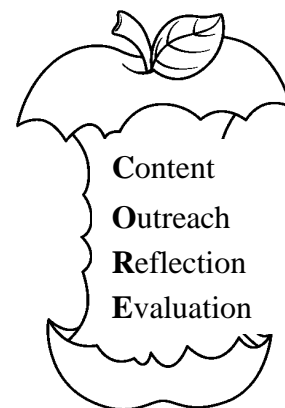


**Eastern Illinois University**  
**Early Childhood, Elementary, and Middle Level Education Department**  
**ELE 3290.001: Science in the Elementary and Middle School**



**Instructor:** Dr. Daniel Carter  
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**Email:** djcarter@eiu.edu  
**Office Hours:** Tuesday – 11:00-1:00, Wednesday – 2:30pm-5:30pm  
**Phone:** 217-581-5728 (Messages Only)  
**Class Meetings:** Buzzard Hall 2430 M,W – 8:00am-9:40am  
**Semester:** Spring 2018

**Unit Theme:** Educators as Creators of Effective Educational Environments: Integrating diverse students, subjects, strategies, societies and technologies.

**Catalog Description:** Science in the Elementary School. 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 ELE/MLE 4100. (3-0-3)

**Prerequisites.** Concurrent enrollment in ELE/MLE 4100, or permission of department chair. University Teacher Education requirements apply and department requirements for enrollment must be met.

**Purpose of the Course:** To involve teacher candidates 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 teacher candidates develop their skills at teaching science processes through discovery, guided discovery, and inquiry lessons. Teacher candidates will also understand the importance of assessment and evaluation, and will develop various means of assessment. *Teacher candidates will integrate technology in their lessons, projects, and science units.*

**Course Texts:**

Bang-Jensen, V. & Lubkowitz, M. (2017). *Sharing books, talking science*. Portsmouth, NH: Heinemann.

Froschauer, L. (2016). *Bringing STEM to the elementary classroom*. Arlington, VA: NSTA press.

**Supplemental Materials:** LiveText Account

**Learning Model:**

The Information-Processing Models

- Information-processing models emphasize ways of enhancing the human being's innate drive to make sense of the world by acquiring and organizing data, sensing problems and generating solutions to them, and developing concepts and language for conveying them (pp 10-13).
- **Scientific Inquiry Model:** The *scientific inquiry model* builds learning around investigations. The National Research Council (NRC) states firmly that science education should focus on only a few important concepts from each discipline at any given grade level---and the learning process should be built around in-depth inquiries into topics selected because they contain those concepts. The framework for K-12 science from the NRC also emphasizes "cross-cutting" concepts---ones that are common to the disciplines and should be learned both to better understand the disciplines and because they have great organizing power. The framework is also unified by continuous hands-on experience. (pp. 71-72)

Joyce, B., Weil, M., & Calhoun, E. (2015). *Models of teaching* (9<sup>th</sup> ed.). Boston: Pearson.

**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. Failure to adequately meet dispositional requirements will lead to remedial requirements set forth by the instructor. <http://www.eiu.edu/clinical/dispositions.php>

**Live Text Assessment and/or Practicum Requirements:** For those classes with Live Text and/or Practicum- If the portfolio, practicum, and/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.

**Standards:****Course requirements and demonstrated competencies are aligned with the following standards:**

- Illinois Professional Teaching Standards (IPTS): [http://www.isbe.net/PEAC/pdf/IL\\_prof\\_teaching\\_std.pdf](http://www.isbe.net/PEAC/pdf/IL_prof_teaching_std.pdf)
- Eastern Illinois University Professional Dispositions  
<http://www.eiu.edu/clinical/forms/DispositionsforEIUCandidates.pdf>
- Illinois Social Emotional Learning Standards (SEL) [http://www.isbe.net/ils/social\\_emotional/standards.htm](http://www.isbe.net/ils/social_emotional/standards.htm)
- Association for Childhood Education International (ACEI): <http://www.isbe.net/rules/archive/pdfs/20ark.pdf>
- National Association for the Education of Young Children (NAEYC):  
<http://www.ncaete.org/Standards/ProgramStandardsandReportForms/tabid/676/Default.aspx>
- Association for Middle Level Education:  
<http://www.amle.org/AboutAMLE/ProfessionalPreparation/AMLEStandards.aspx>
- International Society for Technology in Education <http://www.iste.org/standards/standards/standards-for-teachers>

