

This syllabus will be negotiated on the first day of class and throughout the semester.

**FALL 2007, ESCI 4420
SCIENCE FOR EARLY CHILDHOOD EDUCATION**

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Course Description

Welcome to the course, Science Education for Early Childhood! This course is intended to provide you with opportunities to construct a vision of what elementary science teaching and learning can be like and to help you learn how to plan appropriate activities which fit within this vision. During the semester you will be involved in independent and group activities that will enable you to become a competent and confident teacher of science to elementary school age children.

Course Materials

The instructor will make available core readings from the journal literature and selected textbooks. You will be expected to read and critique relevant course articles. The following book is required:

Tippins, D.J., Koballa, T. R. & Payne, B.D. (2002). *Learning from cases: Unraveling the complexities of elementary science teaching*. Boston, MA: Allyn & Bacon.

Project Learning Tree Materials \$15
Miscellaneous materials and supplies
Two Large Binder Notebooks

Course Goals

The course will focus on possible solutions to questions like:

1. What is the nature of science and scientific knowledge?
2. What do teachers do when they teach science?
3. How can a teacher provide learning environments which will promote active learning, student responsibility and autonomy?
4. How can science be taught as part of an interdisciplinary/thematic/whole language unit using children's literature?
5. What can be done to encourage females and minorities in science?

6. How can a teacher or student assess learning with understanding?
7. What “tools” can assist a teacher in becoming a “reflective” practitioner and students in becoming “reflective” learners?
8. What resources are available for early childhood science educators?
9. How can science be integrated across the curriculum?
10. How can science be taught using outdoor learning environments?
11. What is meant by “culturally relevant” science teaching and learning?

Course Objectives

The objectives of this course are to develop:

- ◆ Positive attitudes towards science, science teaching and learning.
- ◆ Confidence and competence in designing teaching-learning activities needed to teach in an activity-centered or project-centered classroom.
- ◆ Awareness and knowledge of sources of current literature and contemporary issues in science education.
- ◆ Awareness of the multicultural dimensions of the classroom and what it means to teach “science for all” at the early childhood level.
- ◆ Tools to critically evaluate and reflect upon your own science teaching beliefs and practices.
- ◆ Understanding of ways to integrate science with other content areas.
- ◆ Familiarity with ways to use the outdoor learning environment as a context for science teaching.
- ◆ Understanding of constructivism as a referent for thinking about science teaching and learning.
- ◆ Awareness and knowledge of curricular options and curricular materials appropriate for science teaching at the early childhood level.
- ◆ Understanding of science inquiry as a way to motivate students and enhance their creativity.
- ◆ Understanding of how science teachers can use theory to improve their teaching effectiveness.
- ◆ Understanding of science processes skills.
- ◆ Understanding of the characteristics of teaching science as inquiry.
- ◆ Questioning skills to elicit students’ ideas about science concepts.

Expectations

I expect you to:

- ◆ Be an active participant in class discussions and activities
- ◆ Attend **all** course sessions
- ◆ Be **prompt** in attendance
- ◆ Read and reflect **critically** on assigned readings
- ◆ Locate and read additional materials related to elementary science teaching
- ◆ Demonstrate reflection through discussion and writing
- ◆ Share resources, readings and insights

- ◆ Collaborate with colleagues regarding learning
- ◆ Complete **all** assigned tasks to best of your ability
- ◆ Communicate expectations, frustrations and ideas
- ◆ Put as much into this course as you expect to get out of it!

Attendance

Class participation is a very important aspect of the course. If you do not attend class, you are unable to participate in the many activities that will be undertaken during class time. In this regard, you are responsible for attending **all** class sessions. Please arrive at class in a prompt and timely manner. Equally important is your advance preparation for each class. Before class please evaluate readings and/or assignments from the perspective of your own teaching and learning experiences. Your careful preparation and enthusiastic participation will contribute to the course. If it is necessary for you to miss a class due to an emergency, please make every effort to notify me in advance.

