EED 435.01, .02, & .03 Science in the Elementary School
Course Number is a required course for EC—6 & 4—8 Science Certification

College of Education

Department of Curriculum & Instruction
Spring 2008

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Dr. Hammer's Daily Schedule & Office Hours

Monday	Tuesday	Wednesday	Thursday	Friday
EED 435.03 9:00 a.m. – 11:00 a.m. Room 271 TEC	EED 435.01 9:00 a.m. – 11:00 a.m. Room 271 TEC	EED 435.03 9:00 a.m. – 11:00 a.m. Room 271 TEC	EED 435.01 9:00 a.m. – 11:00 a.m. Room 271 TEC	Research &Writing 
Office Hours @ SHSU 11:00 – 1:00	EED 435.02 11:00 a.m. - 1:00 p.m. Room 271 TEC	Office Hours @ SHSU 11:00 – 1:00	EED 435.02 11:00 a.m. - 1:00 p.m. Room 271 TEC	Research & Writing 
Lunch 1:00 – 2:00	Lunch 1:00 – 2:00	Lunch 1:00 - 2:00	Lunch 1:00- 2:00	Research & Writing 
Faculty & Committee Meetings 2:00	Office Hours @ SHSU 2:00 – 4:00	EED 374.0 2:00 p.m.– 3:20 Room 342 TEC	Office Hours @ SHSU 2:00 – 4:00	EED 374.0 2:00 p.m. – 3:20 Room 342 TEC
▼ ▼ ▼				Research & Writing 

A REDESIGN OF SCHOOL
Factory Model vs. Information Age Model

"We need a complete re-design of the way we teach our children. This means we cannot begin with the system we now have. When Edison invented electric illumination, he didn't tinker with candles to make them burn better. Instead he created something brilliantly new: the light bulb.

Chris Whittle
Chairman, Whittle Communications, Tennessee

TEXT/READINGS: *(No textbook is required for this course.)*

Science TEKS Charts – Available from your professor

Project Learning Tree (11th edition) American Forest Foundation. Available at a later date from professor. This professional development event is mandatory.

COURSE DESCRIPTION

This unique classroom and field-based experience is designed to acquaint the pre-service elementary teacher with a variety of instructional principles and practices for engaging children in the learning of relevant science concepts and skills. This course is intended to help you develop the knowledge, attitudes, and skills required for you, as a new teacher, to effectively nurture children's curiosity and guide them in exploring and learning about the fascinating world around them.

The nature of science as a discipline and the scope and sequence of appropriate content for each grade level will be explored. Active involvement in class projects and assignments will enable you to develop an understanding of curriculum, instructional methods and materials, and evaluation techniques for elementary science based upon educational research, contemporary practice, and state and national standards for science education. You will have opportunities to demonstrate your knowledge, attitudes, and skills both in class with your peers and with elementary students during your field placement. Personal reflection on class experiences and your learning is an expected component of your participation in this course.

The intent of this course is to immerse pre-service teachers in the culture and context of the elementary/middle school with the idea that both confidence and competence in science teaching is key. The role of the pre-service teacher throughout this experience is that of a learner and a teacher. The pre-service teacher works collaboratively with practicing EC-4 or 4-8 teachers.

IDEA Objectives:

Essential Objectives:

- Acquiring skills in working with others as a member of a team.
- Developing specific skills, competencies, and points of view needed by professionals in the field most closely related to this course (science education).

COURSE PHILOSOPHY & CONCEPTUAL FRAMEWORK

Science Education is committed to the college's "Conceptual Framework for Teacher Preparation" because of its far-reaching effects in promoting science literacy. The desired attitudes, knowledge, and skills that form the objectives of its courses are best developed through extensive interactions among faculty, pre-service teachers, practicing teachers, administrators, colleagues, business/industry personnel, scientists, curators of museum, and governmental agents. Students are made aware of this collaboration by living it and reflecting on its worth in enhancing their learning and the role they should play as Science Education leaders.

Standards Matrix:

Objectives/Learning Outcomes	**Activities *Indicate Field Based**	**Performance Assessment**	**Standards: State PPR NAEYC NSTA/NSES**
• Identify and explain the significance of the Texas Essential Knowledge and Skills (TEKS) and of prerequisite knowledge and skills in determining instructional goals and objectives. • Interpret and analyze historic events and documents instrumental in the development	• Students will examine documents such as: *Science for All Americans* • *Project 2061* • *National Science Education Standards* • *Texas Essential Knowledge & Skills for Science* to get a big picture of the History of Science Education (Where have we been? Where are we now? And	Discussions and presentations using the collaborative Jigsaw Technique	PPR: 003, 007, 008 NAEYC: 5

