Science Partners: Theory, Practice, Learning
ABNR/SCI 415
Spring 2015

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Email Addresses: jstoughton@cabnr.unr.edu gsell@unr.edu
Office Hours: MW 1-2, Th 10:30-11:30 W 12:30-3:30, Th 9:30-12:30

Catalog Description: Students are paired with an elementary school teacher and their class for three hours per week to teach hands-on, inquiry-based science. Repeatable up to a maximum of 6 credits.

Prerequisites: Junior or senior standing, BIOL 191, CHEM 122 or CHEM 202.

Instructor consent required: An interview with course instructors is required prior to enrollment. Minimum qualifications for those selected to participate are a 2.8 GPA overall and 3.0 GPA in the biology and chemistry series: BIOL 190, BIOL 191, CHEM 121 or CHEM 201, and CHEM 122 or CHEM 202.

Course Description:
Science Partners is a three-credit course, which requires a student commitment of seven to ten hours per week. The student is paired with an elementary school teacher and their class of up to 30 children for three hours per week to assist in teaching hands-on, inquiry based science in the classroom. Teaching time will vary based on student partner and teacher partner schedules Monday-Friday between 9a-3:30p. All assignments to teachers are made in cooperation with the Washoe County School District.

Research shows that traditional, lecture style teaching allows students to memorize facts with little or no understanding of the application or integration of scientific concepts. Science to most students becomes an obscure, unimportant group of facts that are easily forgotten and have little impact on their daily life. Even worse, science becomes boring and students, very early in their school career, decide science classes and careers are not for them.

If hands-on activities and guided discussion are used to show how science works in our daily lives, students see science as a way of learning and thinking about the world around them. Most importantly, they see science as fun. However, this type of science is challenging in a classroom. It requires energy and confidence on the part of the teacher, tolerance for mess and noise. In addition, it requires more than one pair of adult hands for it to be successful. Discovery-based science also often raises more questions than a teacher can answer.

The Science Partners Course is designed to help teachers address the challenges of inquiry-based science. This course provides one-on-one partnerships between elementary school teachers and University of Nevada, Reno science majors. The partners bring scientific knowledge, resources and enthusiasm about science, while the teachers provide pedagogical expertise. Together, this team links science to other subjects in math and language arts and shows students how to ask questions about their world.

The partnership lasts for one to two semesters, but the changes it brings can be permanent. The teacher gains new links to the science community at the university and is instilled with confidence about teaching hands-on science.

Required Texts, Course Materials: Primary Science: Taking the Plunge, Editor: Wynne Harlen (Amazon.com)
Course Objective: Core Objective 14 (Application): Students will be able to demonstrate their knowledge and skills developed in previous Core and major classes by completing a project or structured experience of practical significance.

Student Learning Outcomes:
Upon successful completion of the course students will be able to
1. Develop hands-on inquiry based science experiments, utilizing school district science standards to communicate science, mathematics and other subjects.
2. Serve as science para-professionals and role models for both their students and their partner teacher.
3. Reflect on their teaching experiences and use their reflections to improve their own science knowledge and their classroom teaching.
4. Manage diverse socioeconomic and cultural student groups in the classroom.

Description of Assignments

Student/Teacher Workshop (Mandatory) - All students must attend the Student/Teacher Workshop on Monday, January 19th, 9:30a-2p. If you do not attend the workshop, you may not participate in the course. Please see the Course Calendar for complete information. A light breakfast and lunch will be provided.

Attendance - Students must attend regularly to receive the full benefit of the course and to be a reliable partner for their teacher partner and students. Two absences, combined, will be allowed for either school time or reflection sessions for students to receive an A in the course. Example: You can miss one reflection session and one school time. You MUST notify the professor and the teacher in advance. You may NOT miss two reflection sessions and two school times. Additional absences will result in a lower grade.

Student Observations - All students must schedule four hours of observation time with their Teacher Partner to take place the week of January 26th in their Teacher Partner’s classroom. An Observation Verification Form can be found at Appendix A. Please see the Course Calendar for due dates.

