COURSE OUTLINE FOR EDUC 5373
Essentials of Science
Spring 2017

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Text: Incredible Edible Science by Red leaf Press

This is a Service-Learning Class

**COURSE DESCRIPTION:** Analysis of current goals and instructional strategies utilized in teaching Elementary Science. Methods of teaching scientific attitudes and processes as well as specific scientific concepts and principles.

**GENERAL OBJECTIVES:** As a result of having had this course you should be able to:

1. Discuss the importance of science in the elementary school curriculum.
2. Describe what is meant by “learning through guided inquiry/discovery.”
3. Identify and define various process skills within the science curriculum.
4. Identify particular problems involved in teaching elementary science.
5. Be cognizant of science activities, which provide practice in the various process skills.
6. Identify current developments in the science curriculum through extensive readings.
7. Demonstrate comprehension of content through oral and/or written evaluations as related to both inside and outside class assignments.

**Generalist EC-6 TExES Competencies for class**

**Competency 029 (Students as Learners and Science Instruction)**
The teacher has theoretical and practical knowledge about teaching science and about how students learn science.
The beginning teacher:
A. Understands how developmental characteristics, prior knowledge and experience, and students’ attitudes influence science learning
B. Selects and adapts science curricula, content, instructional materials, collaborations, vocabulary, and activities to meet the levels of interest, knowledge, and understanding as well as the abilities, experiences, and needs of all students, including English-language learners
C. Understands how to use situations from students’ daily lives to develop instructional materials that investigate how science can be used to make informed decisions
D. Understands common misconceptions in science and has effective ways to address those misconceptions
E. Understands developmentally appropriate design and implementation of hands-on learning experiences in science and selects effective, appropriate instructional practices, activities,
technologies, and materials to promote students’ scientific knowledge, skills, and inquiry processes

F. Understands questioning strategies designed to elicit higher-level thinking and how to use them to move students from concrete to more abstract understanding

G. Understands the importance of the planning of activities that are inclusive and that accommodate the needs of all students

H. Understands how to sequence learning activities in a way that enables students to build on their prior knowledge and that challenges them to expand their understanding of science

**Competency 026 (History and Nature of Science)**

The teacher understands the history and nature of science, the process and role of scientific inquiry, and the role of inquiry in science instruction.

The beginning teacher:

A. Understands, plans, designs and implements instruction that provides opportunities for all students to engage in non-experimental- and experimental-inquiry investigations

B. Focuses inquiry-based instruction on questions and issues relevant to students and uses strategies to assist students with generating, refining, and focusing scientific questions and hypotheses

C. Understands and instructs students in the safe and proper use of a variety of grade-appropriate tools, equipment, resources, technology, and techniques to access, gather, store, retrieve, organize, and analyze data

D. Knows how to guide students in making systematic observations and measurements and posing questions to guide investigations

E. Knows how to promote the use of critical-thinking skills, logical reasoning, and scientific problem solving to reach conclusions based on evidence

F. Knows how to teach students to develop, analyze, and evaluate different explanations for a given scientific result including that repeated investigations may increase reliability

G. Knows how to teach students to demonstrate an understanding of potential sources of error in inquiry-based investigation

H. Knows how to teach students to demonstrate an understanding of how to communicate and defend the results of an inquiry-based investigation

I. Understands principles of scientific ethics

J. Understands the roles that logical reasoning, verifiable evidence, prediction, and peer review play in the process of generating and evaluating scientific knowledge
TOPICS TO BE DISCUSSED:

1. Historical Perspectives and State of Art of Science Education/A Vision for Science Teaching
2. Science and the TEKS connection
3. Process Skills of Science
4. Use of Discrepant Events
5. Teaching Science Through Guided Discovery/Inquiry
6. Classroom Management & Cooperative Learning
7. Activities Integrating Math & Science: Connecting Science with other subjects particularly Math and Music

COURSE REQUIREMENTS:

- Complete Assigned Readings – Read text chapters and handouts in order to contribute to class lectures/discussions.
- Major Exam – will be at the end of the course. Material for the exam will be taken from class activities, assigned readings, handouts, etc.
- Select one lesson from chapter four of our text and present it to class.
- Working in groups, share one science lesson provided by your professor in the area of earth, life, or physical science.
- Present a lesson for the GEMS Museum.
- Create or locate one creative earth day lesson.
- Collect 3 discrepant events. Present one of them to the class.
- Collect 5 process skill activities from Chapter 3 of our textbook or another source. These activities should be for providing practice in 5 of the 6 following process skills: classification, communication, observation, measurement, inferring and prediction. Share one of the process skill activities that you selected from chapter 3 of our textbook.
- Collect 3 science songs and share your favorite with the class.
- Develop three 5E model lessons with each one centering on a specific science TEK/STAAR objective.
- Keep a journal and write on designated topics.

