

pds SCIED 458

TEACHING SCIENCE IN THE ELEMENTARY PDS

PDS Section Fall 2012

Maroon Cohort: Tuesday, 12:00AM – 3:00 PM, Room 90 Grey's Woods

Gray Cohort: Tuesday, 3:30 – 6:30 PM, Room 3 Radio Park

INSTRUCTORS



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COURSE DEVELOPMENT

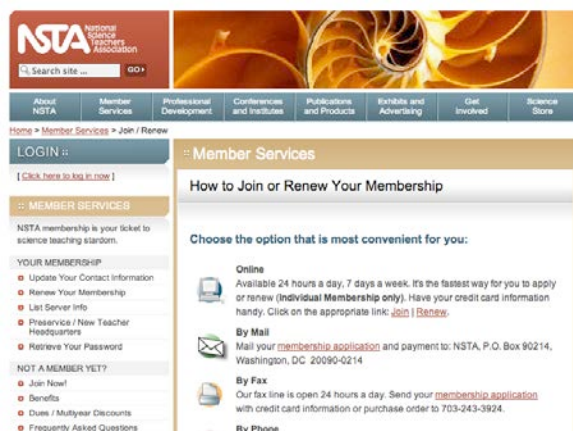
Course activities and assignments for SCIED 458 PDS were collaboratively developed by a planning team, which consisted of mentor teachers, curriculum support teachers, administrators, university faculty, and graduate students. Great care is taken to ensure that each revision of the course reflects the best of what we know about how to support your preparation and growth as a teacher. We hope that you both enjoy and learn from these experiences this year.



REQUIRED RESOURCES

There are 2 main texts for the course:

- Zembal-Saul, C., McNeil, K., & Hersherberger, K. (2013). *What's Your Evidence? Engaging K-5 Students in Constructing Explanations in Science*. Boston, MA: Pearson.
- Michaels, S., Shouse, A. & Schweingruber, H. (2008). *Ready, Set, Science! Putting Research to Work in K-8 Classrooms (RSS)* free use online
http://www.nap.edu/catalog.php?record_id=118822



You also will need a student membership in the National Science Teachers Association (NSTA), with a subscription to *Science & Children*. Visit the NSTA web site for more information (see link below).

<http://www.nsta.org/membership/join.aspx>

Other readings will be assigned throughout the semester. These will be free of charge and available online.

NOTE: There is a lab fee (\$15) assessed automatically to cover the cost of consumable supplies used in class and in your placement teaching.

ACADEMIC INTEGRITY:

All students are expected to act with civility, personal integrity; respect other students' dignity, rights and property; and help create and maintain an environment in which all can succeed through the fruits of their own efforts. An environment of academic integrity is requisite to respect for self and others and a civil community.

Academic integrity includes a commitment to not engage in or tolerate acts of falsification, misrepresentation or deception. Such acts of dishonesty include cheating or copying, plagiarizing, submitting another persons' work as one's own, using Internet sources without citation, fabricating field data or citations, "ghosting" (taking or having another student take an exam), stealing examinations, tampering with the academic work of another student, facilitating other students' acts of academic dishonesty, etc.

Students charged with a breach of academic integrity will receive due process and, if the charge is found valid, academic sanctions may range, depending on the severity of the offense, from F for the assignment to F for the course.

The University's statement on academic integrity, from which the above statement is drawn, is available at <http://www.psu.edu/dept/oue/aappm/G-9.html>

ASSIGNMENTS & GRADING

Your grade for SCIED 458 will be based on your performance, which should reflect effort and quality of work. There will be no extra credit opportunities. The assignments that will be evaluated are described below. *Specific details associated with each assignment will be provided in class.*

Course grades will be assigned using this scale.

A	93-100	B	83-86	C	70-76
A-	90-92	B-	80-82	D	65-70
B+	87-89	C+	77-79	F	< 65

Professionalism (25%)



This course operates on the premise that meaning is co-constructed within a community of learners. Therefore, your presence and participation is essential to the development of the group's understanding of learning to teach science.

As it pertains to the course, professionalism refers to your overall attitude and approach to learning. Dimensions of professionalism include, but are not limited to, your preparation for class (including readings and homework assignments), the quality of contributions you make in class and online, the nature of your collaborative efforts with peers and other members of our developing learning community, and the enthusiasm you convey with regard to your personal professional development.

