

Learning and Teaching Science in the Elementary School
The Evergreen State College
Masters in Teaching Program
Faculty: Jana Dean, M.Ed.
Winter 2011
Sem 2 A2107 (unless otherwise noted)
Fridays, 9:45 - 11:45

In this segment of your graduate program, you will learn to:

- Develop your own conceptual understanding of science through research and inquiry.
- Access materials available for facilitating the learning of science.
- Interrogate your own and children's naive conceptions (and sometimes misconceptions) about natural phenomena.

Children love science because it answers the question "why?" Too often however, this landscape filled with wonder gets cluttered with vocabulary lists and decontextualized concepts that obscure the basis of what it means to do science. Doing science means interrogating assumptions about how things work, making predictions, and testing and re-testing those predictions through observation.

The Washington State Science Learning Standards are uncompromising in that they demand that we provide students experiences that promote "long-term and conceptual understanding." To do that means that you must develop in yourself a **specialized content knowledge** that incorporates the domains of content knowledge, pedagogical knowledge and an in-depth understanding of how people learn a given content. This segment of your studies is comprised of 3 interwoven strands:

1.) **GUIDED PHYSICS INQUIRY:** In these labs, you will develop your understanding of both physics and the process of doing science through a series of guided experiences regarding light. In conjunction with these experiences, you will read an elementary classroom case study, look at children's ideas about light, and read a short portion of a college physics textbook.

2.) **THE TEACHING OF SCIENCE:** Together you will look at research, case studies and formative assessment pertinent specifically to the teaching and learning of science.

3.) **INDEPENDENT LEARNING:** From the Washington State Science Standards, you will select an area of science to learn about. You will track and share your learning via a web page, as well as developing a unit outline. (Full description to come.)

Predicted pacing and assignments are below. **As needed, I will provide additional specific prompts related to labs or readings or the independent project at the end of each session.** From week two forward, you will also respond to one of your colleagues regarding his or her independent learning process and progress each week.

Week	Topics/Activities/Location	Readings Due	Assignments Due
1	What does it mean to teach and learn science?		Bring in a family photo
2	Who are you as a learner of science? Website workshop (11:00 in PC Lab)	NWREL: <i>Math and Science Classrooms: Building a Community of Learners Washington State Science Learning Standards</i> , pp. 1 - 13	Letter to Jana -- Science Biography: How was your science education the same from the models presented in the reading? How was it different? Be specific about both your experience and about the readings.
3	Optics Lab (meet in Lab 2 room 2237)	Self selected section of the <i>Washington State Science Learning Standards</i> Donovan & Bransford, Ch. 9 "Scientific Inquiry and How People Learn"	Independent topic selection On-line Journal Entry: Given your selection of topic and Bransford and Donovan, what do you know about the topic? What do you wonder? What do you need to learn? Peer Response (according to assignment guidelines)
4	Optics Lab (meet in Lab 2 room 2237)	Goldberg, "Children's Ideas About Light" Keeley -- Preface & introduction and selected entries.	Guided Reading (Prompt TBA) On-line Journal Entry and Peer Response (according to assignment guidelines)
5	Optics Lab (meet in Lab 2 room 2237) and/or Workshop: Formative Assessment (meet in Sem 2 A2107)	Bloomfield, " <i>Cameras</i> "	Guided Reading (Prompt TBA) On-line Journal Entry and Peer Response.

Week	Topics/Activities/Location	Readings Due	Assignments Due
6	Workshop: How Children Learn Science	Tools4teachingScience.org	Workshop Preparation On-line Journal Entry and Peer Response. Big Idea Tool for Website
7	Workshop: FOSS Kits and Science Inquiry (Craig Gabler)	Donovan & Bransford, Ch. 10 “. . . Reasoning about Light at the Elementary Level”	Guided Reading (Prompt TBA) On-line Journal Entry and Peer Response.
8	Website Presentations Workshop: Inquiry (Andy Gilbert)	Donovan & Bransford, Ch. 13 “Pulling Threads”	Guided Reading (Prompt TBA) On-line Journal Entry and Peer Response. Unit Outline & Website
9	Website Presentations		Unit Outline & Website
10			

Full-text Resources:

Donovan, M.S. and J. Bransford, (2005). *How students learn: History, mathematics and science in the classroom*, Washington, D.C.: National Academies Press. (free download @ www.nap.edu)

Washington State K12 Learning Standards, Version 1.2, June 2010 (free download @ <http://www.k12.wa.us/Science/Standards.aspx>)

UW College of Education, *Tools for Ambitious Science Teaching*, <http://tools4teachingscience.org/>
Northwest Regional Laboratory, *Math and science classrooms: building a community of learners* (free download @ <http://educationnorthwest.org/resource/1097>)

Wiggins, G. and J. McTighe, (2005). *Understanding by design, 2nd edition*, Alexandria, VA: ASCD Press.

Selections from the following texts are available on ELM:

Goldberg, F. (2008). *Physics and Everyday Thinking*, Armonk, NY: It's About Time.

Bloomfield, L. (1996). *How Things Work: The Physics of Everyday Life*, New York: John Wiley & Sons.

Keeley, P. (2005). *Uncovering Student Ideas in Science: 25 Formative Assessment Probes, Vol 1*, Arlington, VA: NSTA Press.