Teaching in the Classroom - Students are required to teach three-hours per week in the classroom, allowing students three-hours per week of contact time with the children. You will be assigned a teacher partner and school in which you will work. Students may not select their own teacher or school. You will be matched with your teacher partner based on both of your schedules in an effort to provide you with the most teaching opportunities each week. There may be times when either student or teacher partner has a conflict with the pre-scheduled time. Please over-communicate and make any adjustments as soon as the conflict is realized. Contact numbers and e-mail addresses will be provided.

Reflection Sessions/Web Entries – We will meet once per week to discuss what you are experiencing in the classroom, whether positive or negative, what you are trying to develop for teaching in the classroom, and sharing ideas between students and faculty. In addition, we will focus on some specific topics during our whole group sessions to assist you in the proper development of lesson plans for your classroom. Whole group session topics are indicated on the calendar.

In-Class Observations - One course instructor will schedule a time to come to your classroom and observe you teaching a lesson. The objective is to identify any issues and see how you are relating to the students and teacher partner. Your in-class observation is an important component of your course grade. You will receive written and verbal feedback, and you will be asked to make changes to your teaching as needed.
**Lesson Plans** - Students need to provide their teacher partner with their lesson plan outline each time they teach. In addition, students must submit five lesson plan outlines over the course of the semester as part of their course grade. Due dates for the lesson outlines are listed in the calendar.

**Science Lesson Ideas Presentation** – You will partner with one or two other students in our class to prepare a 20 minute overview of the best resources and lesson ideas for a particular topic. You will demonstrate at least one of the hands-on activities and post all your resource ideas online to share with the other students in our class.

**Curriculum Assignment** - Throughout the course of the semester, students are required to produce lesson plan outlines they prepare and teach. The final project for this course will be an in-depth, formal lesson plan, expanded from one of your lesson plan outlines from the semester. Please see Appendix B for a 5e lesson plan template.

This assignment is designed for the student to demonstrate an understanding of the process of teaching science in a public school setting. Students will choose one of their five lesson plans and make changes to the original lesson plan using the Microsoft Word “track changes” tool. In addition to marking changes, please include a one page reflection statement, including a self-assessment of the lesson, your partner teacher’s assessment of the lesson, and comments on how your elementary school students liked the lesson. Explain any changes you made to the original lesson plan. Other topics you can discuss include problems you encountered, reliable resources, unexpected outcomes, etc.

**Important Things to Remember!**

**Dress Code:** The dress code for volunteers is business casual. Please wear your Science Partners name badge, and your Science Partners polo shirt or a nice UNR shirt or sweatshirt. **Do Not** show up in sweats, low-cut tops, droopy pants, or bellies showing. Please be considerate of the students, your teacher partner, the school, UNR and UNSOM by presenting yourself in a clean, professional manner. This does not mean ties and skirts, but reasonable clothing. If you have to ask, “Is this okay?”, please change!

**Checking In/Out:** You need to check-in and out at the main office every time you visit the school. This is an important system for student and staff security. Many schools require you to wear a visitor badge or nametag while you are there. Please be responsible and comply.

**Communication:** Communication with your teacher partner is of the utmost importance. Please let him or her know as soon as possible if you won’t be able to make it to a class, etc. They have set this time aside specifically for you and are counting on you to be there on time and prepared to begin at the time you have agreed upon. There are less than 6 hours in the day for classroom education, and teachers have 12 subjects to cover. They can often utilize your unused time to get students caught up or cover something that came up rather than waiting for you.

**Science Standards:** Your teacher partner has been trained in how to interpret the Science Standards. Talk with him or her about how to incorporate them into your lesson plans as required, and how to determine if your lesson will meet the standards appropriately that you set forth to cover.

