

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

FALL 2008, 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 books are required:

Louv, R. (2005). *Last child in the woods: Saving our children from nature-deficit disorder*. Chapel Hill: Algonquin Press.

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

Project Wild 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 is 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 continue 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_honestry.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 judgments regarding the conditions of projects you submit. Detailed directions will be provided for each assignment along with performance criteria.

Assignments

Science Autobiography	10 points
Last Child in the Woods: Discussion and Photo journal	25 points
Class participation/Case Discussions	15 points
Children's Thinking Interview Projects	25 points
Magic Book	15 points
Field Experience Report	10 points
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Total Points	100 points

Grading Scale

96-100 = A	72-75 = C
92-95 = A-	68-71 = C-
88-91 = B+	64-67 = D+
84-87 = B	60-63 = D
80-83 = B-	

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 (10 points):

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, both formal and informal. You will develop a creative way to display your science autobiography along with a one-page single spaced description of it.

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

Last Child in the Woods: Discussion and Photo Journal (25 points)

This book is organized into seven sections, with each section containing several chapters. As you read this book you should think about the issues and questions it raises for you, particularly as they relate to science teaching and learning. There are two parts to this assignment:

a) Photo Journal:

You will keep a Photo Journal corresponding to the seven sections of the book. Your Photo Journal should contain seven sections. In each section you should write an in-depth reflection about one or more of the issues/questions in the section. Each reflection should be supported with photos, your own personal drawings, or other visual representation.

b) Section discussion:

You will collaborate with peers to lead an interactive discussion of one section in the book. Your discussion should highlight key points in a creative way, and should engage peers in deep and critical reflection. You will have 15-20 minutes for your discussion. Your discussion should not exceed 20 minutes.

Class Participation and Case Discussions (15 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 should be prepared to contribute deep insights to class discussion of all cases.

What are cases?

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 can 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. There is no "correct" response or reaction to these cases. Rather each case is an opportunity for you to clarify your own beliefs and biases and consider the case in relation to your personal experience. You should reflect on the following kind of ideas in preparation for class discussion.

- 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

Children's Thinking Interview Project: (25 points)

The purpose of this project is for you to gain a deeper understanding of how young children make sense of their world, and in particular a selected science concept. You should select a science concept appropriate for the grade level in which you work and investigate students' understanding of it in depth. To gain insights into students' sense-making processes you will choose three children and conduct individual interviews with each about the same concept. You will share what you have learned in an assessment and commentary of at least three pages in length. Your paper should include the following:

°A description of the students in the class (e.g., age, gender, ability level, etc.) and a more specific description of the students you interviewed (including why you chose those students to interview).

PLEASE USE PSEUDONYMS WHEN WRITING ABOUT STUDENTS AND TEACHERS

°The list of questions you asked.

°A summary of students' responses to the questions.

°Your **analysis** of the trends you see in terms of students' ideas about the topic (e.g. in what ways are they the same ideas or different ideas).

°Your **assessment** of whether or not your questions were effective for tapping into students' ideas.

-Which questions were particularly useful for gaining insight into students' ideas? Why?

-Are there any questions you wish you would have asked?

°A commentary about what you learned by talking with students.

°Your analysis, assessment, and commentary should be at least 3 pages in length (double spaced, 12 point font, 1" margins). The entire paper should not exceed 5 pages.

TIPS:

- Make sure your interviews take place in a locale free from distractions.
- Build rapport with the student prior to your interview.
- Be sure to include some questions which are more open-ended; do not ask "yes" or "no" questions.
- Drawing paper, crayons & pencils can sometimes be useful (particularly with younger children) in eliciting their understanding.
- Keep a notebook handy to record students' comments and other relevant information. If possible, audio-record your interview.
- Keep your interview conversational in tone so that students do not feel uncomfortable.
- Select a concept that students have already learned about, are learning about now, or will learn about in the future. (Oceanography is a topic, not a concept. Within the topic of oceanography, for example, you might want to explore how students make sense of the ocean food chain).

(Light is a topic, not a concept. Within the topic of light, for example, you might want to explore students' understandings of reflection and refraction).

(Weather is a topic, not a concept, within the topic of weather, for example, you might want to explore students' understandings of the water cycle).

Magic Book: (15 points)

You will select a science topic you wish to learn about. You may want to select a topic that corresponds with the Georgia Performance Standards at the grade level you teach or hope to teach.

You should conduct research about the basic science concepts associated with this topic. Following directions provided in class, you will use this research to develop and illustrate your own magic book.

Field Experience Report (10 points):

During your field experience you are encouraged to 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 in the rubric.

