



## SCIENCE - EARLY CHILDHOOD "With Georgia On Our Minds"

**ESCI 4420** 10:10 A - 12:05 P / RM 215-216  
Fall 2004  
[nthomson@coe.uga.edu](mailto:nthomson@coe.uga.edu)

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212 E Aderhold Hall  
706-542-4645  
Office Hours: Anytime & by Appointment

### COURSE DESCRIPTION

Welcome to our course, Science Education for Early Childhood! This course is intended to provide us with opportunities to construct a vision of what elementary science teaching and learning can be like, to help us learn how to plan appropriate activities which are consistent with this vision, and especially, for us to experience science as a wonderful way of learning about the world we live in. During the semester we will be involved in independent and group activities that will enable each of us to become a competent and confident teacher of science for pre-K and elementary age children.

### COURSE MATERIALS

During the semester, the instructor will make available selected articles (**SA**) for your reading.

#### REQUIRED TEXTS:

Victor, E. & Kellough, R. (2004). *Science K-8: an integrated approach*. Upper Saddle River, NJ: Pearson. ISBN: 2004 0-13-098881-2, (**VK**)

Tippins, D., Koballa, T., & Payne, B. (2002). *Learning from cases: Unraveling the complexities of elementary science teaching*. Boston: Allyn and Bacon. ISBN: 0-205-30588-1, **TKP**

Georgia's science curriculum. Available: <http://www.doe.k12.ga.us/index.asp>

### COURSE GOALS:

During the semester we will try to answer questions such as:

1. What is the nature of science and scientific ways of inquiry? And, how do these relate to a child learning science?
2. How can science be taught as part of an interdisciplinary/thematic/whole language unit using children's literature?
3. How can we teach science with "Georgia On Our Minds"?
4. What can we do to teach science for the diversity of learners we work with in our classrooms?
5. How can I become a reflective teacher of science?

In this course, my goals are to facilitate your learning by providing opportunities for you to: (1) reflect on others teaching science through other teacher's experiences; (2) reflect on your own teaching experiences; (3) read, write about, and discuss issues concerning science teaching and learning; and (4) think about yourself as a scientist through a variety of science activities. And, in science, remember there is no such thing as a wrong or silly question. Science thrives because questions are continuously asked.

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

Recognize characteristics of teaching science as inquiry.

Design science lessons that promote observation, description, explanation, and inference.

Utilize drawing, art, and literature as ways of knowing and doing science.  
 Conduct a scientific investigation and communicate your findings.  
 Ask questions to elicit students' ideas about science concepts.  
 Determine ways that provide equitable instruction in the classroom.  
 Use teaching strategies that encourage students' interest and learning in science  
 Plan a unit of science instruction that integrates at least one other subject area.  
 Critically reflect on your own and others teaching.  
 Evaluate science curriculum, instructional, and performance assessment materials.

## **COURSE EXPECTATIONS**

My expectations of you in our course include:

Participation:

Demonstrate ability to actively contribute to group and class discussions.  
 Actively engage in learning activities.

Critical thinking:

Class work and assignments demonstrate original thinking and ideas that go beyond what is described in class or in readings.

Show evidence of ability to synthesize information from a variety of sources

Communication:

Communicate respectfully with others.  
 Show respect for others' ideas, especially those that may differ from one's own.  
 Thoughtful dialogue that indicates learning is occurring.

Motivation to learn:

Work diligently to increase knowledge and ability to teach children science.  
 Actively seek information from a variety of resources.  
 Demonstrate a lifelong learner mentality.

Coursework:

Projects indicate that care has been taken in their completion.  
 Go beyond average expectations of assignment.  
 Work is free of misspellings and grammatical mistakes.  
 Work is turned in on time.

Attendance and promptness:

Attend every class meeting  
 Arrive by the assigned starting time of the course and are prepared to begin.

Preparation:

Prepare for teaching experiences through prior practice  
 Account for materials and understand the working of equipment prior to teaching situations

**Academic Honesty:** The University of Georgia's policies on academic honesty are strictly adhered to in this course. Please familiarize yourself with this policy in the undergraduate school bulletin or online: [http://www.uga.edu/ovpi/academic\\_honesty/culture\\_honesty.htm](http://www.uga.edu/ovpi/academic_honesty/culture_honesty.htm)

## **Cell Phones**

Prior to the beginning of each class, please remember to turn off your cell phone, or place it in the "vibrate" or "ringer off" mode.

