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

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 science units.

Course Text

Martin, R., Sexton, S., Wagner, K., & Gerlovich, J. (2005). *Teaching science for all children* (4th ed.). Boston: Allyn and Bacon.

Carin, A. A., Bass, J. E., Contant, T. L. (2005). *Activities for teaching science as inquiry* (6th ed.). Upper Saddle River, NJ: Pearson, Merrill Prentice Hall.

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.)

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.

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
- Illinois Standards for Certification in Special Teaching Fields-Elementary http://www.isbe.net/profprep/CASCDvr/pdfs/26310_elementaryed.pdf
- Illinois Professional Teaching Standards (IPTS) 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
- 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

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

Course Requirements	Demonstrated Competencies	Aligned Standards (ACEI, ILSCSTF-ELE, IPTS, TSIT, LASIT)
Participation	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.	ACEI 5.1 ILSCSTF-ELE 16, 17 IPTS10, 11 TSIT 2E, 6C, 6D LASIT 2D, 2E, 2H
Science Notebook & lab sheets	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.	ACEI 2.2 ILSCSTF-ELE 4 IPTS 1, 7, 10 TSIT 2B LASIT 2B
Readings & written responses (Textbook &	Performance will include reading, reflecting, and preparing for discussion of content related to science teaching and learning (constructivism, inquiry, assessment, questioning, learning cycle	ACEI 2.2, 3.1, 3.3 ILSCSTF IPTS 1 TSIT 2E, 7K

Journal Articles)	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.	LASIT 1E, 2B, 2D, 2F
Quizzes & Tests	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.	ACEI 2.2 ILSCSTF-ELE 4,16 IPTS 1, 8 LASIT
Science Unit*	Performance includes creating a two-week 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. Appropriate informal and formal assessment activities will be included. Focus is on developing a developmentally appropriate inquiry-based science unit that fosters conceptual understanding.	IPTS 1, 2, 3, 4, 6, 7, 8, TSIT 2E, 6A, 6C, 7J, 8A, 8D ACEI 1, 2.2, 3.1, 3.2, 3.3, 3.4, 4, NAEYC 4b, 4c, 4d,
Demonstration Lesson & Group Presentation	Performance includes working cooperatively with peers to select demonstration lessons around a theme. Each demonstration lesson will foster inquiry. Performance will include demonstration 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, ILSCSTF-ELE 4 IPTS 1, 3, 4, 6, 7 TSIT 7A, 7D, 7J, 8D LASIT 1F, 2D, 2F
***LiveText Submission**	**All or a portion of the Science Unit will be submitted through LiveText for Unit and Program Assessment.**	

Core Assignments	Brief Description	Approximate Weight
Readings & written responses (Textbook & Journal Articles)	Select an article from a professional journal that corresponds with the relevant topic. Topics such as constructivism, inquiry-based learning, the learning cycle, using writing in science, authentic assessment, etc. Copy, read, highlight, and write reflective comments in the margins. Type a 1/2 to 1 page reflection that answers this question: What was the key idea presented in this article?	10%
Tests	A midterm and a final will be given over the course content.	20%
Science Unit	An inquiry-based science unit will be developed. The unit will include: topic research, teacher resources, student resources, and lesson plans following the learning cycle model.	30%
Science Notebook & lab sheets	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.	10%
Demonstration Lesson & Group Presentation	Performance includes working cooperatively with peers to select demonstration lessons around a theme. Each demonstration lesson will foster inquiry. Performance will include demonstration understanding of the concept through effective questioning techniques for creating conceptual understanding and overall explanation of the concept.	15%