Elementary Science Methods
02.563
Mondays, 1 - 3:30
O'Leary Library 513 and Field Setting
Office Hours: Mondays, 12-1 p.m.

Instructors: Dr. Michelle Scribner-MacLean (michelle_scribnermaclean@uml.edu) and Melinda Willis, M.Ed. (Melinda_willis@student.uml.edu)

Required Texts
• Massachusetts Department of Education Science and Technology Frameworks. [STF]. Please download from: http://www.doe.mass.edu/frameworks/current.html
• Wong, H. and Wong, R (2009). The first days of school.

Required Online Subscription
• Brainpop.com. Log-in info will be provided (will be used in math methods, too).

Recommended Texts

Education for Transformation
The mission of the University of Massachusetts Lowell is to promote and sustain regional economic development. The Graduate School of Education (GSE) contributes to this mission by developing professionals who help transform the region through leadership roles in education. The GSE’s commitment to “Education for Transformation” produces graduates who:
• demonstrate excellent knowledge, judgment, and skills in their professional fields;
• promote equity of educational opportunity for all learners;
collaborate with other educators, parents, and community representatives to support educational excellence;

- use inquiry and research to address educational challenges

**What this means in this course...**
Students will explore what it means to think like a scientist as they ask questions and explore the natural world. They will learn strategies to bring scientific inquiry to the elementary classroom so that all learners can take ownership of their science questions with inquiry and by using local and community resources.

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**Why take an elementary science methods course? (Purpose)**
Most preservice elementary teachers have had little undergraduate preparation in science. If you have taken a science course, it was most likely taught through lecture and with no laboratory experience. The result for non-science majors is often confusion and possibly fear of science. Lecture-type courses which stress the memorizing information, do not prepare you to teach science in the elementary school. Therefore this course has three purposes:

1. To enhance your knowledge of concepts in science which are commonly taught in elementary schools;
2. To help you develop strategies for conducting inquiry-based science with elementary school children.
3. To enable you to use authentic assessment for inquiry-based science.

Often teachers are afraid to teach science because they "do not know all the answers." If you are willing to investigate along with your students, this fear of not being 'the expert' should be dissipated.

**How will this course be taught? (Processes)**
It is our firm belief that teaching strategies must be modeled in methodology classes. A teaching strategy is an approach to a lesson designed to achieve an intended outcome. Therefore, if you merely want your students to memorize the water cycle you would not use an inquiry-based strategy. Strategies are grouped according to the outcome you are intending to achieve. This grouping is not something that is fixed – you can organize the strategies in any way that you choose.

Inquiry is the means to discovery, but we must acknowledge that because everyone comes to class with different experiences and personal theories, their discoveries could be quite different. However, inquiry requires that there is a question or something that you wonder about. You probably have dozen of questions that you ask yourself every week that relate to science and the nature world. Inquiry in elementary school means fostering curiosity in children, helping them develop questions, and giving them the tools to investigate their ideas.

Once you have selected the strategy to be used according to what you are trying to
achieve in the lesson, then you will be called upon to use your teaching ‘skills.’ This course will also model the requisite skills, which include: clarity of purpose; maintaining the ‘flow’ in your lesson; managing the distribution of equipment, etc.; questioning techniques; giving directions; safety awareness; summarizing and bringing closure to lessons; maintaining order.

Helpful Items to Bring to Class
- Scissors, tape, glue stick, markers, 3-hole punch, metric ruler
- A non-repro blue pencil (This is sold in art supply stores and allows you to take notes on your handouts and then when you copy them, you can’t see your writing).
- Digital camera (you can document your group work, learning centers, etc.).
- USB flash drive (if you have one; many students have found this to be useful for saving work produced in class).

A Walk Through This Course...

This course will contain three components

1. In-class Time / Field Placement

<table>
<thead>
<tr>
<th>What is expected of you</th>
<th>What you can expect from the instructors</th>
<th>Estimated amount of work time per week</th>
</tr>
</thead>
</table>

...
• Arrive on time
• Come prepared with materials ready
• **Have your reading done for the week**
• Hand in assignments (when appropriate)
• Ask questions of the instructor
• Interact with your peers in a positive manner
• Actively engage in the inquiry process
• Do not make appointments during class time.
• Do not leave early.
• Complete CORI for partner school district

• Modeling effective teaching of inquiry-based science
• I’ll return your assessments in a timely manner
• I’ll give you feedback if I feel you’re not doing what is expected of you.