**Teacher Resources:** It is up to you and your teacher partner to discuss what lesson plan ideas you have and what materials you will need. Your teacher partner will have several resources available at their school and in their classroom to assist you with your lesson planning. However, there may be times when you will need to purchase additional supplies or replace consumable supplies you have used.
**Available Resources:** There are several places for you to gather materials and ideas. First, check with your teacher partner to see what they have available to them in the classroom or at their school. Second, visit the Learning Resource Center (LRC) on the first-floor of the College of Education Building. The LRC is basically a teacher’s library and they have many things that can be used in the classroom to enhance your lessons. Third, talk with your professors in the Basic Sciences for ideas or to borrow equipment. Most faculty know about the program and have been very generous about allowing undergraduates to borrow from their labs. Fourth, contact Gina to check out supplies from our Science Resource Center in DMS. **Email your supply requests to Gina by 5pm Thursday for supplies you need the following week.** In addition, here are several websites where you can gather ideas. More websites are listed on our WebCampus page.

Museum of Science, Art, and Human Perception - [www.exploratorium.edu/](http://www.exploratorium.edu/)
Inquiry-Based FOSS Science Curriculum - [www.fossalab.com/](http://www.fossalab.com/)
How to Smile - [http://howtosmile.org](http://howtosmile.org)
Images from NASA - [www.spacewander.com/](http://www.spacewander.com/)
Great Lesson Plans for Kids - [www.enchantedlearning.com](http://www.enchantedlearning.com)
W.M. Keck Earth Science and Mineral Engineering Museum - [http://www.unr.edu/keck](http://www.unr.edu/keck)
Steve Spangler Science - [http://www.youtube.com/user/SteveSpanglerScience](http://www.youtube.com/user/SteveSpanglerScience)

**School District Policies (or Don’ts):** Your teacher partner should be familiar with this information. However, it may benefit you to know where to find answers to what you can and cannot do on the school grounds. There is too much information to print or create a handout, so I am referring you to the school district website which talks about policies and regulations. Probably the most valuable sections for you as a Science Partner and for teaching will be the Series 1000, Series 5000, and Series 6000, [http://www.washoeschools.net/domain/222](http://www.washoeschools.net/domain/222).

- Always ask what they know about the topic first, chances are they know more than what you think – use this to gauge where to start.
- Create lesson plans ahead of time and review them with your teacher partner, they are the experts and can help you adjust your lessons accordingly.
- Questioning students stimulates conversations – “Have you thought about...” or “Have you considered...”
- Remember their names by drawing a diagram of the room including their desks, then write their names on their desks so you will have a mental image.

**Grading Criteria:** The course grading scale will be according to the Board of Regents’ grading scale as follows: 100-93 (A), 92-90 (A-), 89-87 (B+), 86-83 (B), 82-80 (B-), 79-77 (C+), etc.

Late work is only worth 50% of points possible.

**Points System**
- 30 - In-Class Student Observation (and follow-up teaching reflection statement)
- 15 - Evaluation by Teacher Partner
- 20 - Reflection Sessions/Online Discussion
- 15 – Lesson Plans (5)
- 10 – Lesson Research Presentation
- 10 - Curriculum Assignment

