

Augsburg College

Course: EED 360

Elementary Science

Dates: 4/17, 4/24, 5/8, 5/22, 6/5, 6/12, 6/26,
Times: Saturdays, 8:00 – 12:00
Classroom: Old Main, room 4
Instructor: John Stangl
Office hours: Before and after each class
Tele: 651-748-6163 (voice mail)

Course Credits: 1.0

Prerequisites: Admission to the Education Department

Course Description: During our time together, you will have ample opportunities to examine and experiment with successful hands-on instructional science materials. You will practice successful teaching strategies used in today's modern classroom. You will be expected to take risks, ask questions, challenge assumptions, get down and get dirty, and most of all, learn that science can be fun by doing science. There will be an emphasis upon using a wide range of thinking skills, both critical and reflective; you will be expected to expand your sensory perceptions; you will be asked to collect and analyze data; you will need to wear two hats simultaneously: that of a student and that of a teacher. You are also expected to complete a minimum of 10 hours of fieldwork.

Education Department Mission Statement: “The Augsburg College Education Department commits itself to developing future educational leaders who foster student learning and well-being by being knowledgeable in content, being competent in pedagogy, being ethical in practice, building relationships, embracing diversity, reflecting critically, and collaborating effectively.”

Applicable Standards of Effective Practice:

- Standard 1. Subject Matter. A teacher must understand the central concepts, tools of inquiry, and structures of the discipline taught and be able to create learning experiences that make these aspects of subject matter meaningful for students. A teacher of kindergarten through grade 6 must demonstrate fundamental knowledge of scientific perspectives, scientific connections, science in personal and social perspectives, the domains of science, and the methods and materials for teaching science and scientific inquiry.
- Standard 2. Student Learning. A teacher must understand how students learn and develop and must provide learning opportunities that support a student's intellectual, social, and personal development.
- Standard 3. Diverse Learner. A teacher must understand how students differ in their approaches to learning and create instructional opportunities that are adapted to students with diverse backgrounds.
- Standard 4. Instructional Strategies. A teacher must understand and use a variety of instructional strategies to encourage students' development of critical thinking, problem solving, and performance skills.
- Standard 5. Learning Environment. A teacher must be able to use and have an understanding of individual and group motivation/behavior to create learning environments that encourage positive social interaction, active engagement in learning and self-motivation.
- Standard 6. Communication. A teacher must be able to use knowledge of effective verbal, nonverbal, and media communication techniques to foster active inquiry, collaboration, and supportive interaction within the classroom.
- Standard 7. Planning in Instruction. A teacher must be able to plan and manage instruction based upon knowledge of subject matter, students, community, and curriculum.
- Standard 8. Assessment. A teacher must understand and be able to use formal and informal assessment strategies to evaluate and ensure the continuous intellectual, social, and physical development of the student.
- Standard 9. Reflection and Professional Development. A teacher must be a reflective practitioner who continually evaluates the effects of choices and actions on others, including students, parents, and other professionals in the learning community, who actively seeks out opportunities for professional growth.

Course Objectives Aligned with MN Standards of Effective Practice:

Students in this course will

- demonstrate knowledge of the scientific inquiry process [Elem. 8a]
- demonstrate how to effectively plan hands-on/minds-on, guided discovery science lessons that are developmentally appropriate, meet the needs of the learners, embed state and national standards, and develop and maintain positive and safe learning environments. [Elem. 8b,c,d, (i-vii), 2 E,F; 3A, I: 4A; 5E,; 7B,D,E, F,G,H]

- demonstrate understanding of the teacher and student role in guided discovery teaching and effective instructional strategies for implementing a guided discovery curriculum. [2G; 4C,D,F,H,J; 5D,I,M; 6J,K]
- demonstrate how to effectively assess student learning in light of current national and state standards using a variety of assessment strategies. [2E; 8G, H,I, J, L]
- demonstrate knowledge of commercial and local K-6 science curriculum and best practices science resources. [1G]
- demonstrate a greater understanding of the nature of children’s scientific and developmental thinking [2E; 7B,C]
- demonstrate critical self-evaluation as learners and educators. [9D,H]

Technology Requirements: Make a spreadsheet (with formulas) using Excel. Demonstrate proficiency in writing and delivering learner-centered lessons, which feature students using digital technologies to guide their own learning. In addition, the Education Department expects these entry-level technology skills from all pre-service teachers: have the ability to access and navigate the Internet, e-mail and standard PC word processing data-base software. Student who do not possess these skills are expected to contact the Lindell Library for help in developing these skills.

