INQUIRY SCIENCE GRADES K-8

EDN 544 Summer Session 2 ONLINE	Instructor: Dr. Amy Taylor
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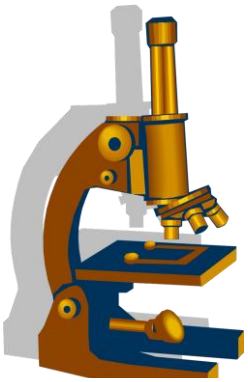
Online at https://learn.uncw.edu/	Office hours: Online or by appointment

The primary mission of the Donald R. Watson School of Education at the University of North Carolina Wilmington is to develop highly competent professionals to serve in teaching and other educational leadership roles in southeastern North Carolina, the state, and nation. The Watson School is committed to achieving excellence in teacher and administrator preparation in all of its programs.

COURSE DESCRIPTION:



To assure that science is taught from a theoretical and conceptual base, content will include studying theories and concepts related to science taught at various grade levels. Materials needed for a successful science program and sources from which these materials may be secured will be discussed. Our primary mode of communication will be through our Blackboard Learn site. I will ask you to visit this site often to check for announcements, print class material, complete online learning modules, etc.

COURSE PURPOSE:

This course will focus on: current issues and trends in science; the development, implementation, and assessment of curricular materials; and effective instructional strategies to teach science in the elementary and middle school.

1. a theoretical and conceptual framework that addresses the current goals of K-8 science; identifies characteristics of exemplary programs, and examines curricular/instructional alternatives.
2. Ideas for teaching elementary/middle school science to enhance your expertise in the following:
   The selection, development and/or implementation of curricular materials and resources;
   The selection of instructional strategies;
   The evaluation and assessment of students, teachers and the curriculum.
3. After completing this course, you should be able to:
   a. Present and defend a philosophy for teaching science in the elementary and middle school.
   b. Use instructional strategies that focus upon the acquisition of process skills and conceptual change/development.
   c. Compare/evaluate the curricular alternatives for teaching elementary and middle school science.
   d. Apply your knowledge of instructional strategies to your teaching of science.
   e. Assess your effectiveness as a science teacher.
   f. Use the internet to enhance your teaching.
   g. Apply research to real-world experiences to improve classroom practice through action.
   h. Increase skills in data collection and data use for diagnosis, planning, decision-making and evaluation.

A Few Personal Comments and Course Objectives:

My personal theory of learning incorporates the epistemology of constructivism where I utilize an inquiry-based approach. I emphasize the importance of creating integrated thematic units and the 5-E learning cycle with my science lessons. In the 5-E learning cycle, students are first ***engaged*** in

the learning before they ***explore*** their ideas. Following a common exploration "hands-on" type activity, teachers and students exchange ***explanations*** of a particular concept or idea. Students are then challenged to ***elaborate*** or ***extend*** their conceptual understanding to a new context. ***Evaluation***, or assessment, takes place throughout the whole learning cycle. Observations of teaching and learning in elementary and middle school classrooms and regular discussions with your colleagues will provide the forum for thinking about alternative ways of creating learning opportunities for ALL students.

REQUIRED TEXT and MATERIALS:

Readings are *on electronic reserve* at Randall Library and/or in learning modules. See complete list on our Blackboard course homepage.
Access the readings at: http://library.uncw.edu/reserves
The readings are not in order on the course reserves so pay attention to title.

OTHER OPTIONAL RESOURCES:

Activities Integrating Math and Science (AIMS) Resource Books by AIMS Education Foundation.
http://wwws.aimsedu.org/aims_store/Search-for-E-Activities-sp-5.html

AAAS, (1993). *Benchmarks for Science Literacy*. Oxford University Press, New York.
www.project2061.org/tools/benchol/bolframe.htm

American Association for the Advancement of Science. (2001). *Atlas of science literacy*.
Washington, DC: American Association for the Advancement of Science.

Delpit, Lisa. (1995). *Other People's Children: Cultural Conflict in the Classroom*. New Press, NY.

