

# ESCI 4440

## Science Teaching Methods in the Middle Grades: Physical Science

Spring 2003

Professor: Lynn A. Bryan, Ph. D.  
Office: Aderhold 212G  
Phone: 542-1763 Fax: 542-1212  
E-mail: [lbryan@coe.uga.edu](mailto:lbryan@coe.uga.edu)  
Graduate Assistant: Ms. Blakely Tsurusaki  
E-mail: [btsurusa@coe.uga.edu](mailto:btsurusa@coe.uga.edu)

**Mondays: 11:15-12:05 in room 215**  
**Wednesdays: 10:10-12:05 in room 216**

### Introduction

Welcome to a semester of learning about middle school science! I have designed this course with the intention of providing you with opportunities to learn more about science teaching and learning and to construct a vision of yourself as a teacher of middle school science. Several broad questions guide this science methods course, including:

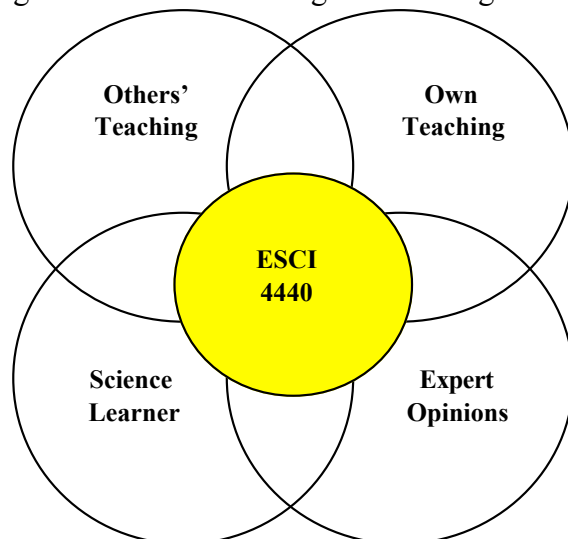
How do students come to understand ideas in science?

What classroom conditions facilitate students' science learning?

What do teachers need to know and do to create such conditions?

Through this course, I hope to facilitate your learning by providing opportunities for you to: (a) reflect on others' teaching via integrated media cases; (b) reflect on your own teaching experiences; (c) read, write about, and discuss issues concerning science teaching and learning; and (d) think about yourself as a science learner via science activities. The diagram below illustrates my conception of the orientation guiding the design of ESCI 4440.

Learning about science teaching and learning through reflection on:



## **Purposes**

The purposes of this course include helping you to:

- clarify and refine your beliefs about teaching and learning middle grades science;
- become aware of students' ideas in science and how those ideas influence their learning;
- learn, practice, and reflect upon teaching strategies that are commensurate with research on how middle grades students learn science;
- understand ways of assessing student learning in science;
- gain sensitivity to the needs of diverse learners in science; and
- begin developing your own repertoire of resources for teaching middle school science.

## **Course Outcomes**

By the end of this course, you should be able to:

- present and defend your beliefs about middle school science teaching and learning;
- determine ways of promoting "science for all" in your classroom;
- recognize characteristics of teaching science as inquiry;
- conduct a scientific investigation;
- ask questions to elicit students' ideas about science concepts;
- Assess and evaluate students beyond their factual understanding of science;
- use teaching strategies that encourage students' interest and learning in science;
- plan a unit of science instruction based on a model conceptual change teaching;
- plan a unit of science instruction that integrates at least one other subject area;
- critically reflect on your own and others' teaching, noting areas of strength as well as needed improvement.

## **Expectations**

Here are my expectations of you for the course, in addition to criteria that I consider when evaluating whether expectations have been met.

Participation:

- attends all class meetings on time
- demonstrates ability to actively contribute to group and class discussions
- actively engages in learning exercises

Critical thinking:

- class work and assignments demonstrate original thinking and *ideas go beyond what is described in class or in readings*
- shows evidence of ability to *synthesize* information from a variety of sources

Communication:

- communicates respectfully with others
- shows respect for others' ideas, especially those that may differ from your own
- timely communication with Dr. Bryan of concerns
- thoughtful dialogue that indicates learning is occurring

Motivated to learn:

- works diligently to increase knowledge and ability to teach science
- actively seeks information from a variety of resources
- demonstrates a lifelong learner mentality

Coursework effort:

- written assignments and projects indicate that care has been taken in their completion
- goes beyond *average expectations* of assignment
- work is free of misspellings and grammar mistakes
- work is turned in on time

Attendance and promptness:

- attends every class meeting
- arrives by the assigned starting time of the course and is prepared to begin

Preparation:

- prepares for teaching experiences through prior practice
- accounts for materials and understands the working of equipment prior to teaching situations

### **Attendance Policy**

Class participation is a vital component of this course. It is important that you arrive on time and are ready to begin.