Academic Honesty

Instructors are committed to the principles of academic honesty and subscribe to the UGA Academic Honesty Policy guidelines for the definition and processes of academic integrity. All students are subject to these academic guidelines; Instructors have and will initiate academic dishonesty proceedings if in their courses they find reasonable cause to do so.

All students are encouraged to read and understand A Culture of Honesty (the UGA Academic Honesty Policy) found at http://www.uga.edu/ovpi/academic_honesty/culture_honesty.htm. Printed copies of A Culture of Honesty may also be obtained from the office of the University of Georgia Vice President for Academic Affairs or from the Independent and Distance Learning office in summary form. Students may talk with their instructors about academic honesty. E-mail and/or telephone contact information is available in this course guide and in the Independent and Distance Learning Student Handbook.

Evaluation/Grading

There are six graded projects to be considered as you evaluate your learning in this course. The quality of work submitted will reflect your personal standards of quality.... keep this in mind as you make judgements regarding the conditions of projects you submit. Detailed directions will be provided for each assignment along with performance criteria.

Assignments:

Science Autobiography	15 points
Case Reactions	30 points
Science in the News	5 points
Notebooks	10 points
Culturally Relevant Lesson	25 points
Field Experience Report	15 points

Total points	100 points
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I am looking forward to a very productive course in which we will all learn a great deal about elementary science teaching and learning!

Science Autobiography (15 points) - Due August 29th

**Science Autobiography
Grading Rubric**

In this assignment you are asked to reflect deeply on the question “where is science in my life?” You should consider your life history and identify meaningful experiences/encounters you have had with science. You will develop a creative way to display your science autobiography along with a one-page description of it.

(Examples: Develop a book; make a mobile; make a photoessay; create a diorama; make a mural, write a Reader’s Theater; develop an epic poem; write a collection of songs)

Science Autobiography	Points Possible
Shows evidence of deep reflection	3
Includes minimum of 5 examples	5
Creative organization/display	4
One-page Explanation of autobiography	3
Total Points Possible (15)	

Case Reactions (30 points)

During this course you will read a number of “cases” that address issues in science teaching and learning. Many of these cases were written by classroom teachers and/or science teacher educators. You should read **all** assigned cases. You will develop a written response for **two** of these cases. Your response should demonstrate insight and in-depth reflection. Your response should be two pages single spaced and typed. You should be prepared to contribute to class discussion of all cases. The two cases you will write responses are:

The Day the Lobster Died - Due September 5**El Secreto de Las Ninas - Due September 19****Case Reactions/Guidelines**

Classroom cases are problem-centered stories of teaching practice that are used to examine and clarify the complexities and connections in teaching practice. They are a particular type of narrative that be used to explicate and clarify the professional knowledge of teachers. In this course you will be reading selected cases written by teachers or teacher educators based on dilemmas they experienced teaching science at the elementary level. You will develop a written response reaction to selected cases. Your response/reaction should be two pages single-space in length. There is no “correct” response or reaction to these cases. Rather, this is an opportunity for you to clarify your own beliefs and biases and consider the case on relation to your personal experience as a teacher. You may want to comment on any of the following in your response:

- a. Your interpretation of the dilemmas/challenges presented in the case;
- b. Theories about science teaching and learning
- c. The solutions you recommend or your evaluation of solutions found in the case
- d. An explanation of why you think the solutions are viable or your justification of other solutions
- e. Your own experiences as a student, teacher or parent
- f. Common sense
- g. Any morals or lessons you think you can draw from your reading and interpretation of the case
- h. Experiences of friends, colleagues or relatives
- i. References to any components of the case itself.

Case Reaction Grading Rubric

The purpose of this assignment is for you to read and reflect on selected cases written by science teachers or teacher educators based on dilemmas they experienced teaching science at the elementary level. You will develop a two-page, single spaced reaction to selected cases. Reaction papers should be typed/word processed and will be graded using the rubric found below.