North Carolina Common Core and Essential Standards
http://www.ncpublicschools.org/acre/standards/new-standards/

Great Explorations in Math and Science (GEMS) by Lawrence Hall of Science.
http://www.lawrencehallofscience.org/gems/

National Research Council. (1996). *National science education standards*. Washington, DC:
National Academy Press. http://www.nap.edu/readingroom/books/nses/

Liem, T.L. (1987). *Invitations to Science Inquiry.*

NSTA Teacher Journals: *Science and Children, Science Scope*, and *The Science Teacher*

Research Journals such as: ***Journal of Research in Science Teaching, Science Education, International Journal of Science Education, Journal of Elementary Science Education and School Science and Mathematics.***

PROFESSIONAL DEVELOPMENT: (beyond the scope of EDN 544)

It is recommended that you join the National Science Teachers Association (NSTA) at the special student membership rate ($34/yr). As part of the membership, you will receive a monthly journal with innovative articles.

SPECIAL CONSIDERATIONS:

If you are a person with a disability and anticipate needing accommodations of any type in order to participate in this class, please notify Disability Services (Westside Hall, Ext. 7555), provide the necessary documentation of the disability and arrange for the appropriate authorized accommodations. Please identify yourself to me so that I can implement these accommodations.

ATTENDANCE AND PARTICIPATION:

Active participation and promptness with work are expected for all class sessions, online modules, assignments, and discussions. Students are expected to be active participants in this class—that is, to complete all reading, writing and activity assignments, and to be prepared to discuss them online. Each anticipated absence must be discussed with the instructor in advance. Each unanticipated absence must be discussed with the instructor immediately upon return to class. In the case of excessive absences, your grade may be lowered at the discretion of the instructor.

Please discuss with me in advance (at least 2 days) if you experience any problems complying with the due dates of assignments. If this is not done, ten percent will be subtracted from the grade received for each day the material is late.

Avoid Plagiarism! Visit the University Learning Center: Writing Services or go to http://www.edu/stuaff/uls/writing-plagiarism.htm

ASSIGNMENTS AND COURSE REQUIREMENTS:

This course is designed so that learning occurs through student engagement in learning strategies that illustrate or demonstrate a philosophy of science teaching, curriculum, and learning.

- Information Sheet and thoughts on the Goals of Science Education (10pts)
- Participation in course modules and group interactions (20pts)
- Five assignments with 20 possible points can be found below and explained in detail further detail in the online modules. *[Total of 100 points]*
- Six online group interactions. [*10 possible points each =60 possible points total].* The rubric for online discussions is posted on the course homepage.
- In addition to the assignments and discussions, there is a ***Final Project*** **that you should begin work on immediately.** (110 points).
- **Total Possible Points for this Course: 300 points.**

All assignments and instructions for group interactions are explained in more detail within the online modules for each week. Be sure to read all directions thoroughly as you begin each module. There is a weekly checklist to guide you through each module.

If you have any questions or concerns then contact me immediately!

1. Mini Literature Review in Science Education 20 pts

2. a. Detailed Integrated 5 E lesson plan (See details in module) (10pts)

   b. Analysis of journal article from teacher journal (10pts)

Based on your grade level preference, select one article from each of the journals *Science and Children* (K-5) or *Science Scope* (5-8) found in the folders on the electronic reserves or others from bound copies of these journals in Randall Library. Read the article and summarize the content. Include in your review the positive and negative aspects of the article (include originality, readability, practicality, etc.) **Limit your remarks to one page.**

3. Discrepant Event Exploration, Misconception Analysis, and video (20pts)
   Choose a discrepant event from the PDF's on course reserve. (Note that each topic has several one page discrepant events). Videotape yourself presenting the discrepant event with appropriate questioning for a given grade level. *You may want to invite your family, friends, or children to be your audience.* Ask a series of questions that leads up to the science content behind the discrepant event rather than giving away the event at the very beginning. *For example*, with the egg and bottle event you wouldn't just say, "Today we are going to put fire in the bottom so that the air pressure changes and the egg is pushed into the bottle." Rather you would say, "What do you think is in the bottle? How could we get the egg in the bottle? Why did the egg get pushed into the bottle?"

   You will use Tealvision to upload your video link to our class blog. See directions in the module.

   What misconceptions may arise from the use of this discrepant event?
   In written format, address the issue of misconceptions in science education answering the following questions: What are misconceptions?, Where do they come from?, How do teachers address them?, and what implications do they have for teaching science using inquiry-based strategies? Explain the possible misconception (from your discrepant event) juxtaposed to the correct science conception. Has there been research conducted on this specific misconception? Paper should be at least two pages in length and be sure to reference any research articles in support of your thoughts.

