

Science Education (ESCI) 4430
Science Curriculum for the Middle Grades
Fall Semester, August 20-December 10, 2004
Mondays, Wednesdays, Fridays, 11:15-12:05
215 Aderhold Hall
corequisites: EDMS 5020; GEOL 4750

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Course description, from UGA Bulletin:

Examination and selection of science curriculum materials and assessments. Evaluating and reformulating materials for relevance to middle grades classrooms. Special attention to examples and problems drawn from the life, earth, and environmental sciences.

A **web site** for the course will be developed and regularly updated during the semester:

<http://www.arches.uga.edu/~djackson/ESCI4430.html>

There is no single textbook to be purchased for this course. **Text materials** will be extensive, but will consist of photocopied or loaned material drawn from a wide variety of sources, in accordance with accepted Educational Fair Use guidelines. A library of books, videos, and software relevant to the course will be built and maintained in Room 215 during the semester.

The **specific schedule** will be determined, week-to-week and day-to-day, based on the progress and input of the class, the availability of field experience opportunities or guest instructors, the progress of GEOL 4750 activities, and, in the case of several outdoor lab activities, the weather. Although the issues considered in this course are inherently interrelated, topics will first be introduced approximately in the order in which they are listed as objectives on this page, so this can also be considered a topical outline for the course.

A day-to-day list of activities, readings, and assignments will be continuously updated in the [Daily Activities](#) area of the course web site. As stated by UGA policy, the course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary.

Formal assignments, of which there will be approximately six during the course of the semester, will be reflective essays or practical design projects, designed to require creative and critical thinking about the issues being addressed.

In accordance with the **University Honor Code and Academic Honesty Policy**, academic work must meet the standards contained in *A Culture of Honesty*. Each student is responsible to inform themselves about those standards before performing any academic work.

Attendance policy: Attendance and class participation are not in themselves an aspect of the course grade. My goal is to try to design class activities so that you feel that you are clearly missing something if you are not here (both physically and mentally!).

Late work policy: A formal assignment will be penalized 10% for lateness if submitted/presented after it has been returned to those who submitted it on time.

Mastery Learning policy: Any assignment may be redone *as a whole* (in a significantly different way or on a different specific topic) for a fully revised grade, if desired.

Course Objectives ("Students will be able to..."):

Basic Principles of Science Teaching

- List, describe, and demonstrate the basic science process skills, and recognize, modify, and design middle-grades-level activities, including both single lessons and long-term project-based units, appropriate for developing them.
- Describe the learning cycle approach to science teaching and learning, and recognize, modify, and design middle-grades-level activities, including both single lessons and long-term project-based units, using this approach.
- Gather, prepare, and critically evaluate several "hands-on, minds-on" activities appropriate for middle school students in major life and earth science topic areas typically included in specifications of middle grades science objectives.

Science Curriculum and Assessment Issues

- Describe and apply various rationales for the overall goals of a middle grades science program, with reference to various recent U. S. national science standards documents.
- Describe and apply various criteria for the design of the specific scope and sequence of the life science and earth science components of a curriculum plan for middle grades science, with reference to both state and local objectives and recent U. S. national science standards documents.
- Select and construct traditional assessment items for maximum possible authenticity, validity and reliability, and fairness.
- Describe the general advantages and limitations of several popular alternative assessment approaches in middle school science.
- Describe aspects of the history and philosophy of science that can inform science teaching and curriculum.

Electronic Technologies in Science Teaching

- Describe examples of the advantages and limitations, as teaching tools for middle school science, of:
 - videotape/disc and electronic display technologies
 - computer- and interactive video-based simulations of natural phenomena, science-technology-society issues, and scientific problem solving processes
 - internet-accessed data and communications, e. g., World Wide Web resources and e-mail-mediated science projects
 - computer-based lab equipment and data analysis software

Ethical, Cultural and Social Issues in Science Teaching

- Describe the problematic nature of several ethical, cultural, and social issues that commonly arise in middle school life science and earth science teaching, and some relevant legal, sociological and psychological principles that may help teachers, students and parents to resolve them:
 - Use and treatment of animals (living and dead) in the science classroom
 - Health/sex/AIDS education as an aspect of science teaching and middle school curriculum
 - Interactions between science and religion, especially in regard to the subject matter areas of astronomy, historical geology and evolutionary biology

Grading Scale:

A = 90-100%

B = 80 -89%

C = 70-79%

D = 60-69%

F = <60%

Elements of Grade:80% approximately 6 written and/or computer-based assignments,
or formal oral presentations

20% final exam* (Dec. 13, noon-3:00, or time arranged Dec. 13-17)

*Required, but with format and schedule highly flexible - see below.

General grading rubric for each assignment/project/exam question:

100%: beyond the call of duty; strikingly impressive; excellent in every way

90%: both complete and showing some evidence of original thought

80%: all aspects of assignment minimally satisfied

<80%: one or more aspects of assignment missing or unacceptable

Final exam items will be a series of practical problems, designed to require creative and critical thinking in applying general principles learned in the course to the potential use of specific, previously unfamiliar curriculum materials. The final exam will require some reading and preparation based on materials (text, video, and software-based) distributed or demonstrated during the last week of classes, and will be given on a time-limited but open-notes basis. The option of either a 3-hour written or 30-minute oral interview format will be offered. Oral exams may be scheduled at any mutually convenient time during the exam week.

Music will be played regularly during the 10-15 minutes immediately preceding class (in order to, as Bugs Bunny would say, soothe the savage beasts). Everybody should take turns bringing in CDs, or else risk being subjected to my own wildly eclectic tastes.

Final note:

Science and middle school kids are two of the most exciting, fascinating, and (yes) challenging aspects of our world! We can't possibly have as much fun (or work as hard) this semester as you will in the future, but let's try to do both! :->