Component	Points
Catchy title for the case reaction	1
In-depth insight and reflection	4
Analysis from multiple perspectives	3

Should include at least six of the following elements: a. Your interpretation of the dilemmas/challenges presented in the case; b. theories about science teaching and learning. c. the solutions you recommend or your evaluation of the solutions found in the case; d. an explanation of why you think your solutions are viable or your justification of other solutions; e. your experiences as a student, teacher or parent; f. common sense g. any morals or lessons you think you can draw from your reading and interpretation of the case; h. experiences of friends, colleagues, or relations; i. References to any components of the case itself.	6
Typed and Submitted on Time	1
Total points possible (15)	

Science in the News (5 points)

Once during the semester you will locate and provide a brief report of a current news event featuring some aspect of science. As you share with the class you should:

- a) summarize the key ideas of the news report
- b) describe what surprised you about the news report
- c) discuss relevance of the ideas to our lives and to teaching

You should prepare an index card addressing these three points.

Science Notebooks (10 points): due December 5th

You should organize all course materials/handouts in notebooks. You may use any organizational scheme that you find useful. You may need some plastic sheet protectors for some items. You will probably need two notebooks or a very large notebook. The last section of your notebook should be: "Additional Science Teaching and Learning Ideas from the Field."

Science Notebook Rubric

Table of Contents	1
Logically organized	2
Comprehensive	2
Neatness	2
Includes "Ideas from the Field"	3
Points Possible (10)	

Field Experience Activities (15 points): Due October 31st.

You will conduct several science activities from the list provided. For one of the activities, you will write up what you learned from the experience following the rubric provided. Your paper should be 2 pages, single spaced and organized in 3 sections (a,b,c on your rubric).

FIELD EXPERIENCE GRADING RUBRIC

During your field experience you will select and carry out several activities from the list provided. You will prepare a field experience report for one of these activities, which should be signed by your supervising teacher. Your field experience report will be evaluated according to the criteria listed below.

OBJECTIVE	POINTS
Participation in an activity with primary focus of science (selected from list)	2
Typed, written report that includes the following information:	4
a. description of the nature of the science teaching/learning activity, including purpose and goals	4
b. in-depth reflective summary of what you learned about elementary science teaching/learning through this activity	4
c. describes implications of what was learned for future teaching	1
d. signature of supervising teacher	
TOTAL SCORE (15 points possible)	

Community Relevant Lesson

An important part of this course is the opportunity to consider what it means to teach science in a relevant way. You will use "memory banking" to explore an important practice in the community where you teach or expect to teach. For example, important practices might include peanut production (Albany, Georgia), the Twilight Bike Criterium (Athens, Georgia), Carpet Making (Dalton, Georgia), etc. Using the memory banking template below, you should interview several people in the community to learn more about the different dimensions of this practice. Once you have gained a deeper understanding of the practice you should create a narrative "story" about this practice. The final part of this assignment involves using what you have learned to develop a lesson plan that relates to this practice. The lesson plan should also relate to one of your Georgia Performance Standards for elementary or middle school science. If possible, you should "try out" your lesson during your field experience.

Memory Bank Template

Practice: _____

Educational Health	Economic	Environmental	Political	Religious	Social

ESCI 4420 Schedule

DATE	TOPIC	ASSIGNMENT
Wednesday, August 22	Course Overview Collecting Data Nature of Science - Science as a Puzzle Science Inquiry Process - Skills Georgia Performance Standards	
Wednesday, August 29 th	Constructivist Oceanography Discrepant Events	Science Autobiography Due
Wednesday, September 5 th	Constructivist Earth Science	Case Reaction Due: The Day the Lobster Died
Wednesday, September 12 th	Constructivist Life Science	

