ELTEP 523A/523B

Ambitious and Equitable Elementary Science Teaching & Learning

University of Washington, Miller Hall 104 & 112
Mondays 8:30-11:20 A.M. - Winter 2016
Office Hours: Email instructor to schedule

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COURSE OVERVIEW

Course Description:

Ambitious teaching practices focus on supporting student learning across ethnic, racial, class, and gender categories; fostering deep understanding of ideas and engagement in solving complex problems rather than the typical emphases on activities and procedural talk. This instruction requires attention to students' emerging ideas and steady adjustments to practice based on assessment of students' understanding.

Ambitious teaching practices are uncompromisingly responsive to student's everyday language, knowledge, and lived experiences. In science, ambitious practice "works with students' ideas" and apprentices young learners into the language and thinking of science as a discipline, with the goal of supporting students in constructing and revising their explanations for natural phenomena. This requires that teachers support students in formulating questions about phenomena that interest students, building and critiquing theories, collecting, analyzing and interpreting data, evaluating hypotheses through experimentation, observation, measurement, and communicating findings. Yet it also means that teachers work on recognizing our own and students' worlds, developing relationships to form inclusive learning communities, providing scaffolding for full participation in science language and activities, and critiquing, challenging, and changing the current culture of science. The ultimate goal is to empower students in the process of becoming scientifically literate and to work toward a new vision of participation in science, one that is more inclusive of a broad range of ideas, for future generations. As Delpit suggests, the inclusion of more voices in the dominant-culture discourse can lead to those voices "not only participating in the mainstream, but redirecting its currents" (Delpit, 2001, p. 552).

The aim of the course is to support the development of your professional identity as future ambitious and equitable science teachers and to support students' identity development in science.

Course Objectives:

Through readings, assignments, and participation, we will all:

- examine the culture of science classrooms and cultural connections and disconnections these create for students
- analyze how school science marginalizes some students
- develop a deeper understanding of who our students are and develop strategies that fold their lived experiences into scientific stories being built in classrooms

- enact strategies to build inclusive scientific learning communities
- scaffold science learning opportunities in the classroom
- enact methods for encouraging students to critique, challenge and change the culture science in the classroom and in their own lives
- analyze classroom talk to create clear visions about what constitutes rigorous and responsive communities of learners
- articulate what makes science a unique way of knowing the world and how this is similar and different to mathematics and literacy

Course Expectations:

1. **Attend all class sessions.** Make arrangements if you must miss. Send an email to your instructor and TA. (Note: There will likely be a make-up assignment provided so that you can catch up on missed information/experiences.)

2. **Come to class prepared** (i.e. read the assigned articles – come with talking points, watch assigned videos, upload/comment on videos, etc.)

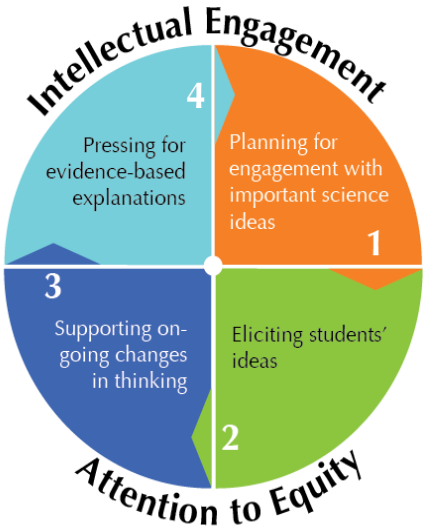
3. **Keep a science notebook** with notes about your experiences in class and in your classroom, including reflections on your ideas about becoming a teacher.

4. **Complete assignments on-time**. Assignments need to be completed by the assigned due date. If circumstances arise that make any of these requirements difficult, please discuss your concerns with us in **advance** of the due date.

5. **Be self-reflective and open to feedback**. Doing rehearsals and enactments with your peers and a facilitator watching may feel uncomfortable. We are all taking risks together and all can benefit from feedback (instructors included!). We will have an exit ticket each week as one way to get feedback from you about our teaching. We also ask that you are open to feedback from your group facilitators and peers when you plan and try-out moves for the enactments with elementary students.