During the semester, various changes such as deletions and/or additions may be made in the course requirements if deemed necessary.

Some class time will be provided for the development of class assignments.
<table>
<thead>
<tr>
<th>COURSE GRADE COMPOSITION:</th>
<th>Possible Points</th>
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<tbody>
<tr>
<td>1. Exam</td>
<td>100 pts.</td>
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<tr>
<td>2. Lesson presentation:</td>
<td>100 pts.</td>
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<tr>
<td>Textbook Chapter 4</td>
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<tr>
<td>3. Lesson presentation:</td>
<td>100 pts.</td>
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<tr>
<td>earth, life, or physical science</td>
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<td>4. Discrepant Events</td>
<td>50 pts.</td>
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<td>5. Earth day lesson</td>
<td>25 pts.</td>
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<td>6. Text/other source process skills</td>
<td>50 pts.</td>
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<td>7. Three 5E model TEK/STAAR lessons</td>
<td>100 pts.</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td><strong>500 pts.</strong></td>
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**GRADING SCALE**

- 94 – 100% of 600 pts = A
- 78 – 89% of 600 pts = C+
- 90 – 93% of 600 pts = A-
- 74 – 77% of 600 pts = C
- 88 – 89% of 600 pts = B+
- 70 – 73% of 600 pts = C-
- 84 – 87% of 600 pts = B
- 60 – 69% of 600 pts = D
- 80 – 83% of 600 pts = B-
- Below 60% - 600 pts = F
NOTES:

- Attendance is extremely important. Students will be expected to attend all classes and to arrive on time. You should exert every effort to attend class meetings. Please note that your final grade will reflect your attendance. For each unexcused absence, 3 points will be deducted from the final course grade. Any absence for which the professor has not given prior approval will automatically be considered unexcused. Allowances for absences that result from emergencies will be made at the discretion of the professor. One point will be deducted from the final course grade for each unexcused late arrival.

- In all written work, grammar, sentence structure, organization, spelling, and handwriting are to be of such quality that would be an acceptable model for elementary students. Points will be deducted for such errors.

- All assignments should be turned in on the designated due dates. For each assignment turned in one class day late up to one week, a letter grade will be deducted from the total score. No assignments will be accepted after one week.

Tips on how to be successful in class:

- Come to each class prepared- do the assigned homework and bring materials to share and discuss.
- Share ideas- orally or hand in articles that relate to the topics being studied in class.
- Speak up during discussions of the chapter or other assigned work.
- Listen to the ideas of other and respond positively.
- Be open-minded and help those that need help.
- Attend all classes and contribute to each class by speaking, discussing class issues, etc. One must come to class prepared and energetic. Sitting quietly is not contributing.
- Have a positive attitude.
- Be quiet and sensitive when others are sharing their ideas.

Professional Standards of Behavior:

- Student Disability—any student with a documented disability needing academic adjustments or accommodations is requested to speak with me during the first two weeks of class. All discussions will remain confidential. Students with disabilities will need to also contact Counseling and Disability Services in Crooker Center. This office can be reached at (713) 525-6953 or 3162.
o Academic Integrity—the university system is based on a respect of intellectual property. Citing sources of information used in one’s work and total reliance on personal ability in individual assessments are fundamentals in scholarly behavior. Any instance of breach in academic integrity will be documented and reported to the Dean of the School of Education. Students will be informed of this action and must submit a written response to the charge. The instructor has the right to fail the student for the specific project or the entire course.

o Students may not bring their children to class as this can be disruptive to other students and to my instruction.

o Students should not bring a complete meal into class and eat. Water, soft drinks, and snacks are ok.

o Students should not be talking on their phone or texting during class.

Selected social justice teachings

Selected social justice teachings of the Catholic Church are used to inform the School of Education programs. As educators, the tenets of social justice should play a pivotal role in decision-making strategies in Catholic, private, and public schools of all levels.

- **Subsidiarity**: Educational institutions should be organized and governed as much as possible by the community being served; education should only be controlled at higher levels of society when it cannot be done effectively locally.

- **Dignity and rights of children**: Children possess full human dignity and are bearers of rights which should be recognized and upheld in the educational process.

- **People have a right to an education**: All people have a responsibility, for the good of society, to contribute to and foster education.

While these three keystones of social justice teachings are present throughout the coursework, they are specifically addressed through scenarios, case studies, and role playing activities at the undergraduate and graduate levels.