of science curriculum. • Become continuous, collaborative learners who demonstrate knowledgeable, reflective, and critical perspectives on their work, making informed decisions that integrate knowledge from a variety of sources. • Advocate for sound educational practices.	Where are we going?) Students will read about and exam U.S. science programs of the past and present. • "Alphabet Soup" Programs • SAPA • SCIS • ESS • FOSS • Nature of Science, Science as Inquiry, and What it means to be scientifically literate (Power Points.)		
• Compare & Contrast components of science instruction in order to formulate appropriate lessons. • Investigate different instructional strategies.	Preparing for Inquiry Instruction Managing the science classroom: • Lab safety • Cooperative grouping • Assigning lab jobs and responsibilities • Handling equipment	Performance Lab Activity Sheets	PPR: 003, 007, 008 NAEYC: 1a, 1b, 1c, 2c, 4a, 4b, 4c, 4d ACEI: 2c, 5a, 5c TExES: 020, 021, 022, 023 NSTA: 1, 8
• Design and plan science-centered, thematic, inquiry-based, hands-on science lessons. • Examine examples of	Preparing for Inquiry Instruction & Processes of Science Virtual classroom visits through videotaped case studies, In-class, hands-on mini-labs	1. Performance Lab Activity and Lab Sheets 2. Participation in discussions of case studies	PPR 003, 007, 008 NAEYC: 1a, 1b, 1c, 2c, 4a, 4b, 4c, 4d TExES: 020, 021, 022, 023 ACEI: 2c, 3e NSTA: 1, 3, 5, 6, 9

different instructional strategies. • Construct meaningful curriculum • Investigate and use developmentally effective approaches	• Unknown Substances • Using a Microscope • Electro Magnets • Squawking Cups • Packing a Liquid Punch • Classification Bags		
• Design a scope and sequence based on state mandates (TEKS) for a grade level for one school year. • Allocate time appropriately within lessons and units, and yearly plans including providing adequate opportunities for students to engage in reflection, self-assessment, and closure. • Illustrate the connection between various components of the Texas statewide assessment program, the TEKS, and instruction • Apply	Planning Scope & Sequence through "jig-sawing" activity. Students portray a school faculty—each assigned to a grade level. They then form vertical teams between 3 or 4 school teams. The teachers of the pseudo-schools form grade level teams and look at the TEKS. They then return to their school-the expert-for a grade level and share the information. Use TEKS charts to discover the spiraling/overlap-ping quality of the Texas Essential Knowledge & Skills and the importance of each grade level doing its share.	Performance & professional-looking document (Product) using technology capabilities. Rubric-analytic rating scale	PPR: 003, 007, 008, 009, 012 NAEYC: 1a, 1b, 1c, 2c, 4a, 4b, 4c, 4d TExES: 020, 022, 023 ACEI: 1, 2c NSTA: 6, 10

developmental -ly effective approaches			
• Display evidence of accurate qualitative and quantitative observations. • Maintains data collection over extended period of time. • Data presented in an organized fashion • Relates personal experience to applications to the classroom; correlation with TEKS, and management issues with children.	Teaching Science through Inquiry Long Term Thematic Observations (Change over time) Activities: Metamorphosis of Mealworms, Phases of the Moon, or Wisconsin Fast Plants™	Product Performance Rubric	PPR: 003, 007, 008 NAEYC TExES: 020, 022, 023 ACEI: 2c NSTA: 1, 3, 5, 6, 9
Create your science eyes—a portal into the world of science—that will engage and motivate your students. During your field experience, you must look for science happening in your assigned building, record what you see (or don't see) and take photographs.	*Assessment Science Eyes Reflective Paper *Project Learning Tree" – Professional Development with the Texas Forest Dept. Students attend five interdisciplinary training sessions in the great outdoors. They receive six hours of professional development credit and walk away with a PLT Activity Guide that	Reflective Paper & Science Eyes Glasses (Product) Rubric for paper Performance (students actively participate (go through the paces) in five sessions.	PPR: 003, 007, 008, 010, 012 NAEYC: 5 TExES: 020, 021, 022, 023 NSTA

	can only be obtained by attending the all day professional development program.		
• Create lessons and structure units so that activities progress in a logical sequence and support stated instructional goals. • Plan a science-centered thematic unit utilizing applicable science knowledge, skills, and assessment. • Discern the value of integrated lessons. • Prioritize and allocate time appropriately within lessons and units, including providing adequate opportunities for students to engage in reflection, self-assessment, and closure. • Utilize developmental-ly effective approaches	Planning Creating a Science Unit from the Scope & Sequence document created earlier. Creating Lesson Plans from the science unit. Students are to produce professional-looking documents using technology to their fullest capacity.	Rubric Product	PPR: 003, 007, 008, 009 NAEYC: 1a, 1b, 1c, 2c, 4a, 4b, 4c, 4d TExES: 020, 021, 022, 023

COURSE FORMAT:
During the weekly classes, students will be involved in lecture or narrative presentations, small group discussions, virtual classroom visits through videotaped case studies, hands-on science activities (individual, paired, cooperative groups), inquiry activities, peer teaching, review of instructional resources, reflective journaling, lesson planning, supplemental professional development opportunities, etc. The field component of the course involves the student working with one or more mentor teachers at an assigned public school campus at a grade level corresponding with student's certification goals. See the schedule in your method's student's manual. The first part of your semester will be spent in the EED classroom. After that there will be a blending of EED classes with field experience leading to total field experience for a period of time. A blending once again will occur leading to full time EED classes at the end.

