

**INFORMAL SCIENCE EDUCATION:
LEARNING AND TEACHING SCIENCE OUTSIDE THE CLASSROOM**

11:300:335 05:300:335

3 credits

Instructor: Roberta Hunter	roberta.hunter@gse.rutgers.edu
Phone Number: 609.915.9595	Office Hours: by appointment
	Prerequisites or other limitations: none
Mode of Instruction: <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input type="checkbox"/> Hybrid <input type="checkbox"/> Online <input type="checkbox"/> Other	Permission required: <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes Directions about where to get permission numbers: from the instructor

COURSE OVERVIEW

Learning goals

Students will gain an appreciation for the vast array of places where people are taught and learn science that fall outside the traditional classroom. You will develop a rich understanding of how to design informal learning experiences that lead to deeper scientific understanding, including effective field trip approaches, exhibit design considerations, and program development ideas. This course will expose you important aspects of informal science learning such as: the various types of ISE experiences; methodologies for assessing informal science learning; issues of diversity, equity, interests, motivation; development of school-ISE context partnerships; and emerging topics such as new media, and life-long learning.

Course catalog description

This course focuses on the teaching and learning of science in out-of-school contexts. These contexts are widely referred to as "informal learning" contexts and include: zoos, aquariums, science centers, natural history museums, docent-led walks/tours, after-school programs, and eco/enviro-tours. Learning theory in this area draws heavily from sociocultural perspectives on

knowing and learning, and the class will discuss its influence, along with cognitive and educational psychology, on the teaching and learning of science in out-of-school contexts.

COURSE MATERIALS

Required

Books Bell, P., Lewenstein, B., Shouse, A.W., & Feder, M.A. (Eds.). (2009). *Learning science in informal environments: People, places, and pursuits*. Washington, D.C.: National Academies Press. (Available at: http://www.nap.edu/catalog.php?record_id=12190)

PDFs Available as necessary on the course Sakai site under Resources, Readings

Recommended

Hein, G. (1998). *Learning in the museum*. New York, NY: Routledge.

Falk, J.H. and Dierking, L.D. (2000). *Learning from museums: Visitor experiences and the making of meaning*. Lanham, MD: AltaMira Press.

Fenichel, M., & Schweingruber, H. A. (2009). *Surrounded by science: Learning science in informal environments*. National Academies Press. Chicago.

GRADING

Assignment	Due date	Grade
Participation	Ongoing	15%
Reading Prompts	Ongoing	5%
Observations	Ongoing	20%
Literature Review Paper	Week 13 (11/18/2013)	25%
Group Project	Week 14 (12/2/2013)	30%
Individual Reflection Paper	Exam Day	5%

The course will follow a combination of seminar-style format, meaning we will read and discuss literature on the topic, and hands-on activities and experiences. Students will engage in several semester-long activities designed to enhance their understanding of the teaching and learning of science in informal settings.

Participation Your participation in class counts heavily towards your grade. ***It is therefore important that you are present and actively participate in class activities and discussions.***

Learning is an active process: the more you participate the more you learn. As part of your participation, you are expected to actively engage in class discussion, group work activities and online. In addition, class participation involves the discussion of assigned readings and attending class as described further below.

Readings/Prompts There will be assigned readings for each class session; you are expected to read them and be prepared to discuss them in class. You are expected to reply to a Reading Prompt on Sakai on a weekly basis. These Prompts are designed to help you get the most out of the reading. On occasion an additional reading may be assigned or a new reading may be substituted for an existing one.

Attendance You are expected to attend all class sessions. However, it is expected that, as adults, life sometimes throws curve balls that require you to be in attendance somewhere other than my class. You will be allowed **one** excused absence (meaning, you will not have to conduct “make up” work for that class) but it is expected that you will read all materials, post to Sakai as necessary, hand-in all work, and be responsible for all course content **even if you are absent**. Other absences can be negotiated on a case-by-case basis. If, at any time, you know you will be absent, please contact me prior to class if possible.