Next Generation Science Standards (NGSS) <http://www.nextgenscience.org> **Course Outcomes**

1. The teacher candidate will exhibit a positive attitude toward providing meaningful experiences in science for young students.
2. The teacher candidate will demonstrate an understanding of the nature of science, the learner, and the learning environment.
3. The teacher candidate will demonstrate a working knowledge of appropriate science learning and hands-on inquiry experiences for children.
4. The teacher candidate will exhibit the ability to effectively utilize various types of materials, resources, and media to engage children in meaningful science experiments.
5. The teacher candidate will demonstrate knowledge of assessment and evaluation procedures for science.
6. The teacher candidate will demonstrate the ability to plan, implement, and assess science instruction for elementary students.
7. The teacher candidate will build and maintain positive relationships while collaborating with peers.
8. The teacher candidate will become familiar with the Next Generation Science Standards (NGSS).

Course Requirements	Demonstrated Competencies	Aligned Standards (ACEI, NAEYC, IPTS, SEL, Dispositions)
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 2.2, 3.4, 3.5, NAEYC 1b, 6c AMLE D5d IPTS 2B, 2D, 2K8F, 8K, 9A, 9G, 9H SEL 2B – 2C, 3A.1b  Dispositions: PEP, EC
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 2.1, 2.2 NAEYC 1a, 4b IPTS 2B, 2N, 6D,  Dispositions: PEP, EC
Readings & written responses (Textbook & Journal Articles)	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.	ACEI 2.1, 2.2, 3.1, 3.3 NAEYC 4b - 4c, 5a IPTS 2F, 2I, 6E, 6S, 9A,  Dispositions: PEP, EC

Quizzes & Tests	Tests will be provided as one form of assessment of teacher candidate's content knowledge related to planning and teaching effective science lessons. Focus is on demonstrating understanding of course content knowledge.	ACEI 2.2 NAEYC 5a IPTS 2A - 2F  Dispositions: PEP
Science Unit*	Performance includes creating a 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 creating a developmentally appropriate inquiry-based science unit that fosters conceptual understanding.	ACEI 1.0, 2.1, 2.2, 3.1 - 3.4, 4.0, 5.2 NAEYC 4a - 4c, 3a, 5a - 5b ISTE 2F, 5C, 6J AMLE A1b, A1c, B2a, B2b, IPTS 1C, 1I, 2B, 2G, 2I - 2K, 2N, 3B, 3I, 5A, 5L, 6E, 6H, 6Q, 7B, 7E, 9A, 9R  Dispositions: PEP, EC, PTSL, SDE
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 demonstrating understanding of the concept through effective questioning techniques for creating conceptual understanding and overall explanation of the concept.	ACEI 1.0, 2.1, 2.2, 3.3, 3.3, 3.4 NAEYC 5a - 5b IPTS 2B, 2I, 2K, 8B, 8N AMLE C4a, C4b,  SEL 2B - 2C, 3A.1b Dispositions: PEP, EC, IWS
<b>*LiveText Submission</b>	<b>All or a portion of the Science Unit will be submitted through LiveText for Unit and Program Assessment.</b>	

Core Assignments	Brief Description	Points
Participation	Class sessions involve interactive activities and presentation and discussion of material that is difficult to make up if absent, so regular attendance is beneficial. Participation includes the following: being in class on time, 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 cell phones are turned off and there is no texting during class. If an emergency arises please notify the instructor if you are unable to attend class by leaving a message through voice mail, text or e-mail. Twenty points will be deducted for each unexcused class absence.	40 pts