Field Experience Requirement: You are expected to complete a minimum 10 hours of verifiable fieldwork at a public or private elementary school during the duration of this course. Details will be forthcoming in class.

Assessments by Standards Summary Grid

Assessment Tool	Activities	Program Standards/Course Outcomes
Hands-on experience with standards-based science units and follow up discussions	<ul style="list-style-type: none"> • Experiencing standards-based science curriculum during class • Unit dissection and experience to determine elements of standards based elementary science • Discussing classroom management issues, instructional strategies used to meet different learning styles, developmental and individual needs 	Elem. (8a), 1-G 4A,C,D,F; 5D; 6J; 8G, I; 9D 5E
Guided discovery, inquiry, and direct instructional strategies	<ul style="list-style-type: none"> • Reading and comprehending course textbook • Assessing student prior knowledge and misconceptions • Planning outcomes, activities, and assessments • Developing and modeling effective management techniques • Creating technology-based instructional resources • Implementing a variety of parental involvement strategies 	Elem. (8a), 1G Elem. (8c), 2F Elem. (8a, d, I-vii), 2A, G; 4A, D, F, H, J; 5D, M, O; J: 7B, C, E, R, G, H; 8G, H, L. 5 E,I 6K, 10
Reflections (3)	<ul style="list-style-type: none"> • Reading and translating theory into modern practice • Reflecting on effective teaching methodology, student learning, and current research • Assessing student and community needs 	5E, I; 8 I, J 4C, 7G, H; 9 D, H Elem. (8 b, c); 3A, L
Micro-teaching; Guided Discovery Lesson	<ul style="list-style-type: none"> • Researching standards-based curriculum • Plan, teach, and assess student performance in hands-on & minds-on guided discovery activities • Reflect on professional and personal development 	Elem. (8a, b, d) 1G; 9D 4D, H; 6J, 7F; 8G 4C
Final Evaluations	<ul style="list-style-type: none"> • Written/oral self-assessments, peer review & instructor feedback 	3A, L; 4C, H, J; 6J, 8G; 9 D

General Course Information and Policies:

- **Required Text**

“Take the ‘Sigh’ Out of Science by J. Stangl (available at Augsburg’s book store)

- **Course Requirements**

Students will:

1. Actively participate in classroom science experiences, discussions, “take-home” labs and evaluations.
2. Demonstrate effective thinking, data collection/analysis, quantitative reasoning, and problem solving.
3. Complete a minimum 10 hours of verifiable fieldwork at a public or private elementary school during the duration of this course.
4. Design, build, and teach a science lesson of your choice using inexpensive manipulatives. Whatever you choose, make something that you will use in your fieldwork experience.
 - Complete a pre-instructional planning process similar to the sample outlined in *“Take the ‘sigh’ Out of Science.”*
 - Create or gather appropriate hands-on manipulatives that will guide children to learning a science topic.
 - Practice your activities on a class (or small group) of children.
 - Write detailed lesson plans of what really works so peers can replicate your successful ideas and teaching strategies. Make ample photocopies of your complete lesson plans for all members of this class. Be prepared to present your fieldwork lesson to a small group of peers.
5. Interview a local “scientist” who is **NOT A RELATIVE, NEIGHBOR, FRIEND ETC.** See samples in “Take the ‘Sigh’ Out of Science”.
 - Document in writing your questions and his/her responses (paraphrased, not word-for-word).
 - Summarize your insights in a personal, written reflection.
 - Be prepared to orally discuss and/or debate your insights.

- **Assessment**

75% of grade.....self-evaluations and self-reflections

25% of grade.....instructor assessments both formal and informal including: quality of assignments, task management, participation and attendance.

N.B. Assignments must be word processed and spell-checked. Well-developed ideas presented clearly and concisely are expected.

- **Grading**

4.0 Highest standard of excellence

3.5

3.0 Above basic course requirements

2.5

2.0 Basic standards met

Course grades falling below 2.0 will not be accepted toward licensure in education. Students must earn a grade of 2.0 to pass this course.