Conceptual basis for Ambitious Teaching:

Based on extensive research of how young people learn science, on authentic forms of science activity, and how teachers learn to appropriate new practices, we describe Ambitious Teaching in terms of a Science Learning Framework with 4 core instructional strategies and tools that support this kind of teaching. More information about these practices can be found at: http://tools4teachingscience.org/.



In terms of attending to equity we begin by articulating Culturally & Linguistically Responsive principles. Supporting learning for all requires that teachers and students…

- Take interest in how students construct science ideas: see students as sense-makers; see science as tentative and about constructing and revising models; see science teaching as supporting the revision of students' scientific ideas
- Recognize our own and others' cultures and linguistic backgrounds & become a student of the students
- Build relationships and inclusive learning environments with norms for participation in science talk
- Scaffold for full participation in science in formative assessments and in classroom talk
- Broaden our ideas about where science phenomena occur and how they overlap with students' lives
- Engage students and teachers in critique & construction of ideas
- Reflect on HOW students are constructing scientific explanations and help students do the same

COURSE OUTLINE BY WEEK

Wk	Date	Class Session	Assignments/Readings Due
1	M Jan 4	**Question**: What are 'best practices' for science teaching? How do students learn science? **Class learning**: Review course expectations, assignments, syllabus; Overview of Ambitious and Equitable Science Teaching Practices; *Model-based Inquiry*	– Science & You self-reflection task *(You will have time in class to sketch out responses, but if you prefer a longer thinking time, please download from Canvas and begin thinking/responding ahead of time, bring your responses to week 1 class.)* - Overview of field experience this quarter: **http://bit.do/uwscience**
2	M Jan 11	**Question**: What do I do when I get my kit? **Class learning**: AST Practice #1: Planning for engagement with important science ideas; *Gearing up teacher content knowledge* **Team Time**: See wk 2 checklist - content knowledge	– **Task**: 1st draft *Theory of Action* due Mon, 1/11 before 8:20am (Canvas) – **Read** *What's Your Evidence?* (WYE book) o Ch 1: Importance of Engaging K-5 Students in Scientific Explanation (p1-18) o Ch. 7: Fostering a Community of Young Scientists over Time (p139-148)
3	Tu Jan 19	**Question**: Eliciting: How do I find out what students know and what experiences or connections they make? **Class learning**: AST Practice #2: Eliciting students' ideas and experiences; *Seeing Student Ideas as Scientific* **Team Time**: See wk 3 checklist – eliciting ideas	– **Task**: Complete wk 2 checklist items – **Read** *Teaching Science to English Language Learners* (TSELL book) o Ch 4: Encouraging Students' Imagination (p31-38) o Ch 5: Using Everyday Experiences to Teach Science (p39-50) o Optional (connects with TSELL Ch 4) *Ballenger (2004) The Puzzling Child* (8 pages) – ***Heads-up!*** *Collect student work from eliciting ideas to bring to class wk 4.*
4	M Jan 25	**Question**: Science Activity: How can student talk opportunities help students learn from activities? **Class learning**: AST Practice #3: Supporting on-going changes in student thinking; *Using back-pocket questions and student-to-student talk structures* **Team Time**: See wk 4 checklist - sensemaking	– **Bring** student work samples to class today from your lesson 1 enactment (We will be analyzing and assessing students' initial understanding together.) – **Task**: Upload individual lesson 1 reflection (Canvas) – see reflection criteria & comment on lesson 1 video – see video commentary prompts (Edthena) – **Read** *TSELL* o Ch 1: Creating a Foundation through Student Conversation (p1-12) o Ch 2: Teacher's Perspective: Science Talks (p13-20)