In-class investigations and activities	Students will participate in weekly in-class activities that represent various instructional strategies. Records of the activities will be submitted in various forms including the 5E learning cycle model and scientific thinking process.	20 pts for each activity plan and record
Readings & written responses (Textbook & Journal Articles)	Select articles from a professional journal that correspond with the relevant topics. 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 one page reflective commentary based on margin comments.	20 pts each
Midterm and Final	A midterm and a final will be given over the course content.	Approximately 50 pts each
Science Unit	An inquiry-based science unit will be developed to meet NGSS and CCSS. The unit will include: topic research, teacher resources, student resources, and lesson plans following various instructional strategies including the learning cycle model.	Approximately 300 pts (depending on scientific topic and grade level)
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 demonstrating understanding of the concept through effective questioning techniques for creating conceptual understanding and overall explanation of the concept. The lesson will be presented to peers and may include a presentation for elementary students. Locate an interesting science demonstration lesson (discrepant event), and write lesson plan following the model presented by instructor. Send a copy of the demonstration lesson plan to class members and instructor through D2L.	30 pts for the lesson plan 30 pts for presentation 30 pts for review of peer presentations
Field Trip	Performance includes interaction with outside agencies to enhance educational experiences for all students. Activities at the nature centers include the integration of handicapped students into the learning environment, investigating environmental education, and methods of incorporating field studies as an integral part of the science curriculum.	50 pts
<b>*LiveText Submission</b>	<b>A portion of the Science Unit will be submitted through LiveText .</b>	

**The instructor will provide detailed instructions and expectations for each assignment. Topics, assignments, readings and due dates will be discussed and placed on the course calendar. The course calendar will be posted on D2L. All assignments must be submitted by the agreed upon due date established during class. Points will be deducted for late assignments. Assignments must be completed in an exemplary fashion to receive an “A”.**

**Attendance Policy:**

Students are expected to notify the instructor prior to any absence. If a second absence occurs or late-arrival occurs without prior notification, a dispositional referral may be completed upon which a meeting with the department chair will be mandated. Unexcused absences impact the participation grade and forfeit points potentially earned for in-class assignments and quizzes on the days of occurrence.

**Grading Scale:** A 100-93%, B 92%-84%, C 83%-75%, D 74%-66%, F 65% and below

**COURSE OUTLINE**

Week 1	What is Science? Conceptions of Scientist & Science Attitudes
Week 2	Scientific Practices & Activities
Week 3	Scientific Practices & Activities
Week 4	Demonstration Lessons (Discrepant Events) The Importance of Questioning Constructivism & Misconceptions
Week 5	Demonstration Lessons (Discrepant Events) The Importance of Questioning Constructivism & Misconceptions
Week 6	Scope & Sequence Charts Science Concepts Developing Clarity of Learning (The Essential Understanding: Understand, Know, Be Able to Do—skills)
Week 7	NGSS Using Trade Books in science
Week 8	The Learning Cycle Model
Week 9	The Learning Cycle Model
Week 10	Inquiry Based Learning
Week 11	Authentic Assessment
Week 12	The Learning Cycle Model
Week 13	Other Science Teaching Strategies Simulations Project Based Learning
Week 14	Resources Available for Teachers

**Academic Integrity**

Students are expected to maintain principles of academic integrity and conduct as defined in EIU's Code of Conduct (<http://www.eiu.edu/judicial/studentconductcode.php>). Violations will be reported to the Office of Student Standards.

## Student Success Center

Students who are having difficulty achieving their academic goals are encouraged to first contact their instructor. If needing additional help, please contact the Student Success Center ([www.eiu.edu/~success](http://www.eiu.edu/~success)) for assistance with time management, test taking, note taking, avoiding procrastination, setting goals, and other skills to support academic achievement. The Student Success Center provides individualized consultations. To make an appointment, call [217-581-6696](tel:217-581-6696), or go to 9<sup>th</sup> Street Hall, Room 1302.

## Students with Disabilities

If you are a student with a documented disability in need of accommodations to fully participate in this class, please contact the Office of Student Disability Services (OSDS). All accommodations must be approved through OSDS. Please stop by Ninth Street Hall, Room 2006, or call 217- 581-6583 to make an appointment.

## ELE 3290 References

### \*Denotes Unit Conceptual Framework References

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