**100 Points Total**
**Course Calendar/Topics Outline:** All field trips subject to change based on availability!

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>Week 1</td>
<td><strong>Introductory Workshop (Mandatory)</strong></td>
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<tr>
<td>Monday</td>
<td><strong>January 19 – 9:30a-2p, Davidson Math &amp; Science, Room 104.</strong></td>
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<td></td>
<td>Breakfast and lunch will be provided!</td>
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<td>Readings – 5e model (WebCampus)</td>
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<td>Online Discussion</td>
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<td><em>All students must schedule 4 hours of observation time with their Teacher Partner to take place in the Teacher Partner’s classroom.</em></td>
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<td>Week 2</td>
<td><strong>Visit the Learning Resource Center (LRC) and the Science Resource Center (SRC)</strong></td>
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<td>Wednesday</td>
<td>Reading (to read before our Wednesday reflection session) – Chpt 1 Why Science? What Science?, <em>Primary Science</em></td>
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<td>Online Discussion</td>
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<td>Week 3</td>
<td><strong>Engineering Education Guest Speaker</strong></td>
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<tr>
<td>Wednesday</td>
<td>Calendar Rough Draft Due</td>
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<td>February</td>
<td>Three hours teaching in the classroom</td>
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<td></td>
<td>Observation Verification Forms Due February 6!</td>
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<td>Chpt 2 Bringing Children &amp; Science Together, <em>Primary Science</em></td>
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<td>Online Discussion</td>
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<td>Week 4</td>
<td><strong>Visit the UNR Greenhouses</strong></td>
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<td>Wednesday</td>
<td>Three hours teaching in the classroom</td>
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<tr>
<td>February</td>
<td>Reading – Writing Quality Learning Objectives (Park University CTLE, WebCampus)</td>
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<td>Online Discussion</td>
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<td>Week 5</td>
<td><strong>Visit UNR Physics</strong></td>
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<tr>
<td>Wednesday</td>
<td>Lesson Plan #1 Due</td>
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<tr>
<td>February</td>
<td>Three hours teaching in the classroom</td>
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<td>Reading – Chpt 3 The Right Question at the Right Time, <em>Primary Science</em></td>
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<td>Online Discussion</td>
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<td>Week 6</td>
<td><strong>Visit Planetarium</strong></td>
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<tr>
<td>Wednesday</td>
<td>Review Teaching Rubric, Schedule Observations</td>
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<td>February</td>
<td>Three hours teaching in the classroom</td>
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<td>Reading – Next Generation Science Standards (online)</td>
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<td>Online Discussion</td>
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<td>Week 7</td>
<td><strong>Visit Keck Mineral Museum</strong></td>
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<tr>
<td>Wednesday</td>
<td>Lesson Plan #2 Due</td>
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<td>March 4</td>
<td>Three hours teaching in the classroom</td>
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<td>In-Class Student Observations!</td>
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<td>Online Discussion</td>
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<td>Week 8</td>
<td><strong>Visit Great Basin Natural History Museum</strong></td>
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<td>Wednesday</td>
<td>Three hours teaching in the classroom</td>
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<td>March 11</td>
<td>In-Class Student Observations!</td>
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<td>Online Discussion</td>
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<td>March 18</td>
<td><em>UNR Spring Break!</em></td>
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<td>Week 9</td>
<td><strong>Visit Earthquake Engineering Lab</strong></td>
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<td>Wednesday</td>
<td>Lesson Plan #3 Due</td>
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<td>March 25</td>
<td>Three hours teaching in the classroom</td>
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<td>Work on your Science Lesson Idea Presentations</td>
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<td>Reading – Chpt 5 Taking Children’s Own Ideas Seriously, <em>Primary Science</em></td>
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<td>Online Discussion</td>
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| Week 10 | Washoe County School District Spring Break!  
Science Lesson Idea Presentations  
Groups 1 and 2 present lesson ideas (20 min each)  
Reading – Chpt 7 Helping Children to Observe, Primary Science  
Online Discussion |
|---|---|
| Week 11 | Washoe County School District Spring Break!  
Science Lesson Idea Presentations  
Groups 3 and 4 present lesson ideas (20 min each)  
Lesson Plan #4 Due  
Reading – Chpt 8 Helping Children to Communicate, Primary Science  
Online Discussion |
| Week 12 | Science Lesson Idea Presentations  
Groups 5 and 6 present lesson ideas (20 min each)  
Three hours teaching in the classroom  
Reading – Chpt 9 Assessing for Learning, Primary Science  
Online Discussion |
| Week 13 | Curriculum Assignment Planning  
Lesson Plan #5 Due  
Three hours teaching in the classroom  
Online Discussion |
| Week 14 | Curriculum Assignment Due  
Teaching Reflection Due  
Three hours teaching in the classroom  
Online Discussion |
| Week 15 | Science Partners End of Semester Lunch  
Program Evaluations  
Wednesday May 7 – 12:30-2:30p, Pennington Medical Education Building, Room 214.  
Lunch will be provided!  
Student Evaluations by Teacher Partners Due! |

**Statement on Academic Dishonesty:** “Cheating, plagiarism or otherwise obtaining grades under false pretenses” constitute academic dishonesty according to the code of this university. Academic dishonesty will not be tolerated and penalties can include canceling a student’s enrollment without a grade, giving an F for the course or for the assignment.