- **Attendance**

Due to the nature of hands-on lab work, 100% attendance and appropriate participation are expected. Absence and tardiness will affect your opportunity to maximize learning and your final course grade. Safety concerns and practical reasons do not permit lab make up work. Final decisions about how absence and/or tardiness affect the course grade rest with the instructor.

- **Academic Honesty:**

The Augsburg College policy on academic honesty applies to this course.

- **Students Rights/Responsibilities:**

“Students with diagnosed learning disabilities or physical handicaps may have legal right to course modifications. Please identify yourself to the professor so he/she might assist you with your course progress. All students have the right to use the college Counseling and Student Development staff as well as receive assistance from the Writing Lab.”

- **Course Schedule:** Individual assignments and due dates may vary during the course.

Date	Class Topics	Assignments Due
1 st Session	<ul style="list-style-type: none"> • Course overview • What is Science? • Strategies to engage young minds • Experiencing science yourself 	<ul style="list-style-type: none"> • Read course syllabus and “Take the ‘sigh’ Out of Science” • “Girl” piece; self reflection • Bring a scientific object + photo
2 nd Session	<ul style="list-style-type: none"> • Lesson analysis: appropriate science concepts, hands-on activities, and attitudinal development • Developmentally appropriate instruction • More experiencing science 	<ul style="list-style-type: none"> • Research Project • “Take-Home” problem solving task.
3 rd Session	<ul style="list-style-type: none"> • Tricks of the trade... • Student misconceptions • Pre-instructional planning • More experiencing science 	<ul style="list-style-type: none"> • “Mirror...mirror...on the wall”; self reflection
4 th Session	<ul style="list-style-type: none"> • Lesson analysis: safety and legal concerns • Content verses Process (Hands-on vs. Minds-on) • More experiencing science 	<ul style="list-style-type: none"> • Pre-instructional planning sheet for your science “kit”
5 th Session	<ul style="list-style-type: none"> • Teacher as Facilitator; Direct Instruction; Guided Discovery • Assessment Strategies and MN Graduation Standards 	<ul style="list-style-type: none"> • “Unexpected Questions....”
6 th Session	<ul style="list-style-type: none"> • Environmental and Outdoor Education • Integration of science across the curriculum • More experiencing science 	<ul style="list-style-type: none"> • Technology simulation and role playing scenario and/or • Helpful Hints for conferences
7 th Session	<ul style="list-style-type: none"> • Examination of commercial vs. local manipulatives and curricula • More experiencing science 	<ul style="list-style-type: none"> • To be announced
Last session	<ul style="list-style-type: none"> • Micro-teaching of fieldwork lesson to your peers • Interview-a-Scientist discussion (written reflection also due) • Final Evaluations; wrap up 	<ul style="list-style-type: none"> • Hands-on activities + lesson plans with multiple copies for each classmate • Interview-a-Scientist • Peer reviews; self evaluations

Bibliography: Below, please find a list of suggested resources to assist your design of guided discovery lessons.

Books on Reserve @ Augsburg's Library

- Science Toolbox by Jean Stangl
- 39 Easy Geology Experiments by Robert R. Wood
- Magnets by Janice van Cleve
- Mr. Wizard's Supermarket Science by Don Herbert
- 50 Nifty Science Experiments by Lisa Melton
- Creepy Crawlies and the Scientific Method by Sally Kneidel
- Scienceworks by the Ontario Science Center
- Sound and Light by David Glover
- The Kid's Summer Handbook by Jane Drake
- Science Experiments You Can Eat by Vicki Cobb
- The Science Book for Girls by Valerie Wyatt
- Teaching Children About Life and Earth Science by Elaine Levenson
- Science In Your Backyard by William Welnitz
- Toys in Space by Carolyn Summer
- Astronomy for Every Kid by Janice Van Cleve
- Tricks and Amusements by R.M. Abraham
- Physics for Every Kid by Janice Van Cleve
- Kitchen Chemistry by Robert Gardner
- Simple Kitchen Experiments by Robert Gardner
- Simple Kitchen Experiments by Muriel Mandell
- Creativity Inside Out by Terry Marks-Tarlow
- Science On a Shoe-string by Terry Marks-Tarlow
- Science On a Shoe-string by H. Strongin
- Nature Watch – Exploring Nature with Children by Adriene Katz
- Nature Activities for Early Childhood by Janet Nickelburg
- Cooperative Learning in Science by Robert Stahl
- Science Experiments by the Hundreds by Julia Cothron
- Learning Under the Sun by William J. Klein
- Learning for All Seasons by William J. Klein
- Light & Sound by Michael DiSpezio
- Classroom Critters and the Scientific Method by Sally Kneidel
- Wacky Science – A Cookbook for Elementary Teachers by Phil Parrtore
- Six-Minute Nature Experiments by Faith Hickman Whittingham

