Elementary Science Methods
PLC 912: TEACHING SCIENCE FOR UNDERSTANDING TO BILINGUAL STUDENTS
Spring, 2014 NE 85, Thursdays 4:00-6:40

Instructor: Donna L. Ross, Ph.D.  
Phone: 594-6129
Email: DLRoss@mail.sdsu.edu (best contact method)  
Office: NE 99
Office Hours: Before and after class or by appointment

Required Technology:
Course information, including a copy of this syllabus, and assignments will be available to you on Blackboard. Once class begins, I will use the blackboard site extensively, please check this site at least twice a week for updates. http://blackboard.sdsu.edu/
You will also need a gmail account for use of google docs.

Required Membership:
It is time to shift from your role as student to that of teacher. A major step in this shift is to become connected with the professional community. Instead of buying a textbook for this class, you will join the San Diego State Science Teachers Association. This provides student membership in the California Science Teachers Association and the National Science Teachers Association. Annual dues depend on current organization rates, but this year they are $35 +5 for PLT, which is much cheaper than joining individually, so I encourage you to wait until we register in class. Consider running for SDSSTA office!

Required Readings:
Science and Children, a journal from the National Science Teachers Association, available from the SDSU library, and also to NSTA members. You need to get your library pin login to access journals from off campus until you have your NSTA membership #.

Additional readings will be posted on Blackboard or distributed in class.

I will also share a variety of source books (books with activities) and trade books (in English and Spanish). You might want to note bibliographic information of the ones you like so that you can begin building your own library.

Required Materials:
An inexpensive spiral-bound notebook. You will need some supplies and materials for science experiments. Most of these can be obtained inexpensively (or for free) if you are creative and plan ahead. Science cannot be taught without “stuff” but it doesn’t have to be expensive. Begin collecting now!
**Course Goals:**
This course is designed to give the prospective teacher an opportunity to engage in the process of constructing scientific knowledge and concepts. This course will provide you with opportunities to enhance your pedagogical knowledge and skills to assist in your student teaching placement in bilingual school contexts. In addition to gaining content knowledge, this course provides experience in communicating knowledge and integrating knowledge with other subjects. In this course, you will have an opportunity to reflect on your own experiences and beliefs about science and science instruction and explore how these impact your ideas about teaching science.

- A primary aim of this course is to introduce effective and varied methods, strategies and resources for teaching science in diverse elementary school settings.
- You will have an opportunity to use various learner-centered pedagogical strategies for bilingual students to support multicultural science education for all students.
- This course has an emphasis on creating meaningful, appropriate science experiences for students with diverse language and background experiences.
- Classroom climate impacts the learning process. This class will explore ways to develop a climate to promote learning by all students.

In this course we will investigate children’s thinking about science, ways to better identify their misconceptions, and strategies for providing relevant experiences to enhance conceptual understanding.

You will be expected to demonstrate emerging competence in teaching science in English and in Spanish (or another predominant language in your student teaching placement site).

One of my personal goals for this class is to help you be excited and enthusiastic about teaching science. Your enthusiasm is infectious in the classroom!

**Course Expectations:**
You are expected to behave in a professional manner. **This includes arriving to class on time and being prepared.** Please complete readings and assignments by the scheduled dates. **Grades will be lowered 10% per 24 hours for late assignments.** You are expected to attend all classes. If you need to miss a class, you are responsible for “hiring a sub” to collect handouts, record notes, and notify you of administrative issues from the missed class. In addition, you are responsible for finding time to complete the missed activities and time, although some assignments cannot be made up. Because each session is such a large percentage of the entire course, absences will impact your grade. Finally, participation in the activities and discussions is critical to this course. Please come prepared to jump into the activities, have fun, and work as a team. Remember that we all have our own areas of expertise, and we need to be respectful of all other members of the class. Attendance and participation are monitored throughout the semester. There will be at least one reading response or mini-activity review due every class period and one activity response or in-class assignment completed in each class session.
Assignment outline and grade breakdown:
(More detailed information follows--Due dates are on separate calendar)
20% -- Mini-unit plan w reflections (CAT)
5% -- Unit outline
20% -- Weekly written activity responses, short presentations, responses to readings, and in-class assignments and discussions (cumulative)
20% -- Prepare and present a science peer model lesson to our class (these are fun!)
15% -- Review of a science education journal article
10% -- Final quiz OR 1 page summary of attendance at SDSEA conference
10% -- Science Notebook

Assignment Summaries
All written assignments, except those completed entirely in class, will be graded on content and presentation. Please take time to proof-read your work. It reflects poorly on our profession when teachers leave careless mistakes in their writing.

