1.4, 1.5

Objective 5: Engage in continual professional growth

- Standards addressed: NSES-C; WA EIED K 2.4.3, S 2.4.1; CTL 1.3, 1.4

Specific Learning Outcomes and Assessment

By the end of the course you should be able to:

Outcomes	Assessment	Standards
Develop and teach a science lesson to elementary students using the <i>learning cycle</i> method	Inquiry Unit and Lesson, Teaching Practicum	NSES A, B, E, F CTL 1.1-1.5 WA Comp 3.1-3.7, 4.1-4.3, 4.5-4.9
Demonstrate understanding of the scientific method by <ul style="list-style-type: none"> Appropriately using <i>hypothesis, prediction, results, discussion, and conclusion</i>; Developing a <i>testable</i> scientific question, performing a simple test using the scientific method; and interpreting results based on evidence 	Portfolio, UFO, Mini-Units, Field Investigations	NSES A CTL 1.1-1.5 WA Comp 1.5.4, 1.5.5
Appropriately assess student learning by <ul style="list-style-type: none"> Developing and appropriately applying assessments that measure student learning outcomes relative to standards 	Inquiry Unit and Lesson, Teaching Practicum	NSES C, D CTL 1.2-1.5 WA Comp 5.1-5.6
Use safe practices when teaching science by <ul style="list-style-type: none"> Being aware of safety when developing, presenting, and participating in science activities; Communicating appropriate safety precautions to students before they perform a science activity 	Inquiry Unit and Lesson, Teaching Practicum	NSES D, E WA Comp 1.5.8, 3.7, 4.8
Adapt existing curricula and resources to age-appropriate lessons using <i>best teaching practices</i> by <ul style="list-style-type: none"> Researching curricula and resources related to specific WA EALR GLE and NSES benchmarks and adapting these materials to specific learning needs 	Inquiry Unit and Lesson, Portfolio	NSES A, B CTL 1.1-1.4 WA Comp 4.5, 4.7

Demonstrate effective questioning skills to guide students in hands-on exploration by <ul style="list-style-type: none"> Leading students from observations to experimental results to conclusions based on logic and evidence 	Teaching Practicum, Inquiry Unit and Lesson, Mini-Units, Field Investigations	NSES A, B, D, E CTL 1.2-1.4 WA Comp 4.6, 1.5.4, 1.5.5
Integrate science lessons with other subjects by <ul style="list-style-type: none"> Developing a lesson that shows effective integration of science with other subjects 	Inquiry Lesson, Portfolio	NSES A, E WA Comp 4.5
Show working knowledge of the NSES-T, WA Science EALRs and GLEs by <ul style="list-style-type: none"> Aligning curricular materials to specific benchmarks 	Portfolio, Inquiry Unit and Lesson	NSES A, D CTL 1.1-1.3 WA Comp 4.5

Course Expectations and Policies

This course is you making the deliberate and conscious decision to learn to be the most effective elementary science teacher possible. My role is to help facilitate your development as a teaching professional, which I will do to the utmost of my abilities. I am open to your suggestions about how the course could be changed or made better. My aim is to have an open, professional dialogue between us; if you have suggestions, specific problems, concerns or questions please discuss these with me as they arise during the quarter. I would prefer to deal with issues as they come up rather than when it is too late to do anything to fix them.

In order to best facilitate your learning, my expectations are as follows:

- **Think critically.** This course is designed to help you develop your critical thinking abilities; these life skills will help you to be an effective teacher of science because students who see you analyze, infer, evaluate, and make reasoned judgments will emulate the behaviors you model and become better learners. Developing your critical thinking skills is one of the most important things you can accomplish as a student and future teacher.
- **Change your expectations.** This course will take a lot of work from both you and me. If you have low learning expectations for this course, that is what you will achieve. Success in this course will require open-mindedness and effort (several hours of study time for each hour of class). Depending on your science background, you may need to spend more or less time studying. Please budget your time to accommodate the workload. By working together, we can accomplish significant and meaningful learning.
- **Show enthusiasm.** Science is fun and exciting. Modeling enthusiasm for science will teach your students to appreciate and enjoy science. It is important to be enthusiastic so that students will be inspired to learn science as well as other subjects.
- **Act professionally.** This course is part of your transition from student to professional educator. As such, I expect you to attend class, be on time, and help others. I will not accept late work unless you have documented reasons.
- **Use common sense.** Don't cheat on assignments or exams. Don't plagiarize others' work (you'll get a zero and will face disciplinary action by the university). Don't expect credit if you turn assignments in late. If you have a problem that prohibits you from turning something in on time, let me know ahead of time if possible. In all instances, communicate with me so we can prevent problems.