5	M Feb 1	**Question**: Science Activity: How can student talk opportunities help students learn from activities? **Class learning**: AST Practice #3: Supporting on-going changes in student thinking; *Using back-pocket questions and student-to-student talk structures* **Team Time**: See wk 5 checklist - sensemaking	– **Read** *TSELL* Part II: Teaching Academic Language (p57-88) – **Task**: Upload individual lesson 2 reflection (Canvas) & comment on lesson 2 video (Edthena)
6	M Feb 8	**Question**: Assessment: How can we know what students have learned so far? How do they know? **Class learning**: AST Practice #4: Pressing for evidence-based explanations; Revising models using evidence we have so far; student metacognition **Team Time**: See wk 6 checklist - explanations	– **Read** *WYE* ch 4: Supporting Scientific Talk and Writing (p. 65-88) – **Task**: Upload individual lesson 3 reflection (Canvas) & comment on lesson 3 video (Edthena) – ***Heads-up!*** *Collect student work from lesson 4 about evidence-based explanations to bring to class week 8.*
7	Feb 15	NO CLASS TODAY (SCHOOL HOLIDAY)	– **Task**: Upload individual lesson 4 reflection (Canvas) & comment on lesson 4 video (Edthena) – **Read** *TSELL* pgs 107-127 o Ch 13: Learning a Second Language o Ch 14: Using Two Languages to Learn Science o Ch 15: Teacher's Perspective Learning a Second Language
8	M Feb 22	**Question**: Planning: How do we know where to go next? **Class learning**: Analysis of student work using a what-how-why levels of explanation chart **Team Time** (shorter): What-how-why dots chart	– **Bring** student work samples to class today from lesson 4 – **Read**: *WYE* selection from Ch 6 pgs 132 – 136 "Using Assessment Data to Inform Instruction" & "Assessing Informal Science Talk" pgs 136-138
9	M Feb 29	**Question**: Integration across subjects: How can we support science teaching and learning when we can't teach science every day? **Class learning**: How talk, writing, and reading support science learning	– **Task**: Final draft Theory of Action due by Feb 29th before 8:20 AM – **Read** article by Heisey & Kucan (2010) "Introducing Science Concepts to Primary Students through Read Alouds: Interactions and Multiple Texts make a difference" (pgs 666-675)
10	Mar 7	NO CLASS SESSION TODAY	– *Please upload late or revise-and-resubmit assignments to Canvas no later than March7th 11:59PM (Contact instructor if you need an extension).*

**** Changes may be made to the schedule and to assignments to reflect questions that arise for the group.***
*** Check our canvas course page for the most up-to-date assignment details, homework, readings, rubrics, course handouts, and due dates.

ASSIGNMENTS

For all assignments, please type and use 12-point Times or New Roman Times font, double spaced. (If you do not have easy access to a computer, please talk with us about alternatives.) Details and rubrics for assignments are kept up-to-date on our canvas site. If you have any questions about assignment expectations, please email us! You likely aren't the only one with that question. We are also happy to work with you to talk about science teaching and student learning by arranging an office hours appointment.

Theory of Action for Ambitious and Equitable Science Teaching

2 assignments: 1st draft due Jan 11th / Final draft due Feb 29th

- Your professional philosophy is grounded in the questions: How do students best learn science? How will I teach science? A professional philosophy of science teaching should integrate your understandings of learning, planning, management, instruction, and assessment.
- It is a ***one-page statement*** that summarizes you as a science teacher. You will complete **two** drafts of this document – your draft is due after the first week of class and a final draft is due near the end of the quarter.
- The strongest philosophy statements *describe examples* of classroom interactions that illustrate your vision, supported by research (see course readings), *avoid* the use of generic catch-phrases like "student centered" or "inquiry" and illuminates your approach with *examples and details*. There is more information about specifics, examples of ToA's from past cohorts, and grading rubric that will help you with this assignment on the Canvas site.

PLAN-ENACT-REFLECT Cycles of Teaching and Learning

4 assignments: Individual Reflections due Jan 25th, Feb 1st, Feb 8th, Feb 15th

- This quarter you will team teach a mini-unit series of 4 lessons that includes at least one example of each kind of science teaching practice you will learn about this quarter.
- Lesson 1: Eliciting Student Ideas
- Lessons 2 & 3: Supporting Ongoing Changes in Student Thinking (Activity + Science talk)
- Lesson 4: Pressing for Evidence Based Explanations

WHAT TO EXPECT IN CLASS

This gives you a general overview about how we will spend our time together each week; however, this timing may shift based on your feedback through the exit tickets. Please come prepared to each class having done assigned reading and/or planning required. Most class sessions (weeks 2-8) have dedicated team-time to work with your group in planning for upcoming teaching enactments.

