Eastern Illinois University
Department of Early Childhood, Elementary, and Middle Level Education
ELE3290.004-Science in the Elementary School

Instructor: Denise E. Reid
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Theme: Educators as Creators of Effective Educational Environments

Catalog Description: Science in the Elementary School. (3-0-3). Exploration of the nature, processes, and products of science and their relationships to society, the world, and the school curriculum. Field-based experiences will be in conjunction with Elementary Education 4000.

Prerequisites & Notes: ELE3000 and six semester hours in science. Concurrent enrollment with ELE3340, ELE4880, and ELE4000 (practicum) is recommended.

Course Credits: 3

Purpose of the Course: To involve students in the process of learning about the nature of science; a sample of its content and the methods used to teach the content. Using theories of how children learn as a basis for instruction, the students develop their skills at teaching science processes through discovery, guided discovery, and inquiry lessons. Students will also understand the importance of assessment and evaluation, and will develop various means of assessment. Students will integrate technology in their lessons, projects, and science units.

Course Text & Other Materials


Supplemental Materials: LiveText Account & Course packet purchased from Copy Express in the student union.
Learning Model: Constructivism, Inquiry & the Learning Cycle Model
Constructivism is a theory about how people learn. This theory is based on the work of early theorists (John Dewey, Jerome Bruner, Jean Piaget, and Lev Vygotsky) that supported discovery learning. The basic premise of constructivism is that learners connect their current explorations with their existing knowledge to form new understandings or knowledge. Inquiry refers to the process of exploring questions, ideas, and phenomena. There are different levels of inquiry, from guided to full inquiry. One teaching and learning model that supports inquiry and provides a framework to help teachers become more effective in using inquiry approaches is the Learning Cycle Model. The original Learning Cycle Model was developed by Professor Robert Karplus and colleagues at the University of California-Berkeley and consisted of three components: exploration, concept introduction, and concept application. The current model has been modified and has five components: Engagement, Exploration, Explanation, Expansion, and Evaluation. (Moyer, R. H., Hackett, J. K., & Everett, S. A. (2007). *Teaching Science as investigations: Modeling inquiry through learning cycle lessons*. Upper Saddle River, NJ: Pearson/Merrill Prentice Hall.)

Dispositions: Teacher candidates in the Department of EC/ELE/MLE will exhibit professional ethical practices, effective communication, and sensitivity to diversity, the ability to provide varied teaching practices evidenced in a supportive and encouraging environment.

Course Outcomes
1. A positive attitude toward providing meaningful experiences in science for your students.
2. An understanding of the nature of science, the learner, and the learning environment.
3. A working knowledge of appropriate science learning and hands-on inquiry experiences for children.
4. The ability to effectively utilize various types of materials, resources, and media to engage children in meaningful science experiments.
5. Knowledge of assessment and evaluation procedures for science.
6. The ability to plan, implement, and assess science instruction for elementary students.
7. The students will become familiar with the Illinois Learning Standards for Science and the National Science Education Standards.

Course Content: The nature of science: Science attitudes, knowledge, and skills; D.A.S.T.; Process Skills; Constructivism; Science Misconceptions; Inquiry; Demonstration lessons and discrepant events; NSES (National Science Education Standards); Illinois Learning Standards; Science Content (Life Science, Physical Science, & Earth & Space Science); Literature & Science; Scope & Sequence Charts (Science Curriculum); Science concepts; Authentic Assessment; The Learning Cycle Model; Simulations; Project Based Learning; Science Teacher Resources.