**Mondays, 1-3:30 p.m. and field work**
(2 hrs. and 30 minutes each week).

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**2. Weekly Assignments and Reading**

<table>
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<th>What you can expect from the instructor</th>
<th>Estimated amount of work time per week</th>
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</table>
| Consult the syllabus weekly to see what is due and what is expected of you.  
Read weekly reading assignments.  
Complete course assignments and turn in on time.  
Ask questions about assignments (if necessary). | Clear assignment criteria. (If you don't understand what is required of you, please ask)  
Help with assignments -- just ask  
Prompt, clear, and detailed feedback about your assignments | 2 - 3 hours per week. |
### 3. Online Discussions and Meetings

<table>
<thead>
<tr>
<th>What is expected of you</th>
<th>What you can expect from the instructor</th>
<th>Estimated amount of work time per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Get logged on during the first week of class.</td>
<td>• Online components will be up and ready at appropriate time</td>
<td>30 min. - 1 hour for most weeks.</td>
</tr>
<tr>
<td>• Participate in discussion 2-3 times each week on online discussions. Your posts should be meaningful, well thought-out, and articulate.</td>
<td>• I'll post weekly questions to reflect upon each week. These will be tied directly to our course topic for that week.</td>
<td></td>
</tr>
<tr>
<td>• Post your first response by <strong>Wednesday</strong> of each week.</td>
<td>• All course materials will be posted on the course site.</td>
<td></td>
</tr>
<tr>
<td>• Post your follow up responses (if appropriate) by <strong>Friday</strong></td>
<td>• I'll add additional resources (when possible).</td>
<td></td>
</tr>
<tr>
<td>• Read all the postings of your peers</td>
<td>• I'll check into the site several times during the week to check your progress.</td>
<td></td>
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</tbody>
</table>
**Course Requirements**

Class attendance is required for all sessions.

**Class participation.**

I’ll be teaching through an inquiry approach and modeling teaching strategies you might use in an elementary setting. This means that you’ll be working with your peers, discussing your ideas, and sharing your findings. Enthusiastic participation is important for this class (see rubric for more info).

All assignments must be completed and submitted to pass this course.

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### Course Assignments - Summary*

<table>
<thead>
<tr>
<th>Assignment Title</th>
<th>Type of Assessment</th>
<th>Point Value</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Class participation and professionalism</td>
<td>Formative</td>
<td>50</td>
<td>throughout course</td>
</tr>
<tr>
<td>2. Brain Pop quizzes</td>
<td>Summative</td>
<td>50</td>
<td>Session 8</td>
</tr>
<tr>
<td>3. Weekly Learning Blog</td>
<td>Formative</td>
<td>200</td>
<td>20 points, Sessions 1-10</td>
</tr>
<tr>
<td>4. Moon Journal &amp; Moon Quiz</td>
<td>Summative</td>
<td>100</td>
<td>Sessions 12 &amp; 13</td>
</tr>
<tr>
<td>5. Learning Center</td>
<td>Formative/Summative</td>
<td>100</td>
<td>Session 13</td>
</tr>
<tr>
<td>6. Process Skill Presentation and Handout</td>
<td>Formative/Summative</td>
<td>200</td>
<td>Session 3</td>
</tr>
<tr>
<td>7. Online discussion weeks</td>
<td>Summative</td>
<td>200 (20 pt/wk)</td>
<td>first 10</td>
</tr>
<tr>
<td>8. Lesson plan</td>
<td>Formative</td>
<td>100 points</td>
<td>Session 4</td>
</tr>
</tbody>
</table>
*More detailed criteria for each of these assignments will be presented well before due dates
Grading Criteria

Course Grading System

ALL ASSIGNMENTS AND REQUIRED HOMEWORK MUST BE SUBMITTED. If assignments are late or not submitted, the student may be advised to withdraw or run the risk of gaining a “below graduate standard” grade. INCOMPLETES will only be given if the student has documented evidence of illness or exceptional circumstances. Inability to keep-up with course work is not grounds for requesting an incomplete.

Late work: You are expected to complete work on time, unless prior arrangements have been made with the instructor. **Two points per day** will be subtracted for work that is late.

Although specific rubrics will be provided for assignments, the overall grading system for the course is based on the system below. Please note that the UMass system now uses the A+ to B system for graduate standard work.