Informal Learning Observations All students will conduct 3-6 hrs. of informal observations outside of class time. You will be provided with methodologies for conducting your observations and a list of venues, both locally on/near Rutgers’ campus and others within close proximity to Rutgers. These observations are considered “homework,” are conducted outside of official class time, and are required. We will also take at least two class field trips to conduct observations at a science center, natural history museum, aquarium, or the like. Field trip attendance is mandatory. You are to keep an Observations Journal, either on paper or electronically, that can be reviewed for a grade.

Literature review paper All students will write a paper on a topic of their choosing as it relates to informal science learning. This will be a 5-7 page (double-spaced, 12pt font, New Times

Roman, 1" margins), literature review-style paper. You will be expected to find original literature on your topic of choice. Specific details about the paper will be handed out in class.

Projects Students will be able to choose one of the following projects to be completed by the end of the semester. These projects will be conducted in groups of 2 (preferred) or 3 (maximum) people per group. Your group will submit a write-up of your project at the end of the semester and present it to your classmates on the last day of class. These options are:

1. Following a 3-phase model, your team will create a coherent school field trip experience on a topic of your choice and aimed at a grade (or grade range) of your choice. You will not need to conduct the field trip.
2. After researching a topic, your team will design an exhibit that could be used in an ISE context (you do not need to build it, but you can if you'd like!).
3. Your team will create an ISE program. First you'll need to decide what kind of program (after-school, eco/enviro-tourism, docent-led program, museum public program, museum school program, ...). Then you'll choose a topic and design your program.

Individual reflection paper: The last assignment of this course is an individual reflection paper 3 pages long (double-spaced, 12pt font, 1" margins) in which you (individually) reflect on what you have learned in this course. This reflection should be based on the contribution of the readings, class activities, and final project to your developing understanding of what it means to teach and learn science in informal contexts.

Electronic Submissions: If you wish to submit your document electronically, please do so via the Sakai Drop Box Tool (do not email me your paper) in MS Word (.doc) format. **Please do not submit other file types.** Label the file with your name (first name and initial of last) and assignment name (e.g., reflection). For example, a literature review paper by me would be RHunterLitReview.doc.

Make sure your name is also on the assignment.

Specific instructions for assignments (listed and not listed) will be provided in class closer to the assignment due date.

Care, respect and integrity in written and classroom exchanges. All written work, including postings on Sakai, should be proofread for clarity, spelling, grammatical errors and the like. Please

use language that is appropriate for the classroom setting and maintain a professional tone in both your Sakai postings and classroom discussions. Assignments should be your own work, except in cases where I have required a group product. Please do your own work and cite your sources. Outside sources should be referenced appropriately (either APA or Chicago style is acceptable). You should not turn in the same work in two separate classes without the specific written approval of the faculty members involved. Violations of academic integrity have serious consequences for your grade, your academic future and your career. Please familiarize yourself with the university policy on academic integrity: <http://academicintegrity.rutgers.edu/integrity.shtml>.

RESOURCES

Rutgers Learning Centers – writing <http://lrc.rutgers.edu/content/writing-assistance>
Association of Science-Technology Centers <http://www.astc.org>
Center for the Advancement of Informal Science Education <http://informalscience.org/>
Coalition for Afterschool Science <http://afterschoolscience.org/index.php>

WEEKLY SYLLABUS

Week 1 **9/9** **Course Introduction** Course syllabus, course requirements, etc.; basic intro to informal learning, disputed definitions, places, etc.

Assignment(s) to complete prior to this class none

Week 2 **9/16** **What is Informal Learning?** History, constructivism outside schools, factors (context, authority, agency, motivation, experiential)

Assignment(s) to complete prior to this class

Readings Bell, et al., (2009) - Chapters 1-2.

Supplemental Readings

Falk and Dierking (2000). *Learning from museums*, Ch 1 - Introduction

Activities Reading Reflection Prompt

Informal Learning Observation Assignment # 1

Due in class Informal Learning Observation #1

Week 3 9/23 Interpretation, Communication, Education Differences between interpretation, Communication, and Education from theoretical and practical standpoints

Assignment(s) to complete prior to this class

Readings Beck, L. (2002). *Interpretation for the 21st Century: Fifteen Guiding Principles for Interpreting Nature and Culture*, Ch. 1.

Hein, G.E. (1998). *Learning in the museum*, Ch 8 - The Constructivist Museum.

