

GS 311: Biology for Elementary Schools Summer 2009

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Summer office hours:

M-R 11:00-12:00 or by appointment

Welcome to GS 311. This is a 300-level pedagogical content knowledge course in which you will learn biology through the kinds of activities appropriate to the children you will one day be teaching. Much of the class time will be spent in hands-on, inquiry-based activities, some of which will be taught by your instructor, some by your peers, and some by you. Be prepared for out-of-class time spent reading, composing essays, responding to online writing assignments, working with an online video-based learning program, and preparing for your assigned teaching time.

Readings and Resources

- *Inquiry and the National Science Education Standards: A Guide for Teaching and Learning* (NRC, National Academy Press) (Available online)
- Handouts from *Inquire Within: Implementing Inquiry-Based Science Standards* (Douglas Llewellyn, Corwin Press)
- The National Science Education Standards (NRC, National Academy Press) (Available online)
- Online Biology Book (<http://www.emc.maricopa.edu/faculty/farabee/BIOBK/BioBookTOC.html>)
- Science for All Americans (<http://www.project2061.org/publications/sfaa/online/sfaatoc.htm>)

Term assignments

Science Notebooks (25 points each, 100 points total)

You will keep science notebooks for each of the four units we will carry out this term: Seeds and Growth, Pond Life, Food for Plants, and The Pillbug Project. Purchase one Blue Book from the bookstore for each of the units. We will construct folders in class to keep your science notebooks and loose papers. Notebooks will be collected weekly and scored using a rubric.

Science quizzes (25 points each, 100 points total)

At the end of weeks 2 and 4 we will have quizzes over the units we have completed.

In-class teaching (50 points)

At some point in the term, each student will take charge of one of the lessons presented to the class. You will receive a written lesson plan and your instructor will support you during the lesson.

Final project (100 points)

Your final project will be a "Preparing for Science Teaching" portfolio which you will work on throughout the term. The portfolio will include three essays and an outline for a thematic unit in which you will include inquiry-based science teaching and integrate literature and writing. On the last day of class, you will give a short presentation on your thematic unit and lead a discussion about your plans and ideas. See the separate handout for details on the essays and the thematic unit.

Class expectations

- Students are expected to attend all class meetings. If you miss a class, it is your responsibility to catch up on the material that you missed.
- Texting, instant messaging, Tweeting, taking phone calls, and all other electronic communication during class distracts you, distracts other students, and is an inappropriate use of class time. Please turn off and put away cell phones and any other electronic communication devices as soon as you enter the classroom. Leave them off until you leave. Talk to me if there is an emergency or other compelling reason for you to leave your cell phone on.
- Students are expected to study independently to reinforce science concepts learned in class.

- Students are expected to contribute positively to class discussions and activities and preserve a safe learning environment. You can disagree without being disagreeable.

Cheating policy:

During a quiz or exam any written, digital, or spoken interaction with other students will be regarded as cheating. The use of crib notes (i.e., pre-prepared notes), text-messaging during a quiz, use of electronic devices that have not been pre-approved, and looking at other student's test papers will be regarded as cheating. Cheating will result in a 0 grade on the assignment. Further cheating may result in further action in accordance with WOU's disciplinary policies. All instances of cheating will be documented.

Plagiarism is turning in someone else's work as your own. This includes verbatim copying from sources (books, internet, CDs, etc.) without giving credit to the source, turning in papers purchased from a paper mill, copying the work of another student, or having someone else write your paper. When preparing papers for submission to an instructor, some paraphrasing may be appropriate. However, when a book or article is quoted at any length, quotation marks and citations (in-text indications of where the material came from and a detailed reference list at the end) must be included. A paper should not, however, be made up mostly of quotes. I can only grade your work; the writers of your source material are not in the class and I cannot grade their work, nor can I give you a grade based on their work. As a college student, you must learn to synthesize facts gleaned from sources into your own writing.

Disabilities statement:

Students who may need accommodations due to documented disabilities, who have medical information which the instructor should know about, or who need special arrangements in an emergency, should speak with the instructor during the first week of class. If you have not accessed services and think you may need them, please contact the Office of Disability Services at 838-8250 or email ods@wou.edu

Week	Units	Readings	Assignments due / quizzes
1	Seeds and Growth Pond Life	What is Inquiry? (Llewellyn) Images of Inquiry (NRC ch 3) OBB chs 44, 49, 50 SFAA ch 1, Nature of Science	Memories of Science draft (Thur) Science notebooks (Thur - check)
2		Designing Investigations (Llewellyn) Preparing Teachers for Inquiry-Based Teaching (NRC ch 5) OBB chs 22, 23, 56	Revised science lesson (Mon) Who is a Scientist draft (Thur) Science notebooks (Thur – evaluate) Seeds and Growth quiz (Wed) Pond life quiz (Thur)
3	Food for Plants Pillbug Project	How do Children Learn Science? (Llewellyn) Making the Case for Inquiry (NRC ch 6) OBB 52 (section on arthropods)	Science Misconceptions draft (Thur) Science notebooks (Thur - check)
4		Creating a Culture of Inquiry (Llewellyn) Inquiry in the National Science Education Standards (NRC 2) OBB 11, 12, 13	Portfolio Project and presentation (Thur) Science notebooks (Thur – evaluate) Food for Plants quiz (Wed) Pillbug Project quiz (Thur)

Llewellyn = handouts from the Llewellyn book, *Inquire Within*.