Wednesday, September 19 th	Constructivist Life Science	Case Reaction Due: El Secreto de las Ninas
Wednesday, September 26 th	Constructivist Life Science	
October 1 st - October 24 th	FIELD EXPERIENCE	
Wednesday, October 31 st	Project Learning Tree	Read: Who's Teaching Whom? Field Experience Activity Due
Wednesday, November 7 th	Constructivist Life Science Culturally Relevant Science Teaching	
Wednesday, November 14 th	Constructivist Physical Science Guiding/Productive Questions	Read: What is a good guiding question?
Wednesday, November 28 th	Constructivist Chemistry	Read: Talking Together About the Moon
Wednesday, December 5 th	Celebrating Our Science Learning Constructivist Chemistry	Science Notebooks Due

IMPORTANT DATES:

Labor Day: September 3rd
Last day of classes: December 6
Fall Break: October 25-26
Exams: December 10-14
Thanksgiving: November 21-23

SCIENCE IN THE NEWS

NAME	DATE
1) _____ 2) _____	August 29 th
1) _____ 2) _____	September 5 th
1) _____ 2) _____	September 12 th
1) _____ 2) _____	September 19 th
1) _____ 2) _____	September 26 th
1) _____ 2) _____	November 7 th
1) _____ 2) _____	November 14 th
1) _____ 2) _____	November 28 th
1) _____ 2) _____	December 5 th

Field Experiences for Science
ESCI 4420
Fall Semester, 2007
Deborah J. Tippins, Ph.D.

Welcome back to a new semester! You will have many opportunities to see and do elementary science teaching this spring in the context of your methods class and your school-based practica. A list of science activities and experiences for your school-based practica are described below. Your participation in one of the activities is required, and will be developed as a course assignment. The other activities and experiences are recommended-try to take an active role in any science activities that may arise.

Suggested experiences:

- Demonstrate a discrepant event (perhaps one you saw in class) and engage students in an activity designed to resolve cognitive dissonance;
- Teach an inquiry lesson that encourages students to be problem-solvers (i.e., such as the oil spill activity we will do in class);
- Have students do the “draw-a-scientists” activity and conduct mini-interviews to develop an understanding of how students perceive science;
- Teach a science lesson in which you use cooperative learning strategies (i.e., assigned roles) to organize the lesson and facilitate learning;
- Plan and implement a science lesson or series of lessons that start with the learners’ questions (i.e., What would you like to learn about rocks? How can we go about learning that?);
- Look closely at the types of questions students are asking about a science concept and record these questions for later analysis;
- Teach a science lesson that is designed to integrate science with other content areas (perhaps through literature, role play, mathematics, etc.);
- Interview teachers concerning their beliefs about the nature of science, science teaching and science learning.
- Develop and use a non-paper and pencil task for assessing student learning of a science concept;
- Observe/assist with the use of technology in science teaching;

- Select two diverse students (i.e., culturally, linguistically, academically) and get to know these students-write about and analyze the process by which you get to know these students, particularly in relation to students as science learners;
- Teach a science lesson which involves the use of living organisms-check with your teacher to make sure that the organisms you plan to use fall within the parameters of school, district, state and federal guidelines);
- Teach a science lesson which directly relates the science content to societal issues;
- Examine the QCC (Quality Core Curriculum) science objectives for the elementary grades;
- Participate in school-based science events (i.e., Family Science Night, Science Fairs, etc.).
- Observe and critique a peer as they teach a science lesson;
- Design an interactive science bulletin board or learning center.

Field Experience

Activity Report Form: (You do not need to use this actual form, but you should respond in depth to these four questions. Be sure to obtain the signature of your teacher).

You should prepare a two-page single-spaced report of your activity. The report should be organized into three sections as follows:

- A) Describe in detail the nature of the science teaching/learning activity you participated in during your field experience. Include the purpose/goal of the activity.
- B) Write a reflective summary of what you learned about elementary science teaching and learning through this activity.
- C) Briefly does the implications of what you learned for your future teaching.
- D) Signature of Supervising Teacher (please have your teacher sign the bottom of your report).

Name: _____

Signature of Supervising Teacher: _____