Journal Article Review: Find two complete journal articles (not single page columns) about the same (or strongly related) topic in elementary science education. Write a review and comparison of the articles in approximately 2-3 typed pages. Turn in a copy of the articles with your review. Because I will have the articles, VERY little of the review should be summary material. I recommend articles from Science and Children or Science Scope. After you write your review, you will have an opportunity to share your articles with your colleagues. May be done in English or Spanish. In your review/comparison, address these questions:

How do these articles relate to the readings we have had in class? (which readings?) Be specific. How do they relate to discussions we have had in class? Be specific. How do they relate to observations you have made in your student teaching placements? In what ways do the authors have a similar approach to the topic? In what ways do they differ? Which author is more aligned with your own philosophy of science education? Why?

There are two primary reasons for this assignment:

a) to become familiar with science education journals
b) to share good ideas about science teaching with your colleagues

CAT and Unit Outline:
The Science CAT is part of a larger requirement for the teacher education program. The focus of the Science CAT is on planning. You will plan a science unit, with 3 hours of fully developed lessons, and an outline of additional lessons. It is scored twice: once for credit in this class and once for the teacher education program. In class, we will discuss the criteria for both scorings. The criteria are similar, but for this class, it is based on a traditional grading scale, as opposed to the pass/fail basis used for the program.
Therefore, although unlikely, it is possible to “pass” for the purposes of either the program or the class and “fail” for the other. Although there are limits to the type of feedback I am permitted to provide on your CAT, the unit outline will give us an opportunity to share ideas and resources. You will be able to choose the science topic for your unit plan. Obviously, it is most efficient to choose a topic that will be taught in your student teaching placement so that this assignment can be used for multiple purposes. Begin talking with your guide teacher immediately about this assignment. Done in English, except for specific sections related to instruction for bilingual or EL placements.

There are three primary reasons for this assignment:

a) to practice developing units of study in science for your students
b) to support your PACT process
c) to see how much the K-8 students love learning science if you follow the national guidelines for science teaching

**Reading Responses/Activity Reviews.** These are responses to the reading assignments or class activities. Usually they will ask you to compare or integrate different readings. These may be done in class or as assigned homework. See the attached guide for the assessment rubric. Other in-class activities and group work will be included in this grade. Most in-class assignments cannot be made up if missed. Most can be done in English or Spanish.

There are three primary reasons for these assignments:

a) they provide motivation to keep up with the reading assignments
b) they serve as a formative assessment to help me gauge your understanding of the reading assignments and my teaching so I can modify my plans as necessary
c) they help to extend and articulate our thinking about the content of this course

**Peer Model Lesson:** In groups of 3-4, choose a fairly self-contained lesson, perhaps involving a discrepant event. Collect the materials, practice the procedures and strategies, and then teach the short lesson to our class. Be sure to have a hand-out describing the key elements of the lesson and providing your sources (make copies for everyone in class). In class, we will sign up for dates and topics. We will review the specific requirements and the rubric in class. Completed partially in English and partially in Spanish.

There are three primary reasons for this assignment:

a) to experience preparing materials and procedures for a science lesson
b) to try out some teaching strategies
c) to share some fun ideas

**Final Quiz OR 1 page summary of SDSEA Conference Sessions**

We will have a final quiz over the science topics we cover in class. It will be similar to the pre-quiz we take at the beginning of the semester. Or, if you prefer, you can attend the SDSEA science teacher conference at Grossmont College on March 1st. Submit a one-page summary of the sessions you attend, with a
brief description of how they relate to our class discussions or readings. Discounted rate is available to student teachers for volunteering for one hour at the conference.

  d) Science Notebook
  e) Science Notebook
  f) Please bring a spiral notebook to science class. We will keep class notes and examples of student work in the notebook. You are welcome to also bring a computer if you like to have some electronic notes, as well.

  **Reading Responses**

Some responses will be written during class and others will be done as homework. Some responses will be individual, others done in groups. In some instances, you will have the opportunity to choose to write an individual or group response. The following rubric will be used to score the responses related to the readings. Activity reports will vary, for example, lesson plans developed in a group to team-teach to a class at our school site, reflections on peer teaching, review of curricula or textbooks. Activity reports will also focus on different topics as we address different pedagogical issues in class.