TExES EC-4 Generalist Standards for Science:

You will practice teaching using a constructivist curriculum designed to provide successful learning experiences for all the children. Through this actual classroom teaching experience, you will be practicing concepts from standards on the Pedagogy and Professional Responsibilities Standards (PPR) with particular emphasis on **planning and designing instruction**, **instructional strategies**, **informal and formal assessment, and managing the classroom environment.** The class is also designed to address the following science standards from the EC - 4 Generalist & 4-8 Science Standards:

The EC-4 and 4-8 science teacher

- manages classroom field, and laboratory activities to ensure the safety of all students and the ethical care and treatment of organisms and specimens,
- understands the process of scientific inquiry and its role in science instruction,
- has theoretical and practical knowledge about teaching science and about how students learn,
- knows the varied and appropriate assessments and assessment practices to monitor science learning,
- understands the history and nature of science,
- how science effects the daily lives of students and how science interacts with and influences personal and societal decisions,
- knows and understands the science content appropriate to teach the statewide science framework (TEKS) in **physical, life, earth, and space science;** and,
- knows the unifying concepts and processes common to all sciences – **nature of science**, **constancy and change**, **systems**, and **properties, patterns, & models**.

COURSE GOALS

The Science Methods course is designed to . . .

1. Prepare prospective EC – 4 elementary teachers and/or 4-8 teachers to draw on a rich knowledge of **science content** and **pedagogy** in order to provide worthwhile and meaningful learning experiences for all children.
2. Develop pedagogical practices of prospective elementary teachers to create learner-centered classroom communities that emphasize the importance of science and technology in our everyday lives.
3. Nurture the role of the elementary teacher as a reflective practitioner who is dedicated to student achievement, professional growth, and the process of life-long learning.
4. Gain insights into various teaching methods that facilitate the science learning process.
5. Acquire practical experience through observation, reflection, and participation in an authentic school setting.

COURSE OBJECTIVES:

Students in this course will meet the following objectives, which are supported by NCATE guidelines and the science teacher competencies. The preservice teacher will . . .

1 Become familiar with local, state, and nationally developed standards and tools that describe and enhance the teaching of science.
2. Establish practical methods of managing science instruction.
3. Experience and develop hands-on/minds-on science lessons.
4. Become familiar with basic laboratory and instructional materials, equipment, and technology used in life, earth, and physical sciences and know how to use these resources effectively and appropriately.
5. Understand safety issues and procedures related to classroom science materials, equipment, and activities.
6. Understand process skills used to gather and organize data in science and apply this knowledge to explore and describe objects, organisms, and events in the environment.

GRADING POLICY (NOTE: A minimum of 50% of the grade for this class is based on field experience related activities. Please check your Common Syllabus for this information)

The correlation between total points and letter grades for the course appears below:

Please Note: Students receiving a grade less than "C" either cumulatively or in field-based activities, will either not be recommended for student teaching or will be offered a professional growth plan that must be completed during student teaching.

Assignments (Non-field-based)	Point Value
Scope & Sequence	50
Science Unit	60
Presentation of Science Unit	20
Science Notebook Cover Design	30
Create “Science “Eyes”	30
Long-term Observation of “Change over Time”	50
In class team participation activities such as labs, quizzes, presentations…	60
Total	300

Assignments (Field Based)	Point Value
Science Lesson Plan Taught and observed during Field Experience	50
Science Eyes Paper	50
Project Learning Tree Professional Development & Reflection	50
Total	150

Pedagogy & Professional Responsibilities Portfolio	150
Total	150

Assignment Descriptions

Non-Field Based:

SCOPE & SEQUENCE Description: Students will select an appropriate grade level for their certification goal and plan a science scope & sequence for a “school year.” using the Texas Essential Knowledge & Skills (TEKS) for science. The plan will indicate the scope of science to be taught and the sequence in which concepts will be taught. The Scope & Sequence is a “big picture” document in planning. An assessment rubric will be used.

