



University of Memphis College of Education

College of Education  
The University of Memphis  
*Instruction and Curriculum Leadership*  
**ICL 7605**

**Methods Elementary Science**  
**Fall 2010**

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## College of Education Norms

**I take 100% responsibility.**  
**I seek equity of voice.**  
**I am willing to talk about sensitive issues.**  
**I listen for understanding.**  
**I appreciate the strengths and contributions of others.**  
**I bring positive energy and encouragement to the team.**  
**I commit to the mission of the college.**

## **ICL 7605: Methods Elementary Science**

**Course Description:** This three-hour course is designed to enable entry-level teachers plan and implement effective and appropriate reform-based science instruction in elementary school. The primary focus is to develop and implement appropriate science lesson that reflects current trends and standards of science education for kindergarten through 6<sup>th</sup> grade students.

Understanding science curriculum of national & state levels science education as well as school district science is critical to begin planning science instruction. Acquisition of the proper level of science content knowledge and application of effective instructional strategies are also important to design the instruction. We, thus, will explore scientific literacy including science concepts, process skills, and the nature of science in the context of experience-based and problem-based learning environment through this course.

Emphasis on the nature of science, scientific inquiry, science process skills, and integrating other subjects with science as well as the various strategies in teaching science will be placed in this field-based format course. This course also provides authentic collaborative experiences to enhance construction of knowledge and development of efficacy through praxis and reflection.

This course is organized around six components:

- (1) Understanding of children's science learning process
- (2) Overview of the nature of science

- (3) Exploration of teaching science as inquiry
- (4) Exploration of science process skills
- (5) Investigation of scientific concepts
- (6) Discussion of teaching from various perspectives

**Prerequisites:** Admission to TEP

**Text:** Bass, J. E., Contant, T. L., & Carin, A. A. (2009). *Activities for teaching science as inquiry* (7<sup>th</sup> Ed.). Boston: Pearson Publishing.

**Course Objectives:** Students in this course will meet the following objectives, which are supported by NCATE (*National Council for Accreditation of Teacher Education*) guidelines and the science teacher competencies. The participants will...

1. Review current goals and standards in science education, including *National Science Education Standards* (NRC, 1996) and State Science Standards (<http://state.tn.us/education/ci/sci/index.shtml>) for the K-6 teachers.
2. Develop knowledge of K-6 level science curriculum presented by national, state, and school district levels.
3. Use or design appropriate curricular materials which meet the developmental need and interest of students.
4. Practice a variety of inquiry-based instruction for teaching K-6 level science lessons.
5. Gain an appropriate level of science content knowledge in life science, physical science, and earth and space science.
6. Design and implement science lessons that promote inquiry and scientific literacy in elementary school science.
7. Understand the nature of science and some important consensus views of the nature of science that science researchers presented.
8. Practice science process skills that can be used in the K-6 science classroom.
9. Apply a variety of science activities by connecting an appropriate science concept into the science classroom.
10. Integrate other subject areas into the instructional process to enhance science teaching strategies.
11. Use technology to establish science teaching resources and communicate reflections for expanding learning and teaching ideas in the classroom.
12. Develop awareness and sensitivity to the needs of diverse learners.

**Use of eCourseware:** This is an intensive hybrid course that includes both components of face-to-face and online class. Teaching & Learning materials that include PowerPoint files, readings, and handouts for the course are provided via “eCourseware.” Students are strongly encouraged to visit the class eCourseware regularly for the purpose of: posting your assignments, participating in weekly discussions, updating class information, and checking grades.

**Field Experiences:** ICL 7605 requires 10 hours of field experiences to field settings-- typically classrooms. Substantial time outside of class will be spent in your classroom or workplace in order to complete the special field activity requirement. If you are not employed as a full-time classroom teacher or as a full-time substitute teacher, then it is your responsibility to obtain a field setting approved by your instructor in which to conduct your field activity. See rubric for details.

**Americans with Disabilities Act:** The University of Memphis does not discriminate on the basis of disability in the recruitment and admission of students, the recruitment and employment of faculty and staff, and the operation of any of its programs and activities, as specified by federal laws and regulations. *The student has the responsibility of informing the course instructor (at the beginning of the course) of any disabling condition, which will require modification to avoid discrimination.* Faculties are required by law to provide "reasonable accommodation" to students with disabilities, so as not to discriminate on the basis of that disability. Student responsibility primarily rests with informing faculty at the beginning of the semester and in providing authorized documentation through designated administrative channels.