<table>
<thead>
<tr>
<th>Grade</th>
<th>GPA</th>
<th>Point structure</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>4.0</td>
<td>990-1000</td>
<td>Work of the highest professional standard demonstrating independent and exemplary performance</td>
</tr>
<tr>
<td>A</td>
<td>4.0</td>
<td>960-980</td>
<td>Excellent work demonstrating independent and high quality performance.</td>
</tr>
<tr>
<td>A-</td>
<td>3.7</td>
<td>910-950</td>
<td>Very good work, carefully executed, but requiring some areas of improvement.</td>
</tr>
<tr>
<td>B+</td>
<td>3.3</td>
<td>860-900</td>
<td>Good work, indicating careful thought and attention to the task, yet requiring several areas of improvement.</td>
</tr>
<tr>
<td>B</td>
<td>3.0</td>
<td>800-850</td>
<td>Work of graduate standard, but omissions exist or careful analysis is not in evidence.</td>
</tr>
<tr>
<td>B-</td>
<td>2.7</td>
<td>760-790</td>
<td>Effort is evident, but work indicates lack of understanding of the demands of the task</td>
</tr>
<tr>
<td>C+</td>
<td>2.3</td>
<td>700-750</td>
<td>Poor quality work with little attention to detail and the demands of the task.</td>
</tr>
<tr>
<td>C</td>
<td>2.0</td>
<td>650-690</td>
<td>Work of very poor quality, indicating no understanding of the depth of analysis required.</td>
</tr>
<tr>
<td>F</td>
<td>0.0</td>
<td>Below 650</td>
<td>Serious neglect or evidence of cheating.</td>
</tr>
</tbody>
</table>

Below Graduate Standard
All assignments must be completed to pass this course. Please make sure that you have corrected the formatting and spelling before handing in assignments. All assignments must be typed and referencing should follow APA.
Grade A, A-
Exemplary work, deemed by the instructor to reflect ideas and writing of a high professional standard which are creative and reflect a thorough understanding of the demands of the assignment.

Grade B+, B
Work of good quality, input from the instructor will help the student redesign the project or reorganize the paper to make it more coherent or viable.

Grade B-, C+
Some of the ideas presented are not necessarily articulated. The student may have missed vital evidence or presented projects that do not show evidence of original thought.

Grade C, C-
The student shows poor understanding of the demands of the task. Aspects of the task may also have been omitted. Significant areas of deficiency. Appears that little thought, time, or effort was put into the work.

Grade F
Unacceptable work. Poor presentation, inadequate response to the assignment, little or no effort, bare minimum has obviously been completed.

Guidelines for Submitting Assignments
1. All formal assignments must be typed and referenced using APA format, except when otherwise stated by the instructor. Please be sure that you’ve checked spelling, grammar, and formatting before submitting assignments.

2. Some assignments may be submitted electronically. You should use your assigned UML email account. If you email an assignment, please put your last name on the document title. For example, you might send a lesson plan and name it: SCRIBNERLessonPlan.
# CLASS SCHEDULE & ASSIGNMENTS
(subject to change)