ELE3290 Standards
Course requirements and demonstrated competencies are aligned with the following standards:
- Association for Childhood Education International Standards (ACEI) [http://www.acei.org/Synopsis.htm](http://www.acei.org/Synopsis.htm)
- Illinois Professional Teaching Standards (IPTS) [http://www.isbe.state.il.us/profprep/PDFs/ipts.pdf](http://www.isbe.state.il.us/profprep/PDFs/ipts.pdf)
- Illinois Core Language Arts Standards (ICLAS) [http://www.isbe.net/profprep/CASCDvr/pdfs/24110_corelangarts_std.pdf](http://www.isbe.net/profprep/CASCDvr/pdfs/24110_corelangarts_std.pdf)
Illinois Core Technology Standards (ICTS)
http://www.isbe.net/profprep/CASCDvr/pdfs/24100_coretechnology.pdf

**Grading Scale:**
- 92% - 100% = A
- 82% - 91% = B
- 72% - 81% = C
- 62% - 71% = D
- 61% or below = F

**Course Requirements**

<table>
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<tr>
<th>Course Requirements</th>
<th>Demonstrated Competencies</th>
<th>Aligned Standards (ACEI, ILSCSTF-ELE, IPTS, TSIT, LASIT)</th>
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<tr>
<td><strong>Participation</strong></td>
<td>Performance includes presence, participation and preparation for group and whole class discussions, and participation in lab activities working cooperatively with peers. Focus is on practices and behaviors that allow the learner to grow professionally.</td>
<td>ACEI 5.1 ILSCSTF-ELE 16, 17 IPTS10, 11 TSIT 2E, 6C, 6D LASIT 2D, 2E, 2H</td>
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<tr>
<td><strong>Science Notebook &amp; lab sheets</strong></td>
<td>Performance includes organizing science notebook in order to create a useful teaching resource. This resource will include handouts, assignments, lab sheets, demonstration lessons and a detailed Table of Contents. Focus is on developing a professional resource that can be used to plan and implement developmentally appropriate lessons using inquiry-based activities.</td>
<td>ACEI 2.2 ILSCSTF-ELE 4 IPTS 1, 7, 10 TSIT 2B LASIT 2B</td>
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<td><strong>Readings &amp; written responses (Textbook &amp; Journal Articles)</strong></td>
<td>Performance will include reading, reflecting, and preparing for discussion of content related to science teaching and learning (constructivism, inquiry, assessment, questioning, learning cycle model, developmentally appropriate practices, etc.) Focus is on increasing the participant’s knowledge and understanding of the learning theory and processes related to science teaching methods.</td>
<td>ACEI 2.2, 3.1, 3.3 ILSCSTF IPTS 1 TSIT 2E, 7K LASIT 1E, 2B, 2D, 2F</td>
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<td><strong>Quizzes &amp; Tests</strong></td>
<td>Tests will be provided as one form of assessment of student’s content knowledge related to planning and teaching effective science lessons. Focus is on demonstrating understanding of course content knowledge. <em>Questions on the midterm and final are based upon reading assignments (textbooks and articles), class discussions, and labs. The questions are either multiple-choice or matching. Most of the questions are at the application, analysis, and synthesis level.</em></td>
<td>ACEI 2.2 ILSCSTF-ELE 4,16 IPTS 1, 8 LASIT</td>
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<td><strong>Science Unit</strong>*</td>
<td>Performance includes creating an extended science unit that is developmentally appropriate and inquiry based. The lesson plans will follow the learning cycle model. Lessons will allow elementary students to develop conceptual understanding.</td>
<td>IPTS 1, 2, 3, 4, 6, 7, 8, TSIT 2E, 6A, 6C, 7J, 8A, 8D</td>
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Appropriate informal and formal assessment activities will be included. Focus is on developing a developmentally appropriate inquiry-based science unit that fosters conceptual understanding. ACEI 1, 2.2, 3.1, 3.2, 3.3, 3.4, 4, NAEYC 4b, 4c, 4d.

Demonstration Lesson & Presentation Performance includes working cooperatively with peers to select demonstration lessons around a theme. Each demonstration lesson will foster inquiry. Performance will include demonstrating understanding of the concept through effective questioning techniques for creating conceptual understanding and overall explanation of the concept. ACEI 1, 2.2, 3.2, 3.3, 3.4, 4.