INTERDISCIPLINARY SCIENCE UNIT Description: You and your team members will work together this semester to create an exciting EC – 4^{th} or 4 – 8^{th} grade science unit. The unit will be submitted in two formats: a polished hard copy and an electronic version (CD or web-based). The unit showcases how you and your team were able to identify a target science TEKS and develop a set of

five learning experiences (activities) that help students attain a more complete understanding of that target TEKS. The five learning experiences (written in the Five E Instructional Model Lesson Plan Format) will be directly tied to a Final Learning Product and assessment rubric.: You and your team members will work together this semester to create an exciting EC – 4th or 4 – 8th grade science unit. The unit will be submitted in two formats: a polished hard copy and an electronic version (CD or web-based). The unit showcases how you and your team were able to identify a target science TEKS and develop a set of five learning experiences (activities) that help students attain a more complete understanding of that target TEKS. The five learning experiences (written in the Five E Instructional Model Lesson Plan Format) will be directly tied to a Final Learning Product and assessment rubric.

SCIENCE JOURNAL Description: You will decorate a 3-ring notebook based on the theme "Science in My World." As part of your Methods Block, you will be required to keep a reflective journal of your classroom experiences. You should also record random thoughts that occur from time to time crystallizing your own views on educational issues.

SCIENCE EYES: Using various creative materials, students will develop their own science eyes as a figurative portal into the world of science for them and their students.

LONG-TERM OBSERVATION: Students will be expected to observe and document long-term observations of "Change over Time" such as mealworm metamorphosis, plant cycles, or moon phases.

IN CLASS ACTIVITIES: Students are expected to participate in class labs, presentations, quizzes, etc. that teach grouping practices, inquiry learning, process skills, lab management, and lab safety.

Field Based

SCIENCE LESSON PLAN: Student is expected to design, plan, and teach an inquiry based, hands-on science lesson in a cooperative group setting during field experience.

SCIENCE EYES PAPER: During the first four weeks of field experience, you will observe the amount and quality of science instruction on your school site. Reflect on the opportunities and possibilities for science teaching and learning on your field-site campus. This reflective essay should include photographs of science laboratories, classroom science corners, students doing investigations, outdoor gardens, etc. Write about what you observe. Is science happening in your classroom or school building?

PROJECT LEARNING TREE PROFESSIONAL DEVELOPMENT WORKSHOP & REFLECTION PAPER: Students are expected to attend an all-day, outdoor, interdisciplinary professional development workshop and write a reflection of the event. Prompts will be provided for the student. Professors will arrange for the workshop.

Expectations:

- Complete assigned readings prior to discussion of topics in class.
- Actively participate in all class activities and discussion.
- Turn in assignments and be prepared for presentations on the **due date**.
- Access the Internet and possess skills to use it.
- Check your e-mail and Blackboard for the course daily.
- Use a word processor to complete written assignments unless instructed otherwise. Use an easy to read font, no smaller than 12 point. Remember to use spell-check and grammar-check features and proofread your work.
- Ask questions if you are confused.
- Talk to your instructor if something is bothering you.
- Learn as much as you can.
- Have fun.

WRITING CENTER

Sam Houston Writing Center, located in Wilson 114, is open from 8 a.m. until 7 p.m. Monday-Thursday, 8 a.m. until 3 p.m. Friday, and 2 p.m. until 7 p.m. Sunday. Writing tutors will work with you one-on-one to help you generate, organize, or revise a draft of any assignment. Please drop by or call 936-294-3680 to schedule an appointment.

RECOMMENDED TEXTBOOKS/RESOURCES

American Association for the Advancement of Science. (1993). *Benchmarks for science literacy*. New York. Oxford University Press. ISBN #0-19-58986.

Project Learning Tree (11th edition) America Forest Foundation. Available at a later date from professor.

Science TEKS Charts – Available from your professor

Ostlund, K., & Mercier, S. (1996*). Rising to the challenge of the National Science Education Standards: The processes of science inquiry*. Primary or Elementary Edition. S&K Associates.[1]
http://www.sciencesbookreview.com/Rising_to_the_Challenge_of_the_National_Science_Education_Standards_The_Processes_of_Science_Inquiry_0965876802.html

Nath, J. & Ramsey, J. (2004). *Preparing for the Texas PreK-4 Teacher Certification: A guide to the comprehensive TExES content areas exam*. Pearson Education, Inc.

National Research Council. (1996). National science education standards. NSTA. http://www.nap.edu/readingroom/books/nses/html/

National Science Teachers Association. (1997). *Pathways to the standards: Elementary school edition.* Lowery, L. (Ed.) NSTA. ISBN #0-87355-161.

RECOMMENDED SCIENCE EDUCATION WEBSITES

Texas Council of Elementary Science	http://statweb.org/TCES/
National Science Foundation	http://stis.nsf.gov/start.htm
National Science Teachers Association	www.nsta.org
Science Framework Toolkit	http://tenet.edu/teks/science
Texas Education Agency	http://tea.state.tx

[1] Highly Recommended Resource