4. Experimental Design in Science Notebooks and Journals (20pts)

5. Issues in Science Education Reflection (20pts)

FINAL PROJECT

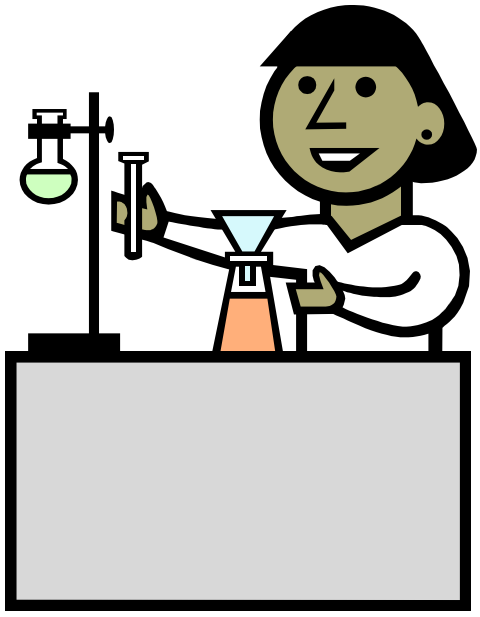
- **a.** Using the articles in the *Science and Children* (K-5) or *Science Scope* (5-8) Journals as a ***template***, choose a science topic of interest to you and design an activity that a science teacher could use with their students.
- **b.** Be ***innovative and original***. (You may draw upon your own teaching experiences and adapt a lesson that you created and found to be effective for teaching your students.) **(15)**
- **c.** Sections to include in your article:
  - **Title (5)**
  - **Introduction (5)**
  - **Background (10)**
  - **Description of unit or context (10)**
  - **Goal of lesson (10)**
  - **Description of what students complete, explore, investigate, etc. (10)**
  - **Student products (10)**
  - **Conclusion (10)**
  - **Resources (10)**

d. Include tables, graphs, concept maps, pictures, sketches, and other visuals. **(10)**
e. If you include photographs, be sure to not show faces of people unless you complete a photo release form.
f. Include references in a bibliography. **(5)**

GRADING PROCEDURE:

During this course, it will be possible to earn a total of approximately 300 points. Your final letter grade will be determined based on percentage points from total:

$$\frac{\text{Pts. Received}}{300} = \%\text{= Final Grade}$$



See Table for the Tentative Summer 2012 Class Schedule

MODULE (Availability Date)	Due (by 12 am)	Readings	Assignment(s)*	Group Interaction
6-27-12 **Introduction: History of Science Education Nature of Science**	**7-3-12**	• **Chapter 2 Goals and objectives by Victor** • **Chapter 1: Teaching Science K-8 by Victor** • **More than a human endeavor by Joanne Olson**	**Research in Science Education: Mini-literature review (20pts)**	**Science Literacy and Goals of science education Discussion**
7-4-12 **Constructivism and 5 E inquiry**	**7-10-12**	• **Chapter 3 from Abruscato (The inquiry process skills)** • **Inquirize your teaching article on module** • **Any article from Science and Children *or* Science Scope**	**Detailed Integrated 5 E lesson plan (10pts)** **Analysis of journal article from teacher journal (10pts)**	**Class Wiki on 5 E lesson plans**
7-11-12 **Misconceptions and Discrepant Events**	**7-17-12**	• **Discrepant Events folder** • **The Science Beliefs Quiz by Mary Stein**	**Discrepant Event Exploration and Misconception Analysis and Video (20 pts)** ***Mid Course Evaluation***	**Discrepant Event Blog**
7-18-12 **Science Integration: Notebook vs. Journal**	**7-24-12**	• **Chapters 13/14 from Koch (Assessment)** • **Explore Science Notebook article (Nesbit)**	**Experimental Design in Science Notebooks and Journals (20pts)**	**Assessment Discussion**
7-25-12 **Issues in Science Education**	**7-26-12**	• **Chapter 9/Abruscato (Adapting the science curriculum)** • **Chapter 8 from Bass (Technology tools)** • **Last child in the woods (Louv)**	**Reflection on an Issue (20pts)**	**Issues in Science Education Blog**
Final Project DUE	**7-27-12**	• **Putting it altogether by Koch**	**Turn in Final Project (110 pts)**	**Final Discussion**