

## Teaching Everyday Science, Winter 2020

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### Course Description

This course is designed to immerse potential science teachers in laboratory and thinking experiences that they can use as a foundation for their own understanding of science curriculum development in future teaching experiences.

### The Science Cornerstones Project

Teaching Everyday Science was created with the support of a National Science Foundation grant received by the Center for Science Education at PSU. The grant resulted in the development of 8 science courses taught by a faculty with diverse interests and backgrounds. These courses, called Science Cornerstone Courses, represent an interdepartmental effort to create, teach, and assess courses that reflect an interdisciplinary curriculum as well as incorporate innovative strategies for teaching and learning.

### The Cornerstones Project Goals

- Understand and apply selected fundamental principles from one or more areas of scientific inquiry
- Directly experience the methods and processes of scientific inquiry, including experimental design, the recording, quantification, and interpretation of observations, and the effective communication of results
- Access and utilize scientific information and concepts in support of their life roles as individuals, citizens, learners, consumers, producers, and family members
- Comprehend the power and the limitations of science as a way of understanding the world, including ways of dealing with uncertainty,
- Recognize the interactions between science and other human endeavors.

### Course Objectives

#### Students will:

- Learn how to engage middle school and high school students in science education.
- Become familiar with inquiry-based strategies for teaching science.
- Become familiar with Common Core and Next Generation Science Standards
- Design and teach an hour-long inquiry-based lesson.
- Practice teaching and assessing student learning.

## Course Information

### Assumptions that Guide this Course:

The learning that takes place in this class is largely accomplished through student-led inquiry and research. In this class you will work collaboratively on projects and exercises that stress the application of concepts to inquiry-based projects. While the inquiry-based approach of the course is a more engaging way to learn, it also places more responsibility on the student to guide one's own learning and intellectual development. Therefore, the learning you achieve in this class is largely a product of your participation in *all* aspects of the course.

**Participation and Group Work:** Attendance and participation during the teaching portion of the class is mandatory and will be counted in the calculation of your course grade. Instructor is not responsible for reviewing any course material given during your absence. All projects will be group-based (3-4 people per group). All group members must be present for teaching activity. If a group member is absent, the group must teach on the "make-up" teaching day.

**Late Assignments or Arrivals:** Late assignments will be penalized 15%. Please do not e-mail late course work. **Late arrivals to class are not permitted on the days of the exams or peer review. Late arrivals will receive a grade of zero for the exam and/or peer review.**

**Incompletes:** Departmental policy dictates that incompletes can be given only for verified medical reasons. A doctor's note is required to receive an incomplete.

**Text:** Teaching Inquiry Science in Middle and Secondary Schools by Anton E. Lawson. 2010

## Course Evaluation

### Grading Scale:

**A:** "superior", high level integration and conceptual development with factual accuracy

**B:** "above average", accurate with significant integration and conceptual development;

**C:** "basic quality", mostly accurate and simply factual, modest conceptual development;

Percent scores and grade break points for letter grades:

A 94 - 100	B+ 87 - 89	C+ 77 - 79	D+ 67 - 69
A- 90 - 93	B 83 - 86	C 73 - 76	D 63 - 66
	B- 80 - 82	C- 70 - 72	D- 60 - 62

**Academic Dishonesty Zero-Tolerance Policy:** Plagiarism or Academic Dishonesty of any form will not be tolerated and will result in a referral to academic affairs and failing grades for the assignment and course participation. For more information, please see Portland State University's Bulletin

### Course Grade Breakdown:

**Attendance and Participation (15% total):** Based on number of classes attended (must arrive to class on time to receive credit), during teaching portion of the class (5%), contribution to group-work for final project (5%) and presentation at the end of the term (5%).

**Peer Review (5% total):** During the peer review session, your final paper will be graded by other students in class. Bring one copy for each member of your group. **You must have a complete paper to participate in the Peer Review.**

**Methods Demonstration (5%):** Your group will teach the experimental methods to another group and demonstrate that the methods will work.