The attendance policy for ESCI 4440 and CHEM 1060 are the same. You are expected to be present for every class meeting. Absences that may be *excused* include illness, death or illness in the family, jury duty, team participation for a UGA sponsored event, or a personal crisis.

Absences for other reasons may be excused at the discretion of the instructor. Absences may be considered *excused* only if you provide written documentation for the absence. I will not ask you for the documentation. It is your responsibility to bring it to me. All work missed during any absence must be made-up. It is the responsibility of the student to contact me regarding content missed in class.

Every unexcused absence will result in a reduction of the final course grade by 2%. Any student with more than three absences, whether excused or not, may be administratively withdrawn from the course. In the event of illness, accident, or other emergency when circumstances permit, you should make direct contact with Dr. Bryan, preferably before class takes place. If I cannot be reached in person or by phone, you should leave a message with the secretary in the Department of Science Education (542-1763). If you miss more than five classes--excused or unexcused--you may be withdrawn from the course.

### **Course Materials**

- various readings will be distributed in class or on reserve for you to copy
- materials for constructing an egg drop project, a science unit, and a portfolio

### **Course Topics**

We will attempt to cover the following topics in this course:

- Nature of science and science knowledge
- Diversity in the science classroom
- Criteria for science as inquiry
- Teacher and student questions about science
- Integrated science process skills
- Children's ideas and explanations in science/ alternative conceptions

- Assessing children's learning in science
- Approaches to teaching science
- Integrating science with other school subjects

### **Assignments and Grading**

Assignments are due at the beginning of class. Assignments not complete by the beginning of class will be considered late. Late assignments will receive a deduction of 10% (of total grade for that assignment) per day late. *Due dates are tentative.*

Written Assignments: You will be asked to complete various written assignments during the semester. These assignments may include: a science impressionist tale, reflections about readings, short reports, activity or demonstration write-ups, etc. (20% of total grade) *Due throughout the semester.*

Middle School Student Interviews: A critical component of science teaching is understanding your students' ideas before designing learning experiences for them. One way to assess their ideas is through interviews. In this assignment, you will design an interview about a science concept, interview two middle school students, transcribe, and analyze your interview. (20% of total grade) *Due February 17.*

Academic Community Service Project: As a new teacher, you will become part of a community in which you will likely serve others in a volunteer capacity. In order for you become familiar with some of the "extra" responsibilities of a teacher and to gain more experience with working with children in less formal settings, you will complete an academic community service project. (10% of total grade) *Due by March 14.*

Unit Plan: A significant task that you face as a teacher of middle school science is curriculum development. For this major course component, you will design and teach a science lesson (in pairs or individually) for middle school students using a conceptual change model framework. (25% of total grade) *Plan due April 17; Teach in schools during the week of April 21 (Note: may be a week earlier).*

Reflective Portfolio: For your final exam, you will construct a professional, reflective portfolio that represents what you have learned about middle grades science teaching and learning. The portfolio guidelines will be resonant with the National Science Teachers Association (NSTA) standards for the professional development of science teachers. The portfolio will be due on the day scheduled for our final exam. (25% of total grade) *Due by May 7.*

Your final grade will be calculated based on a percentage of total possible points: 90-100%=A; 80-89.9%=B; 70-79.9%=C; 60-69.9%=D. Keep in mind that you choose the quality of work that you submit. A's will be given to those products that exhibit **exemplary** qualities rather than simply completion of the assignment.

I will make every attempt to explain the expectations of each assignment, although it is your responsibility to ensure that you understand those expectations. Please communicate with me whenever you have questions.

**Academic honesty**

All 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. The policy holds you responsible for maintaining the highest standards of honesty and integrity. Penalties for academic dishonesty are severe and ignorance is not an acceptable defense. Academic dishonesty includes plagiarism, cheating, lying, tampering, stealing, receiving unauthorized or illegitimate assistance from any other person, or using any source of information that is not common knowledge. You should read the policy at:  
[http://www.uga.edu/ovpi/academic\\_honesty/culture\\_honesty.htm](http://www.uga.edu/ovpi/academic_honesty/culture_honesty.htm)

**Disability policy**

The University of Georgia is committed to providing equal educational opportunities for qualified students with disabilities in accordance with state and federal laws including the American Disabilities Act. Help for disabled students is available from the Disability Services/Learning Disabilities Center. More information is available at  
<http://www.uga.edu/stuact/handbook/stuaffairs/disability.html>

This syllabus is tentative and may be modified with notification as the semester progresses.

*I look forward to working with you this semester!*