High quality participation is expected with consistency. Your instructor will contact you privately if lack of professionalism or participation is observed. If improvement is not noted, your grade will be lowered.

You should attend every class and you will be held responsible for all work covered in the course. SCIED 458 instructors will provide “within reason, opportunity to make up work for students who miss class for regularly scheduled, University-approved curricular and extracurricular activities” or “other legitimate but unavoidable reasons.” According to the University Policy, “legitimate, unavoidable reasons are those such as illness, injury, family emergency, or religious observance.” Interns must contact both their PDA and SCIED instructors prior to missing any class. If an absence does occur, you should discuss with your instructor how to make up any missed work. Unexcused absences will result in your grade being lowered.

Science Notebooks (15%)



We will be modeling the use of science notebooks as a method of engaging you and your students in learning science as inquiry.

1. Your notebooks will be a way to record the questions, procedures, observations, claims and evidence that are made during the science lessons in SCIED 458.
2. You will be asked to connect the assigned readings and investigations to your classroom experience.
3. Your notebooks should contain clear explanations about the big science ideas and include scientific argumentation through stating claims and evidence from the investigations. Since scientists clarify and explain their work using charts, graphs, and labeled illustrations, your notebook should also include them.
4. In addition, you will be asked to add science concepts and principals related to the investigation from class.

As in an elementary classroom, the science notebooks will be an on-going assessment. Many SCIED class sessions involve participating in science lessons that can be modified and implemented in your elementary classrooms, you will want to take notes on these lessons for future use. You will also want to record resources that you can use as a teacher.

We will collect and evaluate your science notebooks three times during the semester. You will receive formative feedback from your instructor.

Inquiry into Science Teaching



The purpose of the teaching project is to involve you in planning and teaching a series of three lessons around a single science topic in-depth. It is expected that you use applications of technology (if appropriate). The basic idea is to support children in developing meaningful, conceptual understanding of a particular science concept through incorporating science talks, giving priority to evidence and explanation, and using approaches and instructional strategies that you have been introduced to

during the semester. The project has several components that are described in detail below.

****NOTE – All teaching should begin on or after November 5th and be completed by Thanksgiving Break.***

Target Concepts and Teaching Dates

You and your mentor teacher will need to spend some time discussing which science topic will be appropriate for this project. Once you have decided on a target topic, you will need to negotiate teaching dates. Your cooperating teacher already knows the schedule of science units that will be taught during the year, so don't feel shy about discussing this project with her/him as

soon as possible. **You will need to specify the science concept you will be teaching in class by 9/11.**

Subject Matter Challenge (15%)



Subject Matter Challenge (15%)

Understanding the subject matter that you will teach is an important part of preparing to teach. In order to demonstrate your knowledge of concepts associated with your teaching topic, we will present you with a challenge around the big ideas associated with your concept(s). You will need to solve your challenge and prepare a short (3 to 4 min.) video in which you present your solution in an engaging, demonstration format that provides a thorough explanation of the concept(s). Your video should also include a brief discussion of 2-3 aspects of the subject matter that children may find problematic and why. A bibliography that includes both resources for children as well as some additional adult level resources/websites must be included. You should have a minimum of 4 resources. We recommend that you develop a storyboard of your video and discuss it with your instructor prior to completing the assignment. Guidance on file format and how to share and submit the assignment will be provided in class. For this assignment, you can work together in groups related by teaching topic. **It is due on 10/2.**

Concept Interview (15%)



Concept Interviews with Children (15%)

The purpose of this assignment is to help you develop a better understanding of what children at your grade level think about the concept you will be teaching. What you learn about children's understandings, and possibly areas of difficulty, will inform the development of your lesson plans. Your concept interview should be designed to unpack children's thinking about the target concept. Tasks such as demonstrations, drawings, writing, and experiments are particularly useful for this purpose. We will be working during class to develop the concept interview tasks. Once you have designed your concept interview, select 3-4 children from your class (with the help of your mentor teacher) based on their responses to a whole class quick draw and write task (we will explain this task in class). Be sure these children are as different as possible in terms of

their science learning, gender, and cultural background. You may want to include the child from the CLE case study project as one of the interviewees.