<table>
<thead>
<tr>
<th>Points</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>4</td>
<td>Response is related to other readings and discussions from previous class sessions and current work. Response demonstrates a synthesis of readings and topics. Directly addresses the topic and questions. Includes specifics. Could NOT have been written without good understanding of multiple readings and discussions.</td>
</tr>
<tr>
<td>3</td>
<td>Legible. Thoughtful response, but may indicate that most current reading or discussion could have been superficial (skimmed readings, for example). Response suggests other resources from class, but the connections aren’t strong or completely appropriate. Generally, this suggests that you have been attentive and thoughtful to most of the readings and discussions, but ran short of time for synthesis or for one of the readings.</td>
</tr>
<tr>
<td>2</td>
<td>Legible and thoughtful. Addresses topic but doesn’t show integration of readings or class discussions. For example, response might provide your opinion about the topic, but without support from current readings. This answer generally means that you have been paying attention in the program but aren’t keeping current with reading assignments. May draw on a reading from a past class with a tangential connection. Often interesting to read, but does not fulfill the assignment.</td>
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<tr>
<td>0</td>
<td>Illegible, doesn’t make sense, or doesn’t directly address topic.</td>
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**Course Grading:**

Assignments that are due on class dates should be submitted before class; they are late if turned in after class ends, unless specified. All assignments turned in after the beginning of class will lose 10% of their total point value. An additional 10% will be deducted for each day your assignment is late! Each spelling or grammatical error in a written assignment completed at home will result in a deduction from your score for that assignment.

Your grade for each assignment as well as your final grade will be determined by the following scheme:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>94-100</td>
</tr>
<tr>
<td>A-</td>
<td>90-93</td>
</tr>
<tr>
<td>B+</td>
<td>87-89</td>
</tr>
<tr>
<td>B</td>
<td>84-86</td>
</tr>
<tr>
<td>B-</td>
<td>80-83</td>
</tr>
<tr>
<td>C+</td>
<td>77-79</td>
</tr>
<tr>
<td>C</td>
<td>74-76</td>
</tr>
<tr>
<td>C-</td>
<td>70-73</td>
</tr>
<tr>
<td>D+</td>
<td>67-69</td>
</tr>
<tr>
<td>D</td>
<td>64-66</td>
</tr>
<tr>
<td>D-</td>
<td>60-63</td>
</tr>
<tr>
<td>F</td>
<td>below 60</td>
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</tbody>
</table>
**Professionalism**

This category is assessed in an on-going, informal manner. I record anecdotal evidence each class session. This is used for borderline grades. I include the following criteria:

<table>
<thead>
<tr>
<th>Attendance</th>
<th>Attitude</th>
<th>Initiative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participation</td>
<td>Preparedness</td>
<td>Responsibility</td>
</tr>
<tr>
<td>Collaboration</td>
<td>Collegiality</td>
<td>Supportiveness</td>
</tr>
</tbody>
</table>

**Policies:**

- **Policy on Cheating and Plagiarism.** Cheating is the actual or attempted practice of fraudulent or deceptive acts for the purpose of improving one’s grade or obtaining course credit; such acts also include assisting another student to do so. Typically, such acts occur in relation to examinations. However, it is the intent of this definition that the term ‘cheating’ not be limited to examination situations only, but that it include any and all actions by a student that are intended to gain an unearned academic advantage by fraudulent or deceptive means. Plagiarism is a specific form of cheating which consists of the misuse of the published and/or unpublished works of others by misrepresenting the material (i.e., their intellectual property) so used as one’s own work. Penalties for cheating and plagiarism range from a 0 or F on a particular assignment, through an F for the course, to expulsion from the University. For more information on the University’s policy regarding cheating and plagiarism, refer to the Schedule of Courses (“Legal Notices on Cheating and Plagiarism”) or the University Catalog (“Policies and Regulations”).

- **Students with Disabilities.** The University is committed to providing reasonable academic accommodation to students with disabilities. The Student Disability Services Office provides university academic support services and specialized assistance to students with disabilities. Individuals with physical, perceptual, or learning disabilities as addressed by the Americans with Disabilities Act should contact Student Disability Services for information regarding accommodations. Please notify me so that reasonable efforts can be made to accommodate you. If you expect accommodation through the Act, contact the Student Disability Services Office (http://www.sa.sdsu.edu/dss/dss_home.html) at (619) 594-6473.

- **Religious Observances.** University Policy on Absence for Religious Observances includes the following statements: “By the end of the second week of classes, students should notify the instructors of affected courses of planned absences for religious observances. Instructors shall reasonably accommodate students who notify them in advance of planned absences for religious observances.” Please notify me in a timely manner and a reasonable accommodation will be reached.