**Statement on Disability Services:** Any student with a disability needing academic adjustments or accommodations is requested to speak with an Instructor or the Disability Resource Center (Thompson Building Suite 101) as soon as possible to arrange for appropriate accommodations.

**Statement for Academic Success Services:** Your student fees cover usage of the Math Center (784-4433 or www.unr.edu/mathcenter/), Tutoring Center (784-6801 or www.unr.edu/tutoring/), and University Writing Center (784-6030 or http://www.unr.edu/writing_center/). These centers support your classroom learning; it is your responsibility to take advantage of their services. Keep in mind that seeking help outside of class is the sign of a responsible and successful student.

**Statement on Audio and Video Recording:** Surreptitious or covert video-taping of class or unauthorized audio recording of class is prohibited by law and by Board of Regents policy. This class may be videotaped or audio recorded only with the written permission of the instructor. In order to accommodate students with disabilities, some students may have been given permission to record class lectures and discussions. Therefore, students should understand that their comments during class may be recorded.
Science Partners

Observation Verification Form

______________________________ observed in the classroom of ________________________,

a total of ______________________ hours on the dates of _________________________.

School ________________________.

Teacher Signature ________________________ Date ______________________

Student Signature ________________________ Date ______________________

Due:  Friday, February 6
Please FAX to Gina Sella at 784-4592.
Appendix B.

Title
Your Name
Adapted from (if applicable)
Grade Level

1. Objectives: What are the learning objectives for the lesson?

2. Nevada State Science Standards:

3. Background knowledge required:
   A. Teachers: This section should include enough information that other educators could pick up the lesson and teach it.
      1. Resources: This section must include at least five resources for other educators to find information on the topic.
   B. Student: Look at the science standards and include information that students should have as prior knowledge before beginning this lesson. Introductory lessons may require no background knowledge.

4. Materials: Include all materials needed for this lesson including the list of at least three resources for students (including web resources).

5. Safety Procedures: Include any safety procedures to be observed during the lesson.

6. Lesson Body – Use the 5E Lesson Format:
   Engagement: These lessons are to mentally engage the students with an event or question. Engagement activities help students make connections with what they know and can do.
   Describe the question/questions the lab activity is expected to answer. Provide a prompt or a set of prompts for the lesson.

   Exploration: Students are to work with one another to explore ideas through hands-on activities. Under the guidance of the teacher, students clarify their own understanding of major concepts and skills.
   Include a description of the lab activities including procedures; be explicit about the educator’s role in the activity.

   Explanation: Students should explain their understanding of the concepts and processes they are learning. Teachers should clarify students’ understanding and introduce new concepts and skills.
   List concepts and vocabulary students are expected to learn from this lesson. Also list three references for students to refer to outside of class (or that will be used to explain the topic); after the reference indicate the information found.
**Elaboration:** These lessons should challenge students to apply what they have learned, and build on the students’ understanding of concepts to extend their knowledge and skills. 

*Indicate how the student is going to demonstrate knowledge/skills taught in this lesson.*

**Evaluation:** Students should assess their own knowledge, skills, and abilities. These lessons also allow teachers to evaluate students’ progress.

*Explain how students will be assessed. Also explain how students will be asked to self assess.*

a. **Formative Assessment:** teacher observation, questioning etc.

b. **Summative Assessment:** projects/assignments with grading rubrics

7. **Clean-up:** Explain clearly how the students will clean up after the lab.

8. **Closure:** What are your parting comments or messages about the lesson to your students? Any comments about how this lesson connects to prior or future lessons?

*Modified from Metamorphosis on a Plate by David T. Crowther, University of Nevada, Reno*