Science Methods in Elementary and Middle School Teaching

EDC 457

Spring Semester 2014

Section 1: Tuesday 4:00-5:50pm in Chafee 251
Section 3: Monday 2-3:50pm in Chafee
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Section 2: Monday 12:00-1:50 in Chafee 244
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Office hours: by appointment

Suggested Readings:

Allen, R. (August, 2006). Moving elementary science from afterthought to inquiry. *Adapted from*
Priorities in Practice: The Essentials of Science, K–6: Effective Curriculum, Instruction, and Assessment, *to be published by ASCD in December 2006*.

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Aram, Robert and Bradshaw, Brenda.. 39(2), (October 2001). How do children know what they know?
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Badders, W. (2000). Methods of assessment. Houghton Mifflin Company retrieved from: http://www.educationplace.biz/science/profdev/articles/badders.html

Baxter, L. & Kurtz, M. (April 2001). When a Hypothesis in not an educated guess. *Science and Children*, 18-20.

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Carrier, R. (2001). Test your scientific literacy! Retrieved from
www.infidels.org/library/modern/richard_carrier/sciLit.html

Checkley, Kathy. (1997). Assessment that serves instruction. *ASCD Education Update*. 39(4), 4-6.

Cheong, Wendy. (March-April 2000). The Power of Questioning. *Synergy Learning, 9-10*

Clark, S. (1998). Targeting Assessment in the Primary Classroom. London: Hodder Stoughton ISBN 0-340-72531-1.

Colburn, A. (Fall,1997). How to make lab activities more open ended. *CSTA Journal*, 4-6.

Coulter, B. (March, 2000). How does technology support inquiry? *Synergy Learning*, 23-25.

Duckworth, E. (1987). *The having of wonderful ideas: And other essays on teaching and learning.* New York: Teachers College Press.

Edwards, C. (October,1997). Promoting student inquiry. *The ScienceTeacher*, 19-21.

Elstgeest, Jos. (1985). The right question at the right time. In Wynne Harlen. *Primary Science: Taking the Plunge*. Oxford, England: Heinemann Educational, 36-46.

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Fulwiler, B. (2007). *Writing in science: How to scaffold instruction to support learning.* New Hampshire: Heinemann.

Hood, K. & Gerlovich, J. (2008). Inquiring minds do want to know. *Readings in Science Methods, K-8*. NSTA Press.

Kim, M., Bland, L., & Chandler, K. (2009). Reinventing the wheel. Science and Children, 40-43.

National Research Council. (2000). *Inquiry and the national science education standards*. Washington, DC: National Academy Press.

National Science Foundation (1999). *Foundations: Inquiry: Thoughts, views, and strategies for the K–5 classroom* (NSF 99-148). Arlington, VA: National Science Foundation.

Palmeri, A. (2009). Making sense of data. Children and Science, 30-33.

Peters, E. (2008). Assessing Scientific Inquiry.

Rankin, Lynn. (2000). Lessons learned: Addressing common misconceptions about inquiry. In National Science Foundation. *Foundations, Volume2: Inquiry: Thoughts, Views, and Strategies for the K-5 Classroom*. Arlington,VA: National Science Foundation, 33-37.

Ross, D., Fisher, D., & Frey, N. (November 2009) The art of argumentation. Science and Children,
28-31.

Salend, Spencer. (2005). *Creating inclusive classrooms: Effective and reflective practices for all students*. Pp. 467-491.

Shepardson, Daniel and Britsch,Susan (February 1997). Children's Science Journals: Tools for Teaching, Learning and Assessment. *Science and Children*,12-17, 46-47.

Watson, B. & Konicek, R. (1990). Teaching for conceptual change: Confronting children's experience.
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Wenning, C. (2005). Minimizing resistance to inquiry-oriented science instruction: The importance of
climate setting. *Physics Teacher Online*, 3(2), 10-15.

Wetzel, D. (2005). Internet basics for the science classroom. In Weave the Web into K-8 Science. NSTA press.