## ASSINGMENTS AND GRADING

Reflective Journal: You will keep a reflective journal during the semester making at least one “case” entry per week. You may reflect on anything that you feel relevant to your experience in becoming a teacher. **(15 points)**

Case Study Responses: You will be reading and discussing several case studies that relate teaching science in an elementary school. You may write your own responses to any four of these cases. **(4 case responses @ 5 points each = 20 points)**

Science Photo Autobiography: You will put together a visual and text-based piece of work that reflects your science experiences from elementary school, middle/junior school, high school and college. **(10 points)**

Reading Children’s Science Literature: In order to promote integration of children’s science literature into the classroom learning environment you will select one story book to read to the class and create 3 questions for class discussion following your reading. You will also write and submit a short summary critique of the book explaining why you chose the book and what (science) concepts it teaches. You may work in pairs for this assignment. **(5 points)**

Portable Exploratory Center: One way to promote curiosity and science learning among children is through the use of exploratory activities. You will design a portable exploratory center to accompany instruction for your field experience. You will also write about the experience. **(20 points)**

Discrepant Event Lesson and Plan: A discrepant event is a demonstration or exercise in which the phenomenon of interest behaves in an unexpected manner. You will plan and present a discrepant lesson to the class. You may work in pairs for this assignment. **(5 points)**

Final Paper: For your final exam, you will synthesize in a final paper your ideas about elementary science teaching and learning. We will discuss at a later date how you wish to organize your paper. This paper will be due on the day scheduled for the final exam. **(15 points)**

Class Participation: An effective way to get the most out of this course is to share your ideas regarding the science education topics that are discussed. Your portion of the course grade will be determined after the last class meeting. **(5 points)**

Creative Product: Science teaching thrives because teachers are creative. You may work alone or in a group to create a product that you feel is just a great idea, lesson, activity, skit, etc. to be shared with and in the class. **(5 points)**

Your final grade will be calculated based on points:

90-100 = A; 80-89 = B; 70-79 = C; 60-69 = D.

Grading is criterion based.

Our course schedule for activities will be developed as we progress through the semester.

<b>COURSE SCHEDULE</b>
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**AUGUST**

- 19 H** How can we hear “The Star Spangled Banner”?  
 Course Overview: Introductions, Objectives, Expectations, and Discussion  
 “Finding Nemo” – Nemo’s First Day of School  
 “Fish Is Fish” by Leo Lionni  
 “Hard Times for These Times” by Charles Dickens: Sowing – “The One Thing Needful & Murdering the Innocents”  
 Ecology of a Cracker Childhood by Janisse Ray pp. 211-216 “Light”  
 Assumptions in the Nature of Science  
 Activities: Diffusion, Confusion, & Photons  
**VK** Read about Solutions (XIII, p. 443-444), Sound (I & II, p. 495), and Color (I p. 514-515).
- 24 T** Curriculum Materials Center, Rm. 207, Aderhold. (10:00-11:00 a.m.) Science Literature Exploratorium.  
**SA** “Why Science? What Science?” from: Harlen, W. (2001). Primary Science: Taking the Plunge. pp. 1-12. NY: Heinemann  
**SA** “Helping Children to Observe?” from: Harlen, W. (2001). Primary Science: Taking the Plunge. pp. 85-99. NY: Heinemann  
**VK** “Goals and Objectives for K-8 Science. pp. 19-31.  
**TKP** Case 5.1 Who Eats the Mango? by Janice Koch  
 Case 5.2 How Do You Grow Rice? By Lorie Hammond & Diana Charmbury  
 Video: Let Me See! Plants. & Student’s Alternate Conceptions about Plants (2<sup>nd</sup> Grade – Harvard Graduates - DVD)  
 Activities: **How does a plant grow?** (see **VK** “Plants” pp. 304-332).
- 26 H** **SA** “The Right Question at the Right Time” from: Harlen, W. (2001). Primary Science: Taking the Plunge. pp. 1-12. NY: Heinemann  
 Activities: Let’s look at Animals (see **VK** “Animals” pp. 354-399).  
**TKP** Case 2.2 Insects and Scientific Problem Solving Go Together by Carla Zembal-Saul  
 Case 9.1 The Day the Lobster Died. by Joe Riley
- 31 T** Heather’s “Private Universe; Minds of Our Own” (DVD)  
**TKP** Case 6.2 What is the Shape of a Star? by Molly Weinburgh  
 Activities: **Let’s Look at the Universe.** (see **VK** “The Universe” pp. 182-213).

**SEPTEMBER**

- 2 H** **Exploring Earth Science**  
**TKP** Case 6.1 Seasons Change and Conceptions Shift-But Not Always as Expected by John Settlage  
 Activities: Activities: Let’s Look at the Earth. (see **VK** “The Earth” pp. 214-251).

