

Science Education (ESCI) 4430, Fall 2007

Science Curriculum for the Middle Grades

Mondays, Wednesdays, Fridays, 11:15-12:05

215 Aderhold Hall

corequisite: EDMS 5020

pre- or corequisite: GEOL 4750/6750 or equivalent

Dr. David F. Jackson, Associate Professor
University of Georgia

212 Aderhold Hall, (706) 542-4637

djackson@uga.edu

Science Education (ESCI) 4430, Fall2007

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.

The only primary **textbooks** for the course are the Teachers' Editions of the commonly adopted middle school textbooks *Science Explorer: Earth Science* and *Science Explorer: Life Science*, published by Prentice-Hall, of which a classroom set is available in Room 215. The Earth Science book is also used in GEOL 4750/6750. Other text materials will be extensive and will consist of photocopied material drawn from a wide variety of sources, in accordance with accepted Educational Fair Use guidelines. A large (at least 2 inch) three-ring binder for them is highly advisable. For those who are interested in further detail, a library of the entire books from which these readings are drawn will be continuously built and maintained in Room 215 during the semester for reference and informal lending.

The **specific schedule** will be determined, week-to-week and day-to-day, based on the progress and input of the class, the occasional availability of field experience opportunities or guest instructors, coordination with GEOL 4750 or EDMS 5020 activities, and, in the case of several outdoor lab activities, the weather. Although the issues considered in this course are inherently interrelated, topics will be first introduced *approximately* in the order in which they are listed as objectives below, so this list can also be considered a crude topical outline for the course.

A **web site** for the course may be accessed at <http://djackson.myweb.uga.edu/ESCI4430.html> and will be continuously developed and revised during the semester. To allow for maximum flexibility/responsiveness in teaching approach and emphasis, daily updates listing [activities, readings, and assignments](#) will typically be posted within a few hours immediately *following* (only partially and tentatively before) each class. 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."

My available **office hours** are: most of the day on most Tuesdays and Thursdays; after class or after Geology class most Wednesdays and Fridays.

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 order to accommodate preferences in working styles and schedules, students may choose to prepare and submit these either alone or as groups of as many as three people. The most common assignments in the past have included, but those this semester may not be limited to:

- Incorporating basic science process skills into topical science lessons
- Curriculum "triage:" What to keep and what to toss
- Constructing traditional assessment items
- Adapting and planning for use of videos
- Reaction paper: Curriculum policy regarding health/sex/AIDS education
- Reaction paper: Teaching about biological evolution in light of possible perceived conflicts with students' religious ideas

Note: "Reaction paper" assignments are considered required, but (in order to encourage maximum frankness and freedom of expression) may be submitted anonymously or pseudonymously if desired.

Late work policy: A formal assignment will be penalized 10% for lateness if submitted after it has already 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

Grading Scale:

A = 90-100%
B = 80-89%
C = 70-79
D = 60-69%
F = <60%

Elements of Grade:

90% approximately 6 written and/or electronic-media-based assignments,
10% final exam* (time to be arranged, Dec. 12-16)

*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/or 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 30-

minute oral interview or a traditional 3-hour written exam be offered. The oral interview format is strongly suggested, has been customary for nearly all students in this course for many years, and may be scheduled at any mutually convenient time during the exam week (as with written exams, *not* earlier).

Attendance policy: Attendance and class participation are not in themselves a formal aspect of the course grade. My goal is to try to design class activities so that you feel that you are clearly missing something important if you are not present (both physically and mentally!). Polite but pointed inquiries will be made, however, about the reasons for repeated or habitual absence or lateness.

In accordance with the **University Honor Code and Academic Honesty Policy**, academic work must meet the standards contained in the UGA document *A Culture of Honesty*. Each student is responsible to inform themselves about those standards before performing any academic work. Details are available at <http://www.uga.edu/ovpi/honesty/acadhon.htm>.

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.

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

Basic Principles of Science Teaching

- Gather, prepare, and critically evaluate several "*hands-on, minds-on*" activities appropriate for middle school students in each of several major life and earth science topic areas typically included in specifications of middle grades science objectives.
- 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.

Science Curriculum and Assessment Issues

- Describe and critically apply various criteria for the design of the specific *scope and sequence* of the life science and earth science components of a curriculum framework for middle grades science, with reference to both current state and local objectives and recent U. S. national science standards documents.
- Select and construct *traditional assessment items* with the goal of achieving the best possible balance between authenticity, efficiency, validity, reliability, and fairness.
- Describe and apply selected 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:
 - *video* and electronic display technologies
 - computer-based *simulations* of natural phenomena, scientific problem solving, and science-technology-society issues
 - *internet-accessed data and communications*, e. g., World Wide Web scientific information resources and electronic-mail-mediated science projects

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
 - Policies regarding *Health/sex/AIDS education* as an aspect of science teaching and middle school curriculum
 - *Interactions between science and religion*, especially in regard to teaching the subject matter areas of astronomy, Earth history, and biological evolution

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! :->