Learning Performance Evaluation

To accommodate different learning styles in this course, we will use inquiry-based science projects, small group collaborative learning, and class discussions as well as individual exams. A practicum experience teaching public school children in an actual classroom will also help to develop your teaching skills. Both formative and summative performance-based assessments will be used to determine a weighted final grade.

Assignment	Points
Science Autobiography	50
Science Notebook	50
UFO	200
Inquiry Unit Plan	60
Inquiry Lesson Plan	240
Teaching Practicum	50
Self Evaluation of Teaching	50
Peer Evaluation	50
Autobiography Reflection	50
Science Teaching Portfolio	200
Total	1000

Grading Scale and Performance Characteristics

900-1000 pts (A- to A), 800-899 (B- to B+), 700-799 (C- to C+), 600-699 (D- to D+), and 0-599 (F). Please see the CWU Catalog for the eligibility requirements for an incomplete (I).

Typical characteristics of A-level performance in this course:

- Consistently outstanding in ability to learn science concepts and apply them creatively and thoughtfully to science teaching pedagogy.
- Begins and ends course with high expectations and performance.
- Does not procrastinate and takes time to consider the rigors necessary for high performance.
- Listens to, reads, and follows all directions.
- Thoroughly understands the science concepts of the Washington State science EALRs and GLEs and can express those concepts succinctly and eloquently in both verbal and written form.
- Succinctly and eloquently expresses themselves when writing, using correct science terminology, correct spelling and grammar. Handwritten materials are clearly printed in a style appropriate for an elementary teacher (legible and readable).
- Consistently on time, with above average participation and an ability to ask important questions.
- Clearly demonstrates openness to learning as much as possible to become a stronger teacher. Understands that developing science teaching skills requires considerable effort and takes proactive responsibility for understanding expectations ahead of time.
- Displays a positive attitude and takes responsibility for their learning.

Course Management and Assessment: Blackboard and LiveText

This course uses Blackboard (<http://courses.cwu.edu>) and LiveText (<http://www.livetext.com>) online learning tools. The Blackboard Learning System makes the course syllabus, lecture notes, assignments, grades, and important announcements available 24 hours a day, 7 days a week. It is *your responsibility* to check Blackboard *daily* so that you are aware of course changes. Before using Blackboard you have to activate your Netware account (if you haven't already) and make sure you are enrolled in the Science Education in the Elementary Schools course (course ID: SCED322.002_1073). If you are not automatically enrolled in the SCED 322 course, go to <http://www.cwu.edu/~media/cwuonline/getstarted.html> and follow the instructions *exactly*.

Livertext will be used to construct your course projects including lesson and unit plans and assessments. To use LiveText you will need to access it via the web. The portfolio you create in this class will also be an artifact in your elementary education major portfolio. Admission to and continuation in the Teacher education program requires you to purchase LiveText. You must present "proof of purchase" to the Certification Office, Black 228.

Bibliography

See Blackboard for electronic versions of these:

American Association for the Advancement of Science (1993). Benchmarks for Science Literacy. New York: Oxford University Press.

National Research Council (1996). National Science Education Standards. Washington, D.C.: National Academy Press.

Office of Superintendent of Public Instruction (2005). Science K-10 Grade Level Expectations.

ADA Statement

Students who have special needs or disabilities that may affect their ability to access information and/or material presented in this course are encouraged to submit a copy of the 'Confirmation of Eligibility for Academic Adjustments' from the Disability Support Services office as soon as possible so adjustments can be made that best serve the learning needs of the student. Students without this form should contact the Disability Support Services office in Bouillon 205 at 963-2171 or dssrecept@cwu.edu.