Note: We highly recommend that you record the interview using Garage Band. This should allow you to focus on what children are saying and attempt to understand the thought processes behind their responses. Unless you have parental permission to use the recordings for other purposes, they should be deleted after you have analyzed them.

Your write-up for this project should include the following components:

1. Identify the concept(s) you were assessing. Describe the whole class draw/write task and summarize your findings about how the students in your class understand the topic, including misconceptions that emerged from the drawing/writing that each student did. Provide evidence for the claims you make about the students' understanding (writing and drawing samples are appropriate).
2. Select three students to interview in more depth: a student with a strong understanding, one with a typical understanding and a student who will need more support in understanding the concept. Include a rationale for each student (use pseudonyms) and why they were selected to participate.
3. Describe your individual interview tasks. Summarize your findings with claims about what the students understand, including misconceptions. Provide evidence for the claims you make about your students' ideas and understandings (quotes from interviews are appropriate).
4. Make 2-3 recommendations for instruction based on what you've learned about children's thinking. Include possible questions that you might ask of students who are at different levels of understanding.

Note: Whenever possible, you should integrate existing research findings about children's misconceptions.

You are encouraged to work in topic groups to design your tasks and interview questions. Each member should conduct his/her own student interviews and write the assignment independently. **The Concept Interview assignment should be submitted to Taskstream on 10/16.** The rubric for the assignment will be on Taskstream.

Content Storyline

Lesson Plans



Lesson Plans and Planning Meeting

Teachers of science need to plan productively for their teaching by understanding the science content and investigating student prior knowledge and possible misconceptions about the subject. Using a content storyline that includes questions, claims and evidence helps teachers to plan for instruction that progressively builds connections between lessons and deeper understanding of the science content. Best practices in science teaching include the use of “talk moves” to support communication and discourse during a science talk.

Planning is a critical phase of the instructional process. It is where your understanding of the science content, research on children's conceptions of the content, and instructional strategies come together. Two meetings with your instructor will take place as part of the planning process. The first is a brainstorming session, and will involve a discussion of the science you intend to teach, students' likely misconceptions, possible representations of the content, and other important considerations for planning. You will want to bring resources such as the district curriculum unit if available and children's informational books related to the topic.

A first draft of the content storyline lesson plans will be due for the second planning meeting. (Template will be provided.) We believe that working cooperatively encourages a richer dialogue for more in-depth planning. By encouraging cooperative planning we aren't expecting the lessons to be worked on individually and then shared with the group. Each group member will need to have a thorough understanding of all aspects of the lesson to teach successfully. The final plan is due 48 hours before you teach.



Teaching

Your classroom teaching will not be graded. Our intent is to minimize the anxiety associated with early teaching experiences and provide you with an opportunity to take risks without the fear of failure. However, you should collect evidence of children's learning throughout your teaching. We require that you video record your science talks for the analysis phase of the project. We will be discussing this during class.

We will have access to a set of 20 video cameras from Penn State that will provide you with a special setting for recording the lessons so that uploading your video doesn't take too long. You will receive training during class time in using the video cameras. Using an iPad to record your teaching is also an option. ***Successful recording of your teaching is your responsibility, so be prepared.*** Prior to teaching you will need to sign up for a video camera, recruit someone to record you (mentor, another intern), and check with your teacher and principal to determine whether there are students in your class who cannot be recorded during instruction.

****Reminder – All teaching should begin on or after November 5 and be completed by Thanksgiving Break.***

Video Analysis of Your Teaching (30%)



Analysis of Teaching (30%)

Dewey once referred to reflection as the “hallmark of intelligent action” – for it is through personal and deep reflection on practice that we develop new understandings of teaching and learning. Therefore, the purpose of this aspect of the project is to ask questions about our teaching, learn from your teaching experiences, watch your teaching video and use the analysis guidelines (generated in class) to assess your students’ learning and reflect about your science teaching practice.

You will have a choice about how you analyze your video. We will be discussing various formats for submission during class. Consider this the final exam of the course – it’s a MAJOR project! You should complete this project independently. **It is due in class on 12/4.**