Whole group	*8:30-10:15 AM*
20 mins	**Entry Task** (i.e. silent writing and partner share about teaching practice prompt; discussing homework readings in small groups, with whole group closing/summary)
5 mins	**Housekeeping** (i.e. assignment clarifications, general questions, logistics information)
80 mins	**Learning about a particular science teaching practice using video examples and/or live modeling by the instructors** (includes handout guide and/or ppt slides on Canvas)

Team Time	*10:20-11:20 AM*
55 mins	**Team planning and rehearsal time** guided by the Team Time weekly checklist in breakout rooms, use handouts from whole group time as resources
5 mins	**Exit Ticket – part of Team Time checklist**

GRADING

A four-point scale will be used to provide grades for each assignment or course component (e.g. classwork). A final course grade will be calculated based on the weighted average of the scores.

Exceeds Expectations	4.0
Meets Expectations	3.7
Approaching Expectations	3.4
Partially Meeting Expectations	3.0
Below Expectations	2.5

Assignment	**Weight**
Theory of Action (draft & final)	20%
Lesson Reflections (4 reflections)	40%
Video commentary (for the 4 videos)	20%
Participation during class discussions and work during team planning time	20%
	= 100%

ADDITIONAL RESOURCES

These are books, articles, journals, and web sites that have valuable information beyond what is offered in our text. We urge you to investigate these.

1. NGSS/ NGSS App http://www.nextgenscience.org/next-generation-science-standards
2. Publications from the American Association for the Advancement of Science:
   - AAAS, *Science Literacy for a Changing Future* (Project 2061), 1994.
   - AAAS, *Benchmarks for Science Literacy*, 1993.
   - AAAS, *Science for All Americans* (Project 2061), 1990.
3. Inquiring Into Inquiry Teaching and Learning (2000) by Jim Minstrell and Emily van Zee. AAAS Publishing.
4. The Science Teacher (507 ST in library): This is a practitioners journal aimed at secondary science teachers.
5. Science and Children (LB 1585.S34 in library): This is a practitioners journal aimed at elementary science teachers.
6. The Physics Teacher (physics-astronomy periodicals 530.5 PHYT)
7. Science Scope (NSTA publication for grade 5-9) (LB 1585.3.M52)
8. Web sites:
   http://AmbitiousScienceTeaching.org
   http://www.nsta.org/ (National Science Teachers Association)
   http://www.ospi.wednet.edu/ (Washington State's office of Public Instruction homepage)
9. Facebook: Ask to join our Ambitious Teaching facebook group and join about 400 other teachers and coaches thinking about these same science teaching practices. (Search groups for "Advancing Ambitious Equitable Practices" and ask to join. https://www.facebook.com/groups/140393105993589/)

Access and Accommodations

Your experience in this class is important to us. If you have already established accommodations with Disability Resources for Students (DRS), please communicate your approved accommodations to us at your earliest convenience so we can discuss your needs in this course. If you have not yet established services through DRS, but have a temporary health condition or permanent disability that requires accommodations (conditions include but not limited to; mental health, attention-related, learning, vision, hearing, physical or health impacts), you are welcome to contact DRS at 206-543-8924 or uwdrs@uw.edu or disability.uw.edu. DRS offers resources and coordinates reasonable accommodations for students with disabilities and/or temporary health conditions. Reasonable accommodations are established through an interactive process between you, your instructor(s) and DRS. It is the policy and practice of the University of Washington to create inclusive and accessible learning environments consistent with federal and state law.

Academic Integrity Statement

UW Academic Integrity Policy: The College of Education holds very high standards regarding academic integrity. Work submitted in this course must be the product of your own original effort. When you incorporate the works, words, or ideas of another, you must provide proper citations. If you are concerned about plagiarism, have questions about legitimate forms of collaboration, or are unclear about appropriate methods of citation, consult a style manual or the instructor. Along with plagiarism and unauthorized collaboration, other forms of academic misconduct include (but are not limited to) falsifying attendance records and submitting the work of others as if it were your own. Violations of the Academic Integrity Policy will result in sanctions that can range from disciplinary warning, to probation or suspension, to – in the event of severe or repeated violations – dismissal from the University. For more information please refer to the College of Education's Academic Integrity Policy and related procedures: http://education.uw.edu/my-coe/current-students/academic-policies.

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