Illinois Learning Standards & National Science Education Standards Assignment (NSES) Performance requires the students to be able to identify the three state science goals (11, 12, & 13) ultimately being able to identify the standards taught in his/her science unit. The students will be comparing the content standards developed by NSES with the content standards in state goal 12, recognizing the content is divided into three categories: life sciences, physical sciences, & earth and space sciences. ACEI 2.2, 3.1, 3.3, ILSCSTF-ELE 4, IPTS 1, 4, 6, 7, TSIT 7A, 7D, 7J, 8D, LASIT 1F, 2D, 2F.

Examine a professional science journal (Science & Children, Science Scope, The Science Teacher, etc.) Read the letter from the editor. What is his/her focus? Briefly describe the main features of the journal. Select one article to read. Write a brief summary. How could the classroom teacher use the information in this professional journal in his/her teaching? How could the classroom teacher use this information in her professional growth? ACEI 2.2, 3.1, 3.3, ILSCSTF, IPTS 1, TSIT 7E, 7K, LASIT 1E, 2B, 2D, 2F.

*LiveText Submission All or a portion of the Science Unit will be submitted through LiveText for Unit and Program Assessment. If the Live Text requirements are rated, by the instructor, to have been completed in less than a satisfactory manner then no more than a "D" may be earned in the class regardless of the number of points earned.

Course Assignments and Expectations***

1. Active Participation (30 points) Most lessons involve activities of some type that are difficult to make up if absent, so regular attendance is beneficial. Participation includes the following: being in class on time (3-5 minutes early), looking at those who are speaking, working cooperatively with group members, being prepared for class, and being actively involved in labs and discussions. This also means that your cell phones are turned off. If an emergency arises please notify the instructor if you are unable to attend class by leaving a message on voice mail or e-mail. Five points will be deducted for each unexcused class absence.

2. Content Area Readings Select an article from a professional journal that corresponds with the relevant topic. Topics will be constructivism, inquiry (teaching science), and authentic assessment. Copy, read, highlight, and write reflective comments in the margins. Be prepared to discuss the topic in class. Type a 1/2 to 1 page reflection that answers this question: What was the key idea presented in this article? In other words what did you learn about the topic from reading this article? (45 points-15 points each) *See grading guidelines listed below.

3. Professional Teaching Journal Critique (20 points)

4. Process Skills Quiz (31 points)

5. Illinois Learning Standards Assignment (10 points)
6. **Science Demonstration Lesson & Presentation (50 points)** Locate an interesting science demonstration lesson, and write lesson plan following the model presented by instructor. Send a copy of the demonstration lesson plan to class members through WebCT. Present to students at Carl Sandburg Elementary School.

7. **Midterm (50—75 points)** The midterm will be taken online thorough WebCT.

8. **Science Unit (160 points)**

9. **Science Notebook (25 points)** Organize your science binder to include a section for labs. (Follow the criteria in your packet.)

10. **Final (approximately 50—75 points)** The final will be taken online thorough WebCT.

Detailed instructions and expectations for each assignment will be provided. ***Refer to course calendar for a daily outline of topics/activities, reading assignments, and due dates.

*Grading system for Content Area Readings:*

**15 points:** Essential ideas for understanding the topic are highlighted throughout the whole chapter, booklet, or article— including the sample lesson or any appendices, the comments in the margins show that you were thinking about the ideas that were presented and not just repeating the idea, and your name is on the article. Written response is well written and reflects the key idea learned from reading this article.

**14 points:** Important ideas are highlighted throughout entire chapter, booklet, or article, but comments are not truly reflective—they just restate the ideas presented, and your name is on the article. Written response reflects key idea presented in the article.

**13 points:** Few ideas are highlighted throughout the whole chapter, booklet or article, and there are few comments written in the margins. Written response is a summary of the article.

**12 points:** Few ideas are highlighted throughout the chapter, booklet, or article and there are no comments written in the margins. Written response is too general.

**Bibliography**


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