

Faculty Development Plan
Name, Teacher Education
2015

CITIZENSHIP

Strengths

- Participated in two department committees (mathematics education search committee, graduate admissions committee ad hoc)
- Past reviewer for two international science education conferences (four to five proposals per conference)
- Regularly attend campus devotionals and forums, talks by colleagues and guests, and social events
- Regularly participate in all faculty and graduate faculty activities (research talks, teaching demonstrations, etc.)

Weaknesses

- New to the faculty and need to strengthen relationships with colleagues
- Need to develop research collaborations with colleagues in the college and outside of the college
- Need to further establish myself in the international science education community

Goals

1. Strengthen relationships with department members by attending campus devotionals and forums, talks by colleagues and guests, and social events with colleagues.
2. Collaborate with colleagues in and outside of the department by planning studies, collecting data, and preparing publications and presentations.
3. Review proposals for the two key science education conferences (NARST, Association for Science Teacher Educators).

Connection to department/university aims

Goal 2 is particularly aligned with the second aim of the Department of Teacher Education, “engaging in educational scholarship” Goal 3 is more closely aligned with the first and third aims of the Department, “serving in our communities,” as I will be actively participating in the campus community and the scholarly community.

These goals support me in meeting the fourth aim of a BYU education (lifelong learning) and will enable me to “serve others throughout [my] life.”

Resources needed

No additional resources required.

Current status

1. Regularly attended campus devotionals and forums, talks by colleagues and guests, and social events. Planning to attend additional events during summer.
2. Collaborative studies in various stages (e.g., writing manuscript with Kathleen Hill at Penn State, completed data collection with Leigh Smith and Rich Sudweeks at BYU, designing study with Adam Johnston at Weber State University).
3. When the opportunity becomes available later this year, I will sign up to review conference proposals.

SCHOLARSHIP

Strengths

- Strong publishing record for a junior faculty member, including Tier 1 journals
 - Five published research articles and two book chapters, five of which were published since hire at BYU
 - One manuscript accepted with major revisions and resubmitted
 - Two manuscripts in review and two manuscripts in preparation
- In the process of collecting data for future publications
 - Two projects in process that will set up 3-4 publications in the coming years
 - Awarded a MSE grant for a research project
- My research hangs together well, setting me up to be established as an expert on teacher content knowledge, especially as it relates to new science teachers and out-of-field teaching
- Established collaborations with colleagues at institutions in other states and countries

Weaknesses

- No publications in the top science education (e.g., *International Journal of Science Education*, *Journal of Research in Science Teaching*, *Science Education*) or education journals (e.g., *American Education Research Journal*, *Journal of Teacher Education*, *Teachers and Teacher Education*)
- Struggle to write daily and am easily distracted by peers

Goals

1. Meet department publication expectation of an average of 1.5 publications per year.
2. Have submitted at least three publications to one of the top science education or teacher education journals.
3. Set aside at least 30 minutes each day to write and strictly observe “writing office hours.”

Connection to department/university aims

Each of these goals is directly related to the second aim of the Department of Teacher Education (“engaging in educational scholarship”). With this scholarship, I hope to be able to positively influence teachers and students throughout the US and the world (third aim) by influencing the preparation of science teachers (first aim).

These goals serve to meet the university aims by encouraging my lifelong learning. By pushing my learning forward, I will be better able to provide an education that is intellectually enlarging.

Resources needed

I have been generously provided with a grant from the McKay School of Education. No additional resources are required at this time.

Current status

1. Three manuscripts currently submitted, with two more manuscripts in preparation.
2. Two manuscripts submitted to one of the top science education journals.
3. As part of my Scholarship Strategies project, I have developed a Do Not Disturb sign for my door and put writing office hours on my calendar. I have also generated a worksheet to track my time spent writing.

