IL177 Hands-On Science: Developing Science Kits for Elementary Students.
MAY 2009

Contact Information
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Class Hours
For the first two weeks of the course, formal classroom hours will be from 9:00 am - 12:00 pm., although, occasionally we may need to meet in the afternoon. During the third week most of our time will be spent out in the local area elementary schools and YMCA Magic Place sites, therefore, it may be necessary to start before 9:00 am and stay later than 3:00 pm each day.

Overview/Philosophy
Developing and maintaining high-quality science education, particularly at the elementary school age, is a serious concern. With the pressures of standardized testing and very limited supply budgets, teachers are often forced to “teach to the test” rather than help their students develop a curiosity of and interest in science. As a result, the fun in science is lost and children develop a dislike, or at best, a tolerance for science. All too often, college students are quoted as saying “I want to get my lab science out of the way as quickly as possible” rather than look at these courses as an opportunity to explore something exciting and different. This attitude towards science stems from their early experiences with science at the elementary school level. During this course we will develop “Science Kits” geared towards the Virginia standards of learning (S.O.L.’s). Our aim is to provide elementary school teachers (specifically 5th grade) with a toolbox of fun and exciting activities, instruction manuals, and lesson plans which will spark their children’s interest and curiosity about science while still addressing the S.O.L.’s. To that end, much of our time will be spent doing hands-on science, however, each day some time will be spent discussing pedagogical approaches to science education as well as the science theory needed to understand and construct the kits. As part of the learning process you will be required to keep an informal blog of your thoughts, reflections, and ideas of the science and pedagogies involved. This will prove particularly important during the final week when out in the local area schools.

Goals and Learning Outcomes
Students taking this course will:

- Develop an understanding of the science necessary to teach 5th-grade such that they can:
  (a) Explain the scientific processes involved in various activities/experiments.
  (b) Create age-appropriate lesson plans based on sound scientific knowledge.

- Appreciate the value of inquiry-based (hands-on) learning such that they can:
  (a) Explain the advantages and disadvantages of this approach to teaching 5th-grade science.
  (b) Create age-appropriate lesson plans which use inquiry-based learning.

- Appreciate the value of experiential learning such that they can:
  (a) Articulate the advantages of studying this topic in the intensive learning format.
  (b) Articulate the advantage of working in a group environment.

- Demonstrate effective communication skills such that they can:
  (a) Write a well-researched, well-organized lesson plan.
  (b) Give a well-organized presentation and speak clearly in class discussions and while conducting lessons with 5th-grade children.

Assignments
Assignment #1 (10%)
This is a 5 – 10 page paper answering questions on copyright rules, why we need good science teachers, how children learn, discovery-based learning, and other issues important to this
course. The details will be provided on the first day of class. Post your paper in your “My Daily Blog” on Blackboard. Note: “My Daily Blog” can only be viewed by you and the instructor.

Assignment #2 (20%)
Short Presentation: At the end of the first week or beginning of the second week you will be required to give a short (10 minutes) presentation describing a particular activity you have developed as part of your group project. Leave two minutes at the end to answer questions and receive feedback from the class. During the presentation you should describe:

- The science behind the activity.
- The learning outcomes met by the activity.
- How this activity fits into the larger theme of your group project.

Written Assignment: After receiving feedback from the class during your presentation, modify (if necessary) your activity and post it to your “My Daily Blog” by the following day. Include a brief paper addressing the bullet points listed above.

Performance in the Schools (10%)
While out in the local area schools and YMCA Magic Place sites, each of you will be required to conduct activities with the children as a means to “test” your material. Not all of your activities will go over well, but that’s part of the learning process. Some of the children will be a pleasure to interact with while others may be quite challenging. In all cases I expect you to conduct yourselves in a professional manner. Remember, you are representing Roanoke College.

Final Group Project (60%)
The majority of your grade in the course is based on the quality of your final group project and the contributions you make to the project. Though it is important to work hard as a team, I do recognize that sometimes not all group members contributed equally. To monitor your individual progress and contributions to the group project, you are required to post to your “My Daily Blog” each and every day. Please note that only you and I can view your blog so you are free to comment on challenges you are having with other group members. You should use your blog to post specific material you have written, personal reflections, and other material which will help me evaluate your progress and contributions to the group project. In addition to your personal blog, your group will be assigned a group Wiki which you can use as a group storage site for all the material being incorporated into the final group project. This is also where you will post the final form of the group project for a grade. Other groups will be able to view but not edit your group’s Wiki so that the entire class can share good ideas.

Attendance
You are expected to attend every class. Attendance is checked at each meeting. If you are going to be absent from class, I must be notified. If more than one class period is missed then I will assume you are not interested in completing the course and you will be dropped from the class (DF). You are accountable for all work missed because of an absence.

Grading Scale
A: ≥ 93, A-: 90-92.9, B+: 87-89.9, B: 83-86.9, B-: 80-82.9, C+: 77-79.9, C: 73-76.9, C-: 70-72.9, D+: 67-69.9, D: 63-66.9, D-: 60-62.9, F: < 60

Academic Integrity
The College academic integrity policies are vigorously enforced.

Readings
In addition to handouts I may provide, below is a partial list of other material which will be available for your use:

- Elementary School Science and How To Teach It, Blough and Schwartz (Holt Rinehart & Winston, 1990)
- Teaching Science Through Discovery, Carin (Prentice Hall, 1997).
The Science Guy’s Big Blast of Science, Bill Nye, (Addison-Wesley, Menlo Park, 1993).

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<tr>
<th>Dates</th>
<th>Schedule</th>
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<tr>
<td>May 11th – 15th</td>
<td>• The majority of your time will be spent in groups of three discussing concepts, experimenting with equipment, and developing activities, instruction manuals and lesson plan booklets focused on a particular theme.</td>
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<td>and May 18th – 21st</td>
<td>• Daily progress will be monitored through ongoing dialog with the instructor and posts to “My Daily Blog” and “Our Group Wiki”.</td>
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<td>May 22nd</td>
<td>• Out in the schools: During this time each of you will be expected to conduct science activities with the school children and will be evaluated on your performance. Use this opportunity to test out the activities you have developed.</td>
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<td>May 25th</td>
<td>• Memorial Day Holiday</td>
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<td>May 26th – 28th</td>
<td>• Additional time spent out in the local area schools and YMCA Magic Pace sites.</td>
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<td>• Each afternoon we will “regroup” as a class and discuss the morning’s events. This will enable you to make any changes or modifications to your program before going out to the schools the following day.</td>
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<td>May 29th</td>
<td>• Cleaning up, wrapping up, and finishing up your projects. The final form of your group project is due by 5 p.m.</td>
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