**Written Assignments and Academic Misconduct:** All written work submitted must be the student's original work and conform to the guidelines of the *American Psychological Association (APA)* available online and via their publications. This means that any substantive ideas, phrases, sentences, and/or any published ideas must be properly referenced to avoid even the appearance of plagiarism. Plagiarism includes, but is not limited to, the use, by paraphrase or direct quotation, of the published or unpublished work of another person without full or clear acknowledgment. It also includes the unacknowledged use of materials prepared by another person or agency in the selling of term papers or other academic materials. It is the student's responsibility to know all relevant university policies concerning plagiarism. Any documented cases of plagiarism can and will result in dismissal from the course with a failing grade, and may result in other more serious sanctions by the College of Education.

**Evaluation and Grading Policies:** Students will be evaluated in terms of successful completion of the learning activities, including regular, routine, and minor assignments and major projects. Everyone is expected to participate during class time and online during discussions and work on group projects. Clear criteria for success will be given for each assignment. Twenty percent of points will be deducted from an assignment for each day that it is late.

**Grade Scale:**

90- 100 = A  
80- 89 = B  
74- 79 = C  
70- 73 = D  
69 = F



### **Course Assignments:**

Attendance/Participation	5%
<i>Online Discussions (20%):</i>	
- Journal Discussions	10%
- Case Reflections	10%
Critters Log Poster	10%
Science Resources File	15%
Five Days Unit Plan	20%
Group Case Study	10%
Field Experience Activity	10%
<u>Exam</u>	<u>10%</u>
<b>Total</b>	<b>100%</b>

### **Assignments**

All written work except for in class activities will be typed using 12 pt. font and 1.5 spacing with 1 inch margins. Title, your name, ICL 7605, Fall 2010, and the instructor's name should be included in front of the first page. Students should post their assignments via eCourseware.

#### **5% – Attendance and Participation**

- Should demonstrate positive and respectful attitudes in interaction with the instructor and their peers.
- Includes professional attributes – attendance, punctuality, preparedness for class, cooperation, flexibility, patience, and enthusiasm)
- Quality of online participation, class participation and lab/activities (Handouts for the class activity will be collected and then graded)

#### **20% – Weekly Class Discussions through Electronic Posting**

##### **For the journal discussion (10%) & case reflections (10%):**

- Question(s) will be generated from the textbook, class discussion, and synthesis and analysis of readings and real-world teaching cases.
- Reading materials and cases will be provided.
- Total of 8 postings.

#### **10%. – Field Experience Activity**

As part of your requirement for this class and your teacher induction program, you are required to spend **10 hours** in a school. You will be placed in an elementary classroom where you will observe a veteran teacher and participate in the activities of the classroom. You will observe effective classroom management techniques used in an elementary classroom and you will participate in the implementation of a teaching strategy. You will

share your reflections on your experience and submit it with your field experience hours and signature page at the end of the course. See rubric for details.

### **10% – Critters Log Poster**

- Students are required to submit three artifacts that include a log, reflection, and poster for this assignment.

The log should include 2~3 entries per week of observation log with pictures, drawings, sketches, or photos. The poster should include a summary of your observations, records of informal scientific experiments, and information of the critters' population (i.e., species, habitat, life cycle, and interesting facts).

A 1-2 pages reflection note that includes ideas & examples of how to incorporate this experience into your science teaching must be included. See rubric for details.

### **10% – Group Case Study**

- Students, in small groups, work on a case, which reflects a real-world teaching episode. Each group will discuss and develop a teaching plan, activities, and a classroom management plan in accordance with the case throughout the semester. Present your case by using technology ...power point or transparencies. Duration for this activity is about 15 minutes. However, individual student should submit his/her own case-paper.

### **15% – Science Resources File:**

- Includes a minimum of 5 student centered/inquiry-based science lesson plans on a science topic you select (Should be appropriate for the grade level of your choice and topic listed in the grade level TN standards).
- Gather a minimum of 10 instructional activities or science demonstrations that you can use to teach the topic from any sources including professional journals, activity books, museums, internet, teacher reference books, etc.
- Includes numerous pages of **general background information** (science content) for the topic from textbooks, resources books, and websites.
- A minimum - **one page summary** of safety considerations, modifications, material availability, and integration ideas for the entire activity file.
- A reference list with at least **three different sources** – one of which must be other than the internet (The websites and reference materials are not only listed but also have **a brief explanation**). You should prepare the copies of class students' number of a reference list for distribution.
- Presentation of science resource files by using **PowerPoint**.
- See rubric for details.

### **20 pts. – Five Days Unit Curriculum Development**

**For this assignment, you must (1) submit a binder that includes all required documents and (2) deliver one lesson to the class.**

- Develop a unit curriculum of your interests in K-6 science: The lessons may come from science textbooks, the internet or other sources but will need to be approved by your instructor and rewritten in a detailed lesson plan format.