<table>
<thead>
<tr>
<th>DATE / TIME</th>
<th>TOPIC(S)</th>
<th>ASSIGNED READING &amp; VIDEO CASES (to be done after class session)</th>
<th>ASSIGNMENTS</th>
</tr>
</thead>
</table>
| **SESSION 1**  
September 9th  
Room 513  
O’Leary Library | • Course overview  
• Draw A Scientist  
• What’s in the bag?  
• Introduction to Moon Journal  
• Ingrid’s Case | • Watch: Jennie’s Case  
• Read pg. 1-36 in the Mass. Science & Tech. Frameworks [STF] | • Session 1 online discussion  
• Start your blog and post the site address on Blackboard. This week’s topic: My science story  
• Start Moon Journal |
| **SESSION 2**  
September 16th | • How children learn science  
• Oobleck: What Scientists Do  
• Introduction to Process Skills  
• Introduction to Assignment 6: Process Skill Presentation | • Read Chapter 1 in TLA  
• Read and Discuss Online: Wong: Basic Understandings | • Session 2 online discussion  
• Continue with Moon Journal  
• Begin Assignment 3  
• Begin Assignment 6 |
| **SESSION 3**  
September 23th | Observation vs. Inference  
• Introduce to Lesson Planning  
• Sarah’s Case | • Finish reading MA Science and Tech Frameworks.  
• Read Chapter 2 in TLA | • Session 3 online discussion  
• Continue observing the moon |
<p>| • Assessment in Science | • Read and Discuss Online: Wong: First Characteristics | • Begin Assignment 8: Lesson Planning |</p>
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| **SESSION 4**  
September 30th | • Overview of school  
• ONLINE: Share your first lesson plan online. Comment on draft of two others. | • Read Chapter 13 in **TLA**  
• Read and Discuss Online: Wong: Classroom Management | • Session 4 online discussion  
• Continue observing the moon  
• Assignment 8: Lesson Plan submitted online. |
| **SESSION 5**  
October 7th | • Teamwork, safety, and lesson planning.  
• Bring final version of lesson plan. | • Plan with your teaching group this week  
• ONLINE: Do Safety Module and discuss. | **Send lesson plan to Instructors by Wednesday** |
| **SESSION 6**  
October 14th | **UML CLOSED**  
• ONLINE: Do modules on Lesson Introduction, Materials Management, and Connection to the Frameworks and discuss. | • Arrange to get supplies by next week  
• Read Chapters 3 and 4 in **TLA**  
• Read and Discuss Online: Wong: Future Understandings | • Session 5 online discussion |
| **SESSION 7**  
October 21st | • Lesson #1 at Field Placement  
• ONLINE: Debrief  
• Online: Do modules on Classroom Management, Process Skills, and Lesson Conclusion and Discuss. | • Watch Tom's Case  
• Read Chapter 5 in **TLA** | • Session 6 online discussion  
• Prepare for next week’s lesson. Lesson plan to Instructors by Wednesday  
**DUE:** Assignment 4: Moon Journal |
| SESSION 8  
October 28th | ・ Lesson #2 at Field Placement  
・ ONLINE: Debrief  
・ ONLINE: Do modules on Content Vocabulary, Flow of the Class, Misconceptions, and Assessment tools and discuss. | ・ Read Chapter 6 in TLA  
・ Watch Donna's Case | ・ Session 7 online discussion  
・ Prepare for next week's lesson. Lesson plan to Instructors by Wednesday |
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<tbody>
<tr>
<td><strong>SESSION 9</strong></td>
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<tr>
<td>November 4th</td>
<td>• Lesson #3 at Field Setting</td>
<td>• Read Chapter 7 in <strong>TLA</strong></td>
<td>• Session 8 online discussion</td>
</tr>
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<td></td>
<td>• ONLINE: Debrief</td>
<td>• Watch Jean's Case</td>
<td>• Due: Assignment 2: Brain Pop Quizzes (please number 1-30)</td>
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<td></td>
<td>• ONLINE: Do modules on Writing in Science and Instructional Technology and discuss.</td>
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<td>November 11</td>
<td>Veteran’s Day</td>
<td><strong>University Closed</strong></td>
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<tr>
<td>SESSION 10</td>
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<tr>
<td>November 18th</td>
<td>• Lesson #4 at Field Setting</td>
<td>• Read Chapter 8 in <strong>TLA</strong></td>
<td>• Session 9 online discussion</td>
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<td></td>
<td>• ONLINE: Debrief</td>
<td>• Watch Dotty's Case</td>
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<td></td>
<td>• ONLINE: Do modules on Engineering and Technology Connections and Differentiating Instruction and discuss.</td>
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<td>SESSION 11</td>
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<tr>
<td>November 25th</td>
<td>• Lesson #5 at Field Setting</td>
<td>• Read Chapter 9 in <strong>TLA</strong></td>
<td>• Session 10 online discussion</td>
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<td>• ONLINE: Debrief</td>
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<td>SESSION 12</td>
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<tr>
<td>December 2nd</td>
<td>• Moon Study</td>
<td>• Read Chapter 10 in <strong>TLA</strong></td>
<td>• Session 11 online discussion</td>
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<tr>
<td>O’Leary Library</td>
<td>• Moon Quiz (take home)</td>
<td>• Read handouts assigned in class</td>
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<tr>
<td>SESSION 13</td>
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<tr>
<td>December 9th</td>
<td>• Course Wrap Up</td>
<td>• Read Chapter 11 and 12 in <strong>TLA</strong></td>
<td>• Due: Learning Center</td>
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<td></td>
<td>• Learning Centers</td>
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<tr>
<td>O'Leary Library</td>
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