TEACHING

Strengths

- Average student rating of 4.1 in Fall 2015, which is positive for a first year professor.
- Based course development on experienced faculty member's course. Personalizing course as I go along.
- Currently employing two undergraduate students in collecting data for a science education research project
- Used Center for Teaching and Learning resources to conduct a mid-course evaluation

Weaknesses

- Student ratings leave sufficient room for improvement on student rating (3.1 in Winter 2016) largely due to frustrations about grading and limited modeling of science instruction
- Have not served on a masters thesis committee
- Course could be more aligned with current national science education standards

Goals

1. Improve student ratings by being more explicit about grading and by adding science investigations that highlight principles taught in class.
2. Serve on a masters thesis committee.
3. Continue mentoring undergraduate students in education research (data collection and analysis).
4. In order to be more aligned with current national science education standards, I will model the integration of crosscutting concepts and scientific practices into content lessons.

Connection to department/university aims

These goals are connected to the department's aim to prepare noble educators by helping to improve my instruction to teacher candidates. They are also connected to the aims of the university, particularly that of lifelong learning and service. Teachers spend their lives in service to the community and continually learning.

Resources needed

No additional resources required.

Current status

1. Responded to midcourse evaluations during the W16 semester by modifying assignments and instruction in current course and future courses. Clarified grading policies in syllabus and modified/removed especially problematic assignments. Added a living/non-living investigation.
2. Will attend summer events with graduate students to become acquainted with their projects and seek to be on a committee.
3. Continue mentoring undergraduate students in education research.
4. Making modifications to instruction to be more aligned with current national science education standards.

COURSE DEVELOPMENT PROJECT PROPOSAL

Name

Teacher Education

Course Purpose

By the end of this course you will be prepared to plan, enact, and reflect upon appropriate and effective science instruction for children in K-6 classrooms.

Final Products

In this course, there will be four final products, demonstrating your progress towards reaching this goal. Because you will often work as a team as an elementary teacher, you will work in small groups on all of these products except the final exam.

1. **Unit concept map:** You will create a concept map in preparation for planning a unit. This will demonstrate your abilities to make sense of the content and interpret the state science Core.
2. **Unit concept outline:** You will create an outline of concepts to be taught in a unit. Here you will demonstrate your understanding of the content, your ability to identify meaningful target concepts, and your ability to plan a conceptually coherent unit.
3. **Lesson plan:** You will create a lesson plan for one lesson from your unit outline. Here you will demonstrate your understanding of various aspects of effective science instruction.
4. **Final exam:** You will be given up to two hours to complete a multiple-choice and short-answer assessment. During this online assessment you will demonstrate your knowledge of the topics taught in the course, particularly the frameworks and strategies for planning, enacting, and reflecting on appropriate and effective science instruction.

ELED 446 Course Outcomes

1. Teacher candidates will evaluate their personal dispositions, development, and growth toward becoming a teacher of science.
2. Teacher candidates will identify and describe purposes for teaching science in K-6 classrooms.
3. Teacher candidates will explain what science is and how children learn science, including the knowledge and reasoning skills students must acquire to become proficient in science.
4. Teacher candidates will recognize the practices, crosscutting concepts, and core ideas of science and engineering and how they influence science instruction in K-6 classrooms.
5. Teacher candidates will plan for science instruction for children of various ages, abilities, backgrounds, and exceptionalities, including how to (a) identify appropriate science content from national standards and state core curricula; (b) apply a variety of appropriate teaching methods and strategies to support science learning; (c) integrate science with other disciplines across the elementary curriculum; and (d) employ appropriate assessment methods and strategies.

Evidence of Progress

1. Complete homework to prepare for class and other assignments.
2. Actively participate in in-class activities, including discussions and investigations.