Activities Reading Reflection Prompt

Due in class nothing

Week 4 9/30 Types of ISE Engagement Socio-cultural perspective, power of description

Assignment(s) to complete prior to this class

Readings Ellenbogen, K. (2002). Museums in family life: An ethnographic study.

Activities Reading Reflection Prompt
Observation Assignment #2

Due in class Informal Learning Observation #2
One paragraph about your group's ideas for your class project. Where (type of informal learning context) will you focus this work? What will be your target audience? If a school-led project, what grade level will your project target? What content topic will be the focus? What resources might you need?

Week 5 10/7 Designed Spaces Design considerations, object/learner/message oriented design in science centers, zoos, aquariums, natural history museums, etc.

Assignment(s) to complete prior to this class

Readings Bell, et al., (2009) - Chapter 5 - Science Learning in Designed Spaces.
Eberbach & Crowley. (2005). From living to virtual: Learning from museum objects. *Curator*, 48(3), 317-338.

Activities Reading Reflection Prompt
Observation Assignment #3

Due in class Informal Observation Assignment #3

Week 6 10/14 School-based Field Trips Lesson planning, effective leading of trips, the pre-visit-post design approach

Assignment(s) to complete prior to this class

Readings Melber, L.M. (2007). Informal Learning and Field Trips: Engaging Students in Standards-Based Experiences Across the K-5 Curriculum
Activities Reading Reflection Prompt

Week 7 10/15 Assessment/Evaluation Experiential learning theory, object learning theory

Assignment(s) to complete prior to this class

Readings Bell, et al., (2009) - Chapter 3 - Assessment
Activities Reading Reflection Prompt

Due in class nothing

10/19 ***Plainsboro Preserve Field Trip*******

Week 8 10/21 Family Learning Mediation by family, where to families learn.

Assignment(s) to complete prior to this class

Readings Bell, et al., (2009). Ch 6 - Programs for Young and Old.
Activities Reading Reflection Prompt
 Observation Assignment #4

Due in class Project proposals to be handed in today
 Informal Learning Observation #4 ***

Week 9 10/28 Museum Partnerships How to establish good working relationships

Assignment(s) to complete prior to this class

Readings Kisiel, J. (2010). Exploring a school-aquarium collaboration: An intersection of communities of practice. *Science Education*, 94(1), 95-121.
Activities Reading Reflection Prompt

Due in class nothing

Week 10 11/4 Interest, Attitudes, and Identity How do interest, attitudes and identities of learners affect student ISE learning?

Assignment(s) to complete prior to this class

Readings Packer, J. & Ballentyne, R. (2002). Motivation factors and the visitor experience: A comparison of three sites. *Curator*, 45(3), 183-198.

Activities Reading Reflection Prompt

Due in class nothing

11/9 ***Field Trip*******

Week 11 11/11 Diversity and Equity How can we provide quality ISE experiences for all learners?

Assignment(s) to complete prior to this class

Readings Bell, et al., (2009) - Chapter 7 - Diversity and Equity

Activities Reading Reflection Prompt
Observation Assignment #5

Due in class Informal Learning Observation #5 =

Week 12 11/18 Topics - New Media; Citizen Scientists Web 2.0, mobile devices, museum technology; citizen science as ISE learning

Assignment(s) to complete prior to this class

Readings Bell, et al., (2009) - Chapter 8 - Media
CAISE. (2009). *Public participation in scientific research: Defining the field and assessing its potential for informal science education*. Washington, D.C.: Center for Advancement of Informal Science Education.

Activities Reading Reflection Prompt

Due in class **Literature Review paper due in class**

Week 13 11/25 Loose ends/ TBD Wrap up an unfinished discussions; time to work on group projects

Assignment(s) to complete prior to this class To be determined

Week 14 12/2 Project Presentations

Assignment(s) to complete prior to this class

Activities Complete individual project write up
 Complete group presentation

*Due in class **Individual project write up due in class***

Week 15 12/9 ISE Careers A chance to speak with professionals working in various ISE contexts and environments.

Assignment(s) to complete prior to this class

Activities Write 3 – 5 questions to ask a panel of ISE professionals

Due in class nothing

******* Individual reflection papers due on day of exam *******