**Midterm Exam (15%) and Final Exam (20%):** See study guide. **You may not be late to the exams. If you are late, you will receive a zero for the exam.**

**Final Project (40% total):** Each group will design, teach and assess a 50-minute inquiry-based curriculum. A final paper consisting of two drafts will be due at the end of the term. Teaching (10%), Final Paper Draft 1 (10%), Final Paper Draft 2 (20%).

### **Access and Inclusion for Students with Disabilities**

PSU values diversity and inclusion; we are committed to fostering mutual respect and full participation for all students. My goal is to create a learning environment that is equitable, useable, inclusive, and welcoming. If any aspects of instruction or course design result in barriers to your inclusion or learning, please notify me. The Disability Resource Center (DRC) provides reasonable accommodations for students who encounter barriers in the learning environment. If you have, or think you may have, a disability that may affect your work in this class and feel you need accommodations, contact the Disability Resource Center to schedule an appointment and initiate a conversation about reasonable accommodations. The DRC is located in 116 Smith Memorial Student Union, 503-725-4150, [drc@pdx.edu](mailto:drc@pdx.edu), <https://www.pdx.edu/drc>.

- If you already have accommodations, please contact me to make sure that I have received a faculty notification letter and discuss your accommodations.
- Students who need accommodations for tests and quizzes are expected to schedule their tests to overlap with the time the class is taking the test.
- Please be aware that the accessible tables or chairs in the room should remain available for students who find that standard classroom seating is not useable.
- For information about emergency preparedness, please go to the Fire and Life Safety webpage (<https://www.pdx.edu/environmental-health-safety/fire-and-life-safety>) for information.

### **Title IX Reporting**

As an instructor, one of my responsibilities is to help create a safe learning environment for my students and for the campus as a whole. We expect a culture of professionalism and mutual respect in our department and class. You may report any incident of discrimination or discriminatory harassment, including sexual harassment, to either the Office of Equity and Compliance or the Office of the Dean of Student Life.

Please be aware that as a faculty member, I have the responsibility to report any instances of sexual harassment, sexual violence and/or other forms of prohibited discrimination. If you would rather share information about sexual harassment or sexual violence to a confidential employee who does not have this reporting responsibility, including an Interpersonal Violence Advocate at the Women's Resource Center or the Queer Resource Center. You may contact a confidential advocate by calling 503-725-5672. This Sexual Misconduct Website provides a complete of those confidential employees and off campus resources.

For more information about Title IX please complete the required student module Creating a Safe Campus in your D2L.

### Winter 2020 Schedule (Subject to change)

Week	Date	Topics	Due Dates Readings and Assignments
1	Jan 7, 9	Course Introduction	
		Teaching science as a way of knowing.	
2	Jan 14, 16	Teaching science as a way of knowing.	<b>Chs. 1 and 2</b>
		Introduction to Inquiry. Inquiry Activity	<b>Chs. 3 and 4</b>
3	Jan 21, 23	Introduction to Inquiry. Inquiry Activity. Minds of our Own video.	
		Inquiry Activity, More on inquiry-based learning	
4	Jan 28, 30	Introduce teaching project, Organize groups, exam review	
		<b>Midterm Exam</b>	
5	Feb 4, 6	Prepare for teaching activity	<b>Chs. 5, 6 and 7</b>
		Prepare for teaching activity <b>Teaching/Methods approval</b>	
6	Feb 11, 13	Prepare for teaching activity, Discuss structure of final paper <b>Teaching/Methods approval</b>	
		Teaching / Rod Shroufe Talk	
7	Feb 18, 20	<b>Simple Heredity</b>	
		<b>pH</b>	
		<b>Inertia</b> <b>Buoyancy</b>	
8	Feb 25, 27	<b>Thermal Capacity</b> <b>Levers</b>	
		<b>Nature of Light</b>	
9	Mar 3, 5	Make up Teaching Day	
		Work on final projects	
10	Mar 10, 12	Work on final projects, <b>Peer Review</b>	
		<b>Presentations, Final Exam Review</b>	<b>Draft 1 Due</b>
<b>Final</b>	17-Mar	<b>Final Exam 3:30</b>	<b>Draft 1 returned, Draft 2 Due by March 20</b>