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C&I 426.01: Teaching Science in the Middle and Secondary School

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Teaching Science in the Middle and Secondary School
C&I 426

School of Ed 112 - Tuesday and Thursday- 8:10-11:00

Instructor: Fletcher Brown,  
Office: 106 School of Ed Building  
Office Hours: Tuesday 11-12, Wed 1-2:30, or by appointment  
Email: Fletcher.Brown@mso.umt.edu  
Textbooks: Teaching Secondary School Science by Trowbridge & Bybee  
National Science Education Standards

Goal/Objectives

The goal of this course is to help prepare you to teach science in the middle and secondary school. After completing this course, you should be able to:

1. Describe appropriate science concepts, processes and attitudes to be included in the middle and secondary science curriculum.

2. Select appropriate materials to support secondary science instruction.

3. Plan effective science lessons for middle and secondary science students.

4. Deliver effective science instruction to secondary school students using a variety of teaching methods.

5. Discuss current problems and issues related to secondary school instruction in an informed manner.

6. Develop the ability to be reflective about teaching, education, students, and the entire educational process.

Attendance

You are expected to be in class on time and for all class meetings. This is your education; get the most out of it.

Assignments

1. Word-processed assignments are mandatory.
2. Submit work on or before the due date to receive credit for your work.
3. Submit high quality, thoughtful assignments only.
Other Important Information

1. Be flexible; the syllabus might change in order to serve your needs in a more helpful, efficient manner.

2. Be in contact with me if anything related to the class is unclear or if you need further assistance.

3. Be sure to "Go the Extra Mile" in everything you do for this course. We need EXEMPLARY science teachers in our schools that go the EXTRA MILE. So, begin now.

Course Structure

Regular Class and Field Experience Meetings: The methods course work and field experience will be divided into three sections. The first section of class (8/28-10/23) students works in class developing an understanding of what good science instruction is composed of. This includes readings and participation in inquiry oriented instruction, cooperative group learning strategies, integrating math and science content and pedagogy, and the use of appropriate form of technology in teaching. Along with the classroom meetings students will begin their second field experience, meet their teacher, and become comfortable with the students and the classroom-learning environment. The second section of class (10/27/-11/30) students will be completely immersed in their field experience and will not meet in class during regular meeting times. E-mail journalizing will be used to focus student’s field experience on important themes identified in class or the text. Students will also teach their integrated unit in their respective middle or high school. The third section of class students will again meet at the regular class meeting time at the University using their experience in the field as a basis to refine their teaching practice. Students will present their integrated unit to the rest of the class and complete the remaining requirement in their class portfolio.

Integrated Math/Science Meetings: When possible during the first and third sections of class the math and science methods classes will meet together and complete investigations modeling integrated math/science teaching. After the investigations students and instructors will deconstruct the investigations identifying the unique and overlapping content and processes for both disciplines