Sample Tentative Course Schedule

Tuesday	Thursday
3/27	3/29
<ul style="list-style-type: none"> ● Introductions, Syllabus, Blackboard and LiveText ● Critical Thinking and Scientific Literacy ● Scientific Self ● <i>Assignment: Science Autobiography, Notebook</i> 	<ul style="list-style-type: none"> ● Science as Knowing and Scientific Method ● <i>Assignments: Moon Chart, UFO</i> ● <i>Activity: Go with the Flow Mini-Unit</i>
4/3	4/5
<ul style="list-style-type: none"> ● <i>Activity: Go with the Flow Mini-Unit (Q, H, P, Testing)</i> ● <i>Due: Science Autobiography</i> 	<ul style="list-style-type: none"> ● Constructivism and Science Teaching ● 5 E Learning Cycle and Bloom's Taxonomy ● <i>Assignment: Lesson and Unit Plan</i> ● <i>Due: Go with the Flow Mini-Unit Write-up</i> ● <i>Due: UFO Questions</i>
4/10	4/12
<ul style="list-style-type: none"> ● WA Science EALRs and GLEs ● National Science Education Standards ● Science Education Reform ● <i>Activity: Science WASL Data Mining, WASL Items</i> 	<ul style="list-style-type: none"> ● Demonstrations and Safety ● Planning and Objectives ● Questioning and Process Skills ● <i>Activity: Ball on a Roll Mini-Unit</i>
4/17	4/19
<ul style="list-style-type: none"> ● General and Performance Assessment ● Making Connections (Content Integration) ● <i>Activity: UFO Work</i> ● <i>Due: Ball on a Roll Mini-Unit Write-up</i> 	<ul style="list-style-type: none"> ● Assessment Alignment to Outcomes and GLEs ● <i>Activity: UFO Work</i>
4/24	4/26
<ul style="list-style-type: none"> ● <i>Activity: Final UFO Work</i> 	<ul style="list-style-type: none"> ● <i>Due: Presentation of UFO Research Projects</i>
5/1	5/3
<ul style="list-style-type: none"> ● Resources/Journals, Curricula ● <i>Activity: Inquiry Unit and Lesson Work</i> 	<ul style="list-style-type: none"> ● <i>Activity: Moon Mini-Unit</i> ● Models and Misconceptions ● <i>Due: Moon Journal</i>
5/8	5/10
<ul style="list-style-type: none"> ● <i>Activity: Inquiry Unit and Lesson Work</i> ● <i>Due: Moon Mini-Unit Write-up</i> ● <i>Due: Prep for Field Experience (kits, materials)</i> 	<ul style="list-style-type: none"> ● <i>Activity: Inquiry Unit and Lesson Work</i> ● <i>Due: Final Prep for Field Experience</i> ● <i>Due: Inquiry Lesson Plans</i>
5/15	5/17
<ul style="list-style-type: none"> ● <i>Activity: Teach to Elementary Students</i> 	<ul style="list-style-type: none"> ● <i>Activity: Teach to Elementary Students</i>
5/22	5/24
<ul style="list-style-type: none"> ● <i>Activity: Teach to Elementary Students</i> 	<ul style="list-style-type: none"> ● <i>Activity: Teach to Elementary Students</i>
5/29	5/31
<ul style="list-style-type: none"> ● <i>Activity: Autobiography Reflection</i> ● <i>Due: Self Evaluation of Teaching</i> ● <i>Due: Inquiry Unit and Lesson Plans (final)</i> 	<ul style="list-style-type: none"> ● Course Evaluations ● <i>Activity: Portfolio Reflections</i> ● <i>Due: Autobiography, Portfolio Reflections</i>
Final Exam:	Due: Final Portfolio (6/1 at 5pm): Final Portfolio, including the Standards Reflection, Summary and

	revisions of previous LiveText submissions. (You must inform me by June 1 via email of any revisions you make to previously submitted LiveText portfolio items. Otherwise, I will not review previously submitted LiveText portfolio items again.)
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