- This activity is required to participate in the following processes: sharing your topic, submitting a draft of unit plan, and a formative assessment. Final presentation and Unit binder due date is Nov. 22.
- **A cover sheet for the Unit should be included on the front and at the beginning of the Unit (use of a 3 ring binder is recommended). Tabbed dividers are expected between each article that is submitted for the unit.**
- Your unit includes at least 5 detailed lesson plans including copies of original activities used. The lesson plans should be Inquiry based.
- Document and submit followings: (1) five lesson plans that include student handouts & artifacts, and any assessments (i.e., worksheets) and (2) a 2-3 pages of reflection paper for your lesson teaching that includes your mentor teacher's and students - evaluation, self-evaluation of strengths and weaknesses, and revisions based on evaluations and your teaching reflection.
- Assessment – develop formative assessments to examine whether the objectives are met in all sections of the lesson. Submit rubrics and/or assessment sheets.
- **Science teaching practice** – (1) teach at least one lesson from your unit plan to your assigned class, (2) present your unit to the class and the use of technology for your presentation is required. You will get feedback from the course instructor and your peers.
- See rubric for details.

#### **10% – Exam**

### Weekly Schedule: Monday 5:00 – 8:00 PM

- eDiscussions are **due at the end (Friday midnight)** of each assigned week.
- Reading(s) will be read before the class time: All readings are provided.
- Students will be expected to print out (from eCourseware) and bring all the copies of handouts and PowerPoint files each week.

Week/Date	Content	Assignments
<b>1. August 30</b>	<b>Course Introduction:</b> Course Overview (use of eCourseware) Rationale of Science Teaching in the Elementary School TN & National Science Education Standards (NSES) in EC-6	eDiscussion #1 – “Say Hello” to the class NSTA position statement
<b>2. Sept 6</b>	Labor Day Holiday	
<b>3. Sept 13</b>	<b>National Science Education Reform and the Nature of Science (Reading 1):</b> Why should children learn science? U.S. Science Education: Past & Present Nature of Science Science Activity & Science Case 1	eDiscussion #2 – Journal Discussion
<b>4. Sept 20</b>	<b>How science should be taught? (Reading 2)</b> Learning Theories in Science Teaching Safety in Science Teaching Classroom management in the science classroom Science Activity & Science Case 2 (Safety aspect)	eDiscussion #3 – Case Organize Case Groups & Assign a Case Adopt Critters
<b>5. Sept 27</b>	<b>Scientific Methods:</b> Basic and Integrated science process skills Science Activity – Physical Science (Motion & Friction)	eDiscussion #4 – Case
<b>6. Oct 4</b>	<b>Planning &amp; Skills Development for Science Teaching (Reading 3):</b> Strategies and skills in planning and conducting science lessons and activities Science Activity – Chemical Science (Float/Sink & Density)	eDiscussion #5 - Journal Discussion
<b>7. Oct 11</b>	<b>Presentation of Science Resources File</b>	Science Resources File (Binder)
<b>8. Oct 18</b>	<b>Fall Break</b>	
<b>9. Oct 25</b>	<b>Effective Science Instruction: Inquiry-Based Instruction &amp; The Learning Cycle (Reading 4):</b> Different models of science instruction Science concept lesson – Physical Science (Electronic- and	eDiscussion #6 - Case

	Wind- energy)	
<b>10. Nov 1</b>	<b>Assessment in Teaching Science (Reading 5):</b> Different types of assessments in science Designing student assessments Science Activity – Earth Science (Shoreline Research) Science Case 3	eDiscussion #7 - A formative assessment for your lesson
<b>11. Nov 8</b>	<b>Integrating Science with Other Subjects (Reading 6):</b> Integration of Math/Science Science Activity – Integrated Curriculum (Mini-Olympic)	
<b>12. Nov 15</b>	<b>Critters' Log Poster Presentation &amp; Discussion</b> <b>Share your field experience</b>	Critters Log Poster Field Experience Activity Assignments
<b>13. Nov 22</b>	<b>Unit Plan Presentation</b>	Unit Binder
<b>14. Nov 29 316</b>	<b>Science &amp; Technology (Reading 7):</b> Benefits and ways of using technology in your classroom Exploring a variety of technology in the context of science teaching Science Case 4 (Technology aspect)	eDiscussion #8 - Journal Discussion
<b>15. Dec 6</b>	<b>Group Case Study Presentation</b>	Group Case-PPT Individual Case-Paper
<b>16. Dec 13</b>	<b>Exam</b>	