Schedule of Learning Activities

	Goals	Outline of Activities	Homework	Due	Assigned	Course objectives
1	Begin to establish a community of learners of science and science teaching. Establish expectations for the course.	Introduce course (Insights, Scarology, Syllabus) Investigation 1: Living/non-living things			My Science Timeline Informal Science Education	5
2	Students will reflect on the role of their past experiences on their beliefs about science teaching and learning. Students will consider the role of content knowledge in science teaching.	Past experiences with science (My Science Timeline discussion, I Used to Love Science) Content knowledge (introduce assignments and State Core)		My Science Timeline	Science Content Test Unit Concept Map	1
3	Students will consider reasons science is important, what science is, and the interaction of science and religion	Why is science important (Sticky Activity) What science is (card sort, science and religion discussion) Unit Concept Map work time		Science Content Test	Students' Science Ideas	2, 3, 5
4	Raise their sights about the possibilities of science teaching and learning by helping to them to see that children are very capable and that science learning is much more than memorizing. Learn about data collection and analysis.	Children's capabilities (reading, show videos) Investigation 2: How students learn Unit Concept Map work time	<i>Ready, Set, SCIENCE!</i> (case studies, four strands)			3, 4
5	Talk is important for revealing and developing student thinking. Students have misconceptions that need to be exposed and worked through.	Importance of talk in the classroom (<i>A Private Universe</i> , misconceptions) Debrief Students' Science Ideas Assign BSCS Talk Strategies presentations	TERC videos on talk <i>Ready, Set, SCIENCE!</i> strategies	Students' Science Ideas		5
6	Talk is important for revealing and developing student thinking.	BSCS Talk Strategies presentations (and scenarios) Unit Concept Map work time		Unit Concept Map		3, 5
7	Be familiar with, understand, and be able to plan for instruction with the crosscutting concepts.	Introduce NGSS CCC (video) Investigation 3: Cheese puffs	<i>Framework CCC selections</i>			4, 5

8	Understand the role of conceptual coherence in unit and lesson planning.	Concept of target concepts Conceptual coherence (TV shows, debrief Conceptual Storyline Probe) Assign Unit Concept Outline Investigation 4: Mineral classification	Conceptual Storyline Probe		Unit Concept Outline	5
9	Be familiar with, understand, and be able to plan for instruction with the disciplinary core ideas.	Introduce DCI and learning progressions. Investigation 5: Seasons Unit Concept Outline work time	<i>Framework</i> DCI selections			4, 5
10	Be familiar with, understand, and be able to plan for instruction with the science practices.	Introduce the science practices (NGSS, identify in past investigations)Practices presentations Investigation 6: Three parallel investigations	<i>Framework</i> practices selections			4, 5
11	Understand and be able to use the 5E Learning Cycle lesson planning format.	Introduce 5E Learning Cycle lesson plan Assign Lesson Plans Investigation 7: Conductors and insulators	5E readings 5E videos	Unit Concept Outline	Lesson Plan	5
12	Understand the different types of investigations and the unique features of experimental design.	Types of investigations lecture Investigation 8: Cars	None			4, 5
13	Understand the principles of seamless assessment and be able use them in planning a lesson.	Seamless assessment Lesson Plans work time	<i>Seamless Assessment</i>			5
14	Understand the practice of modeling and be able to engage students in modeling. Understand principles behind high quality demonstrations.	Modeling (making sense of, making sense with) Principles of demonstrations	Modeling and demonstration readings		10 Minute Demos	5
15	Present a demo to peers to allow students an opportunity to practice doing high quality demonstrations.	10 minute demos presented Lesson Plans work time		10 Minute Demos		5
16	Learn principles involved in engaging students in high quality informal science education, including field trips and citizen science.	Informal science education (possibilities, principles for field trips) Citizen science (Zooniverse, others)	Informal science education readings (listed on assignment)	Lesson Plan	Practicum Observations Practicum Teaching	5
17	Understand principles of integrating science with other disciplines, especially literacy and mathematics.	Discuss practicum assignments Elements of integration Lesson critique Investigation 9: Scale of planets	Examples of integration readings	Practicum Observations Practicum Teaching		5

18	Understand basic principles of engineering design and the engineering practices how these can help support student learning of science content.	Engineering design cycle Investigation 10: Heat transfer	Engineering design readings			4, 5
19	Students will use a framework to evaluate and adapt the effectiveness of lesson plans found on the internet.	Critique three lessons Framework for critiquing Improve a lesson plan How to find resources	Explore potential resources			5
20	No class	(Time to work on Informal Science Education assignment)		Informal Science Education		5
				Final Exam		

