

Science Education (ESCI) 4430/6000
Science Curriculum for the Middle Grades
Fall Semester, 2006
Mondays, Wednesdays, Fridays, 11:15-12:05
215 Aderhold Hall
corequisites: EDMS 5020; GEOL 4750/6750 or equivalent

Dr. David F. Jackson
Associate Professor
212 Aderhold Hall
djackson@uga.edu
(706) 542-4637

Official **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.

Relationship to **subsequent courses**: The Spring courses in the Science component of the Middle School program are Physical Science for Middle School Teachers (CHEM 1060 or ESCI 4000/6000) and ESCI 4440, which pays more detailed attention to Methods of science teaching rather than Curriculum (How to Teach it, versus this semester's What to Teach) and tries to use examples drawn primarily from Physical Science instead. Instructor assignments for these courses are not yet finalized, but they will be taught and I will most likely teach at least one of them.

A **web site** for the course will be continuously developed and regularly updated during the semester at <http://djackson.myweb.uga.edu/ESCI4430.html>

The **primary textbooks** for the course are the Teachers' Editions of the middle school texts *Science Explorer: Earth Science* and *Science Explorer: Life Science*, published by Prentice-Hall, of which classroom sets are available in Room 215. The Earth Science book is also used in GEOL 4750/6750. The publisher will not allow the Teachers Edition of the texts to be purchased by individuals independent of the K-12 adoption process. You may choose to purchase a student edition from the publisher or other source, but it has not been ordered at UGA Bookstores. **Other text materials** will be very extensive and will consist of photocopied or web-based material drawn from a wide variety of sources, in accordance with Educational Fair Use copyright guidelines. Dedicating a large (at least 2-inch) three-ring binder for them is highly advisable. A **resource 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 4750/6750 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 below, 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 area of the web site. In other words, as stated by official UGA policy, "the course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary."

In accordance with the **University Honor Code and Academic Honesty Policy**, academic work must meet the standards contained in *A Culture of Honesty* (http://www.uga.edu/ovpi/honesty/culture_honesty.htm). Each student is responsible for informing her or himself about those standards before performing any academic work.

My available **office hours** are: approximately 10:00-4:00 on most Tuesdays and Thursdays; and before or after class on most class days.

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 aspects and examples of **the history of science and of the nature of scientific knowledge and scientific inquiry** 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

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

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.

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 if you are not here (both physically and mentally!).

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.

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

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* (time to be arranged)

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

(Very) 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 significant evidence of original hard 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 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 (Dec. 8 and 11-14).

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 is invited to 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! :->