- **Syllabus is Subject to Change.** This syllabus and schedule are subject to change in the event of extenuating circumstances. Details of assignments will be provided in class. If you are absent from class, it is your responsibility to check on announcements made while you were absent.
Peer Teaching Assignment

Do all team members actively participate in the teaching of the lesson?
- Yes (1 pt)  No (0 pts)

Is the presentation between 36 and 48 minutes?
- Yes (1 pt)  No (0 pts)

Are there at least 20 minutes of hands-on, science activities for the class?
- Yes (2 pts)  No (0 pts)

Are the investigations **directly** related to the PRIMARY science objective of the lesson?
- Yes (2 pt)  No (0 pts)

In the activities, do the students get to make some decisions about variables or data collection methods?
- Yes (1 pt)  No (0 pts)

Is there a one-page handout copied (or posted on google doc) for everyone in the class? Does it include a description of the activities so they can be used later in the student teaching placements and references clearly cited? [must be one hard copy for instructor]
- Yes (1 pt)  No (0 pts)

In the presentation (or on the hand-out), is it clear where this part of the lesson would fall in the larger unit of study and are the objectives clear?
- Yes (2 pt)  No (0 pts)

Are common student misconceptions related to the science topic described in the presentation or the handout? (and the sources for this information referenced?)
- Yes (2 pts)  No (0 pts)

Do **all** members seem well-prepared, able to answer questions, and organized?
- Yes (2 pts)  No (0 pts)

Does your team VERY briefly (~5 minutes), but accurately, explain the science behind the activities **at a teacher level**?
- Yes (2 pts)  No (0 pts)

Does your team explicitly incorporate strategies for English Learners and/or use Spanish Academic Language?
- Yes (2 pts)  No (0 pts)

Does your team assess prior knowledge?
- Yes (1 pt)  No (0 pts)

Completing all of these in a satisfactory manner will give you 19/20 points (an A). To get 20/20 (an A+), there needs to be something extra-special!
General Schedule: (note, the revised version of this will be on Blackboard after the first class. During our first class you will sign up for dates to do your peer lessons.

Note: At least one Activity Review (AR) or Reading Response (RR) will be due every class session…often there will be two. Specifics will be described in class and posted on Blackboard. Remember to check both the “assignment” and “course documents” sections of Blackboard regularly. For the major assignments, also refer back to the summary here in the syllabus.

Class schedule: NOTE:

<table>
<thead>
<tr>
<th>DATE</th>
<th>Major Topic</th>
<th>Notes and Major Items Due</th>
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<tbody>
<tr>
<td>January 23</td>
<td>Seeds</td>
<td>RR and/or AR due weekly</td>
</tr>
<tr>
<td>January 30</td>
<td>Air Pressure</td>
<td>No written assignments due</td>
</tr>
<tr>
<td>February 6</td>
<td>Moon phases</td>
<td>Peer lessons</td>
</tr>
<tr>
<td>February 13</td>
<td>Light</td>
<td>Peer lessons</td>
</tr>
<tr>
<td>February 20</td>
<td>Simple Machines</td>
<td>Peer lessons</td>
</tr>
<tr>
<td>February 27</td>
<td>Magnets</td>
<td>Journal Article Review</td>
</tr>
<tr>
<td>March 6</td>
<td>Sound</td>
<td>Peer lessons</td>
</tr>
<tr>
<td>March 13</td>
<td>electricity</td>
<td>Peer lessons</td>
</tr>
<tr>
<td>March 20</td>
<td></td>
<td>Mini-unit outline</td>
</tr>
<tr>
<td>March 27</td>
<td>friction</td>
<td>Peer lessons (half of class at Mission Trails)</td>
</tr>
<tr>
<td>April 3</td>
<td></td>
<td>No class</td>
</tr>
<tr>
<td>April 10</td>
<td>Chemical reactions</td>
<td>Peer lessons</td>
</tr>
<tr>
<td>April 17</td>
<td>cohesion</td>
<td>Science notebooks</td>
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<tr>
<td>April 24</td>
<td>Density</td>
<td>Final Quiz</td>
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<tr>
<td>May 1</td>
<td>PLT</td>
<td></td>
</tr>
<tr>
<td>May 8</td>
<td>PLT</td>
<td>No peer lessons</td>
</tr>
</tbody>
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*PLT (Project Learning Tree) is an environmental education curriculum for grades K-8. Teachers can only obtain the curriculum guide by completing a training of at least 4 hours. I am certified to provide trainings. Although the curriculum is free, there is a $5 fee for shipping/handling and materials, so we will decide as a class if we want to do this.

Once you see how children love learning science, you will want to know more about teaching science! One of my promises is to make you aware of multiple resources and opportunities to continue growing and improving as a science teacher. I can’t wait to get started!