- 7 T **Exploring Earth Science**  
Activities:
- 9 H **Discrepant Event Activities**
- 14 T **SCHOOL VISITS: “MEET YOUR TEACHER DAY”**
- 16 H Understanding the Nature of Science and Sciencing. **VK** pp. 32 – 46.  
**Water, Weather, and Climate** (see **VK** “Water, Weather, and Climate” pp. 252-302).  
“Whale Rider” DVD  
Activities:
- 17 F **SCHOOL VISITS: 1/2-DAY OBSERVATION**
- 21 T **Georgia Museum of Natural History** Visit – Georgia’s Fauna and More.  
**TKP** Case 8.3 How Formal Should Informal Education Be? by Judith Sweeney
- 23 H **State Botanical of Georgia Garden** Visit – Muppets and Plants
- 24 F **SCHOOL VISITS: 1/2-DAY OBSERVATION**
- 28 T Strategies for Helping Children Learn **VK** pp. 66-97.  
**TKP** Case 8.1 *El Secreto de las Ninas* by Cynthia, Jessica, and Angela Calabrese Barton  
**Exploring Ecology**  
Video: The Lorax  
Remnants of a Forest  
Activities:
- 30 H Planning the Instruction **VK** pp. 118-145.  
**Investigating Environmental Science**  
“Rabbit Proof Fence” DVD  
Activities:

**OCTOBER**

- 1 F **SCHOOL VISITS: 1/2-DAY OBSERVATION**
- 5 T Assessing and Reporting Student Achievement **VK** pp. 146-178.  
**Neither Plant nor Animal** (see **VK** “Neither Plant nor Animal” pp. 434-453).  
**TKP** Case 6.4 And God Made the Little Birdies, Too. by Andrew Paolucci  
Activities:

7 H **Changes in Matter and Energy** (see VK "Changes in Matter and Energy" pp. 434-453).

Activities:

**OCT 11 - NOV 5 --- FULL TIME SCHOOLS: 7:30 – 3:30 PM.  
MIDTERM – OCTOBER 12  
(THU, OCT 28 – FRI, OCT 29 FALL BREAK)**

## NOVEMBER

9 T Reflections and discussion on teaching science in the elementary school.  
**Friction and Machines** (see VK "Friction and Machines" pp. 454-473).  
Activities:

11 H **Heat, Fire, and Fuels** (see VK "Heat, Fire, and Fuels" pp. 474-493).  
Activities:

16 T **Sound** (see VK "Sound" pp. 494-505).  
Activities:

18 H **The Electromagnetic Spectrum** (see VK "Light" pp. 506-519).  
Activities:

22 T **Light**  
TKP Case 5.4 Constructivism: Time for a Reality Check by Ellen van den Berg  
Activities:

**25 H NO CLASS - HOLIDAY – THANKSGIVING RECESS**

30 T **Magnetism** (see VK "Magnetism and Electricity" pp. 520-545).  
Activities:

## DECEMBER

2 H **Electricity**  
Activities:

7 T **NO CLASS – UNIVERSITY FRIDAY CLASS SCHEDULE**

9 H **Elementary Education in Other Countries**  
Activities:

10 F **READING DAY**

**14 T EXAMINATION FINAL NOON – 3:00 – 6:00 PM / RM 215 ADERHOLD HALL**

**ESCI 4420 Early Childhood Science Education  
Field Experience Project  
Fall 2004**

Dr. Norman Thomson, nthomson@coe.uga.edu , 542- 4645, 212I Aderhold Hall

From your field experience(s), I would like you to write an open case such as one found in the our book “Learning from Cases” (Tippins, et. al.2002). It should be based on your field experiences, preferably in the context of teaching and/or learning science, in the early childhood levels. Your case will be anonymously submitted to an elementary school teacher for follow-up commentary or response to your case and returned to you.

In constructing and writing your case you should include the following:

1. Create a catchy or clever title.
2. Write an abstract summarizing your case.
3. Develop a dilemma written as a story in which you provide a rich and reflective description of the context (grade level, people involved (pseudo-names should be used), the dilemma[s] (event, problem, topic, issue, etc.), quotes or a constructed dialogue, thoughts and feelings of individuals involved,

Do not include a solution, outcomes, morals or in your case. Rather, you might like to pose questions you would like the reader to consider as a result of reading your case.

Some ideas for you case may reflect questions that you posed at the beginning of the semester and, are most likely, shared by others. It may be related to the teaching/learning/assessment of particular concepts or processes in science, or how can one integrate science into a curriculum that emphasizes mathematics and literacy. It might focus on a classroom social dilemma that includes multicultural and multilingual (ESOL) children. It might include parents, other teachers, or issues of classroom management. The choice is yours and there is no correct way to write an open case. It may represent a compilation of problems and not be anyone incident. Remember it is your story.

4. Write some Questions for Reflection and Discussion.

Your case should be about 3-5 pages typed double space.