NRC = *Inquiry and the National Science Education Standards* (available online)

OBB = Online Biology Book

SFAA = Science for All Americans

GS 3 1 1 Portfolio Project: Preparing for Science Teaching

Due date: Last day of class, July 16

Turn-in format:

All drafts and the final project should be submitted electronically, by email or on in person on a flash drive. Submit your work in Word or, if you do not have Word, save as an RTF file. I will use the Comments feature to give you feedback on your drafts and to mark up the final project.

Portfolio contents

Memories of Science essay: Draft due week 1. Length: about 1 ½ - 3 pages. In this essay, you will reflect on how you learned science when you were an elementary student. Consider what activities you can remember from the classroom and what they meant to you. Also think about other places where you learned science: museums, books, Scouts, outdoor school, summer camp. What did you learn? What positive things did you take away from these experiences? What negative things did you experience? In the last paragraph or two, draw your conclusions from your memories. What do they mean in the context of your own teaching?

Who is a Scientist essay: Draft due week 2. Length: about 1 ½ - 2 pages. Reflect on stereotypes of scientists that are presented in the media. Then use the internet to find three working scientists who do not fit the stereotype: different gender, different ethnic background, working somewhere other than a lab, etc. (you can find websites of thousands of working scientists by searching the various science department websites at major universities or by searching major research agencies such as the National Institute of Health or the USDA Forest Service). Reflect on how media images of scientists and real images of scientists might influence student attitudes about science. If possible, use interviews with children or adults you know to find out what their ideas of scientists are and where they get their ideas.

Science Misconceptions essay: Draft due week 3. Length: about 1 ½ - 2 pages. After you have learned about student misconceptions and have perhaps had some of your own misconceptions confronted, reflect on that process. Describe any misconceptions you had that you discovered were in conflict with current scientific knowledge, and reflect on how that discovery felt. Describe common life science misconceptions that you have learned about and how you could assess for these in the classroom, then consider how to address misconceptions in the classroom in a way that feels safe to students and does not put them on the defensive or leave them feeling stupid.

Thematic unit outline: Due with the portfolio on the last class day (you may turn in a draft at least one week early if you want feedback). Prepare an outline for a thematic, inquiry-based life science unit (or a portion of a thematic unit) consisting of about 3 instructional days. The chosen theme should be aligned to one of the three National (or Oregon) Life Science Standards. Include the following:

- A paragraph that describes the overall theme and “storyline” of your unit. What is it that ties all of the activities together?
- The national and Oregon state standards that will be addressed in the unit.
- A paragraph describing how you plan to integrate writing, reading, and math into the unit.
- A description of each day’s activities. This does not have to be a formal lesson plan, but do include the following for each activity:
 - Goals or objectives – what should the students know at the end?
 - Materials needed
 - Approximate time needed
 - Description of what students will do. Use the 5E format for inquiry-based activities. Make it clear how you will Engage students, what they will Explore, how they will Explain what they have found out and connect conclusions with evidence, how you can Extend their learning, and how you will Evaluate their learning while the lesson is in progress and later when you do a formal evaluation.

You'll be graded on...	I'll be looking for...	Point value
Memories of Science essay	<ul style="list-style-type: none"> • Includes both formal and informal (free-choice) learning situations. • Includes specific examples (“There was this one cool thing we did...”) rather than vague descriptors (“It was really interesting,” or, “Science was boring.”). • Uses specific examples to support ideas and opinions. • Draws solid conclusions at the end. 	10
Who is a Scientist essay	<ul style="list-style-type: none"> • Uses specific examples from the media to support statements about media-perpetuated stereotypes of scientists. • Refers to websites of at least three working scientists who do not conform to the stereotypes. • Uses evidence to support statements about media influence on popular ideas about scientists: from textbooks, educational literature, or interviews. 	10
Science Misconceptions essay	<ul style="list-style-type: none"> • Includes specific examples of your own misconceptions that you discovered. • Discusses common misconceptions in the life sciences. • Considers ways of establishing a culture of inquiry that allows students to confront their misconceptions in a comfortable way. • Science content is accurate. 	10
Unit plan outline	<ul style="list-style-type: none"> • Covers the minimum requirements: three instructional days; inquiry-based science lessons; integrates literature, writing, math. • Science storyline is strong and evident. • Methods of assessing student thinking and learning are evident, varied, and appropriate to the activities and to the age of the students. • Science content is accurate. 	50
Basic mechanics: punctuation, grammar, spelling throughout all parts of the portfolio.	Be sure to spell-check. Use standard English grammar and punctuation.	10