Wolf, Dennis Palmer. (Winter,1987). The art of questioning. *Academic Connections* , New York: College Board, Office of Academic Affairs, 1-7.

Additional Resources:

- Rhode Island Grade Span Expectations (on-line at http://www.ride.ri.gov/Instruction/gle.aspx)
- National Science Education Standards Frameworks (on-line at http://www.nextgenscience.org/framework-k–12-science-education)
- Next Generation Science Standards (online at www.nextgenscience.org)

Course Goals and Objectives:

The goal of EDC 457 is to enable students to develop knowledge and skills in **methods** of teaching science to elementary children in grades 1 through 6 and middle grades 6-8. Students learn to plan and implement active, standards-based science lessons. Students will improve their knowledge of **science content**, **practices and attitudes** in preparation for working with children. Students will be enthusiastic teachers of science who help students get excited about learning this subject.

The objectives of this course are to provide students with the opportunity to:

- translate science theory and research into practice (ACEI Std. 1; RIBTS 3, 4.2),
- analyze and challenge personal understanding of the nature of science and science teaching (ACEI Std. 2.2; RIBTS 1,2),
- learn teaching techniques (pedagogy) to teach standards-based science content (ACEI Std.3.3; RIBTS 5).,
- gain practice in teaching science content through hands-on, inquiry, and discovery experiences (ACEI Std.2.2; RIBTS 1,2).,
- connect science lessons and content with science standards (National Science Education Standards, and Rhode Island Grade Span Expectations) (ACEI Std.3.2; RIBTS 3, 4).
- incorporate technology in planning and teaching high quality science lessons (ACEI Std.5.2; RIBTS 10).,
- work collaboratively with student teachers and cooperating teachers in planning science lessons(ACEI Std.3.3, 5.2; RIBTS 5,10). ,
- facilitates student learning across the disciplines through integration of science with other curricular areas (ACEI Std.1, 3.1, 3.2; RIBTS 3, 4).
- utilize organizational and grouping strategies to provide for needs of elementary and middle level students (ACEI Std.3.2; RIBTS 3, 4).,
- design and implement instructional programs and related activities that create a supportive learning environment for the elementary and middle level student (ACEI Std.3.2; RIBTS 3, 4, 5.4, 5.5).

Grading Policy:

Attendance:

It is expected that you will attend every class session and come prepared, having completed all readings and assignments for that class. Missing class will result in points deducted from your total as follows:

*Late once, leaving early once, or 1 class session missed = 1 points deducted
*Late twice, leaving early twice, or 2 classes missed = 5 points deducted
*****Late 3 times, leaving early 3 times, or 3 classes missed = 15 points deducted
*More than 3 absences, 3 times leaving early, or 3 times being late may result in a student being required to retake this course.

Participation: Students are expected to actively participate in all class experiences both independently and while working in groups. Show your commitment to becoming a GREAT elementary and middle school science teacher. Part of your grade will reflect your enthusiasm in class.

Communication Skills: As prospective teachers it is important that you exhibit

proficient oral and written communication skills. If these skills are not proficient, it is your responsibility to visit the URI Writing Center or obtain tutoring to improve your oral and written communication skills.

Emailing Assignments/Work to Instructor: Please be very specific in naming any file/attachment/document sent to your instructor in the following format: **lastname_assignment title.doc.** Failure to do so will result in the file sent back to you and credit will not be given.

Special Considerations: If you have a documented disability which may require individual accommodations or modifications please make an appointment to discuss this prior to the second class.

Portfolio Assignment: In order to successfully complete this course, you must attain 75 points ("Meets the Standard") on the **Videotaped Lesson** assignment. You may revise and resubmit your work for this assignment until your work meet the standard, but your course grade will reflect the need to revise your work.

Written Assignments and Grading

Assignments/Activities % Points

- **Participation & Class Activities 20**
- **Weekly Lesson Planning Assignments 30**
- **Videotaped Science Lesson & Commentary 40**
- **Final Reflection Paper 10**

Total Points 100