COURSE DEVELOPMENT GRANT PROPOSAL

Name

Teacher Education

In my course I highlight principles of teaching, and help my students learn science content, by modeling science instruction. This regularly involves engaging students in science investigations, which require lab materials. As part of my Course Development Project I will be developing several new investigations (Cheese Puffs investigation, Seasons, Scale of Planets, and Heat Transfer). The money from this grant will be used to purchase materials for these investigations. This would include calorimeters, light sources, globes, photovoltaic cells and motors, thermometers, etc.

SCHOLARSHIP STRATEGIES PROJECT PROPOSAL

Name

Teacher Education

Scholarship Theme

I am interested in the subject matter knowledge of K-12 science teachers, particularly with new teachers and out-of-field teachers. I hope to improve the well-being of teachers, the science learning of students and a deeper theoretical understanding that informs policy and practice.

Goals (to complete by Feb 2017)

1. Maintain at least two manuscripts under review.
2. Submit at least three manuscripts to top tier science education or teacher education journals.

Scholarship Strategies

1. Set aside daily blocks of time to write.
 - a. 30 min each day
 - b. Adjust each semester
2. Have "writing office hours."
 - a. Shut my office door.
 - b. Post sign that shows when I'm available:
 - i. Indicate when class is and other busy times
 - c. Turn off email during this time. Ignore phones.
 - d. Track daily writing time.

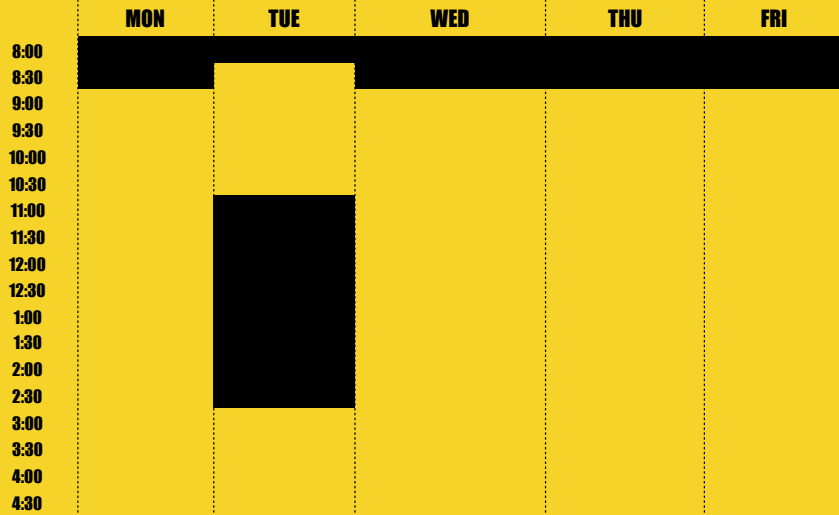
Method to Evaluate Progress

1. Track daily the amount of time spent writing (not researching, reading or analyzing).



CAUTION

Return at the blank times for safer conditions.



WINTER 2016 WRITING LOG

2016	30 min project	task	total time
Mon 23-May			
Tue 24-May			
Wed 25-May			
Thu 26-May			
Fri 27-May			
Sat 28-May			
Sun 29-May			
Mon 30-May			
Tue 31-May			
Wed 1-Jun			
Thu 2-Jun			
Fri 3-Jun			
Sat 4-Jun			
Sun 5-Jun			
Mon 6-Jun			
Tue 7-Jun			

CITIZENSHIP PROJECT PROPOSAL

Name

Teacher Education

Goals (to complete by Feb 2017)

1. Department: Strengthen relationships with department members by attending campus devotionals and forums, talks by colleagues and guests, and social events with colleagues.
2. College: Collaborate with colleagues in and outside of the department in analyzing data, preparing conference presentation proposals, and academic manuscripts.
3. International: Review proposals for the two key science education conferences (NARST, Association for Science Teacher Educators).