Assignment #1: Complete the following tasks for the first class session:

- Bring a small, **recent**, photograph of yourself to the 1st class (you will get it back)

- Bring one “scientific object” of your choosing to the 1st class (you will take it home the same day)
- Read the course syllabus and required text: “*Take the ‘Sigh’ Out of Science*”
- I have enclosed Jamaica Kincaid’s “Girl” piece. Write ***your*** version – reflecting upon remembered voices in your past ***instructing you***. Those voices may have been formal or informal. The style of your version is up to you. We will spend time together during our 1st session sharing all, part, or none (if you prefer). This activity will serve as part of our introductions to one another.

Welcome! I look forward to the learning camaraderie, which I expect will characterize our time together.

“Girl”

From “At the Bottom of the River”

By Jamaica Kincaid

Wash the white clothes on Monday and put them on the stone heap; wash the colored clothes on Tuesday and put them on the clothesline to dry; don’t walk bareheaded in the hot sun; cook pumpkin fritters in very hot sweet oil; soak your little clothes after you take them off; when buying cotton to make yourself a nice blouse, be sure it doesn’t have gum on it, because that way it won’t hold up well after a wash; soak salt fish overnight before you cook it; is it true that you sing Benna in Sunday School? Always eat your food in such a way that it won’t turn someone else’s stomach; on Sundays try to walk like a lady and not the slut you are so bent on becoming; don’t sing Benna in Sunday school; you mustn’t speak to wharf-rat boys, not even to give directions; don’t eat fruits on the streets – flies will follow you; *but I don’t sing Benna on Sunday’s at all and never in Sunday school*; this is how to sew on a button; this is how to make a button hole for the button you just sewed on; this is how to hem a dress when you see the hem coming down and so to prevent yourself from looking like the slut I know you are so bent on becoming; this is how to iron your father’s khaki shirt so that it doesn’t have a crease; this is how to iron your father’s khaki pants so they don’t have a crease; this is how to grow okra – far from the house, because okra trees harbor red ants; when you are growing dasheed, make sure it gets plenty of water or else it makes your throat itch when you are eating it; this is how to sweep a corner; this is how to sweep a whole house; this is how to sweep a yard; this is how to smile to someone you don’t like too much; this is how you smile to someone you don’t like at all; this is how you smile to someone you like completely; this is how you set a table for tea; this is how you set a table for dinner; this is how you set a table for

dinner with an important guest; this is how you set a table for lunch; this is how you set a table for breakfast; this is how to behave in the presence of men you don’t know very well, and this is the way they won’t recognize immediately the slut I have warned you against becoming; be sure to wash every day – even if it is with your own spit! Don’t squat down to play marbles – you are not a boy, you know; don’t pick people’s flowers – you might catch something; don’t throw stones at blackbirds, because it might not be a blackbird at all; this is how to make a bread pudding; this is how to make a pepper pot; this is how to make a good medicine for a cold; this is how to make a good medicine to throw away a child; this is how to catch a fish; this is how to throw back a fish you don’t like, and that way something bad won’t fall on you; this is how to bully a man; this is how a man bullies you; this is how to love a man, and if this doesn’t work, there are other ways, and if they don’t work, don’t feel too bad about giving up; this is how to spit in the air if you feel like it, and this is how to move quick so that it doesn’t fall on you; this is how to make ends meet; always squeeze bread to make sure it’s fresh; *but what if the Baker won’t let me feel the bread?* You mean to say that after all you are really going to be the kind of woman who the baker won’t let near the bread?