ESCI 4420 SCHEDULE

DATE	TOPIC	ASSIGNMENT
Monday, August 18 th	Course Overview Collecting and Analyzing Data Georgia Performance Standards Nature of Science	
Monday, August 25 th .	Inquiry-based science teaching Overview of Process Skills	Science Autobiography due (share with class)
Monday, September 1 st	LABOR DAY HOLIDAY	
Monday, September 8 th	Constructivist Life Science: Animals Food Chains	Read: El Secreto de las Ninas Read: Section 1 – Last Child in the Woods
Monday, September 15 th	Constructivist Life Science: Plants Insects Asking Productive Questions	Magic Books Due Read: Section 2 – Last Child in the Woods
Monday, September 22 nd .	Constructivist Life Science: Ecology	
Monday, September 29 th	Constructivist Physical Science: Sound Electricity	Read: Who's Teaching Whom Read: Section 3 – Last Child in the Woods
Monday, October 6 th	Copnstructivist Physical Science: Shadows and Light Astronomy	

DATE	TOPIC	ASSIGNMENT
Monday, October 13 th .	Constructivist Earth Science: Rocks & Minerals Weather/Erosion Sand/Soil Landforms	Children's Thinking Interview Project Due
Monday, October 20 th .	Constructivist Earth Science: Oceanography – Camouflage Predator Prey	Read: the Day the Lobster Die Read: Section 4 Last Child in the Woods
Monday, October 27 th .	Socio-scientific issues Diversity in Science Teaching	Read: The Egyptian Mummy Read: Section 5 Last Child in the Woods
Monday, November 3 rd .	Health, Human Body Nutrition Genetics: Inherited & Learned Traits	Read: Section 6 Last Child in the Woods Field Report Due
Monday, November 10 th .	FIELD EXPERIENCE	
Monday, November 24 th .	Thanksgiving Holidays	
Monday, December 1 st .	Constructivist Chemistry: Physical and Chemical Change Atoms & Molecules	Last Child in the Woods Photo Journal Due
Monday, December 8 th .	Constructivist Chemistry: States of Matter	

IMPORTANT DATES

LABOR DAY: September 1st.

FALL BREAK: October 31st.

FULLTIME FIELD EXPERIENCE: November 10th

THANKSGIVING: November 21st.

Field Experiences for Science

ESCI 4420

Fall Semester 2008

Deborah J. Tippins, Ph.D.

Welcome back to a new semester! You will have many opportunities to see and do elementary science teaching this fall 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.

The Montillation of Traxoline

Traxoline is a new form of zionter.

It is montilled in Ceristanna.

Ceristannians gristerlate large amounts of fevon and then bracter it to montil traxoline. It is very important to learn about taxoline. It is one of our most lukized snezlaus.

Questions to Answer:

1. What is traxoline?
2. Where is montilled?
3. How is it made?
4. Why is taxoline important?

SCIENCE AUTOBIOGRAPHY RUBRIC

Science Autobiography	Points Possible
Shows evidence of deep reflection	2
Includes minimum of 5 examples	3
Creative organization/display	3
One-page single spaced explanation of autobiography	2
Total Points Possible (10)	

Last Child in the Woods Photo Journal Rubric

Part 1 Photo Journal

CRITERIA	POINTS AVAILABLE	POINTS EARNED	TEACHER COMMENTS
Thoughtfully organized into seven sections	3		
Evidence of reflection and critical connection To ideas/issues in the seven sections of Louv's book	4		
Supported with photos, drawings or other graphic illustration of your reflections	4		
Includes a journal introduction that explains your perception of the significance of this book to the course or a description of your own interest in or experience with nature-deficit disorder	2		
Includes a conclusion to explain and summarize what you have learned in reading Louv's book	2		

Part II Discussion

Criteria	Points available	Points Earned	Teacher Comments
Collaborate with peers to facilitate interactive discussion	3		
Key points of the section are highlighted in a creative way	4		
Activity engages peers	3		

Magic Book Rubric

Focus on a topic appropriate for elementary science	5 points
Incorporate key science ideas that are scientifically accurate	5 points
Neat/attractive appearance	5 points
Total Points Possible	15 points

Field Experience Grading Rubric

OBJECTIVE	POINTS
Participation in an activity with primary focus of science (selected from list)	1
Typed, written report that includes the following information: a. Description of the nature of the science teaching/learning activity, including purpose and goals b. In-depth reflective summary of what you learned about elementary science teaching/learning through this activity c. Describes implications of what was learned for future teaching d. Signature of supervising teacher	3 3 2 1
TOTAL SCORE (10 POINTS POSSIBLE)	

Children's Thinking Interview Project Rubric

Criteria	Points Available	Points Earned	Teacher Comments
Includes thorough description of students in the class and detailed description of three students interview	3		
Contains a list of probing questions that were asked to elicit students' understandings of a science concept	3		
Providing a summary of students' responses to the questions	3		
Includes an in depth <u>analysis</u> of the trends/patterns you see in terms of students' ideas about the topic	5		
Provides an assessment of the extent to which your questions were effective for tapping into students' ideas	5		
Includes a commentary about what you learned by talking with students.	5		
Double-spaced, 12 pt. font, includes a "catchy" title and is submitted on time	1		

Last Child in the Woods
Discussion Sign-Up Sheet

Monday, September 8 th	Section #1 The New Relationship Between Children and Nature	
Monday, September 15 th	Section #2 Why the Young (and the rest of us) Need Nature	
Monday, Sept. 29 th	Section #3 The Best of Intentions: Why Johnnie and Jeannie Don't Play Outside Anymore	
Monday, October 20 th	Section #4 The Nature – Child Reunion	
Monday, October 27 th	Section #5 The Jungle Blackboard	
Monday, November 3 rd .	Section #6 Wonder Land: Opening the Fourth Frontier	

*You will read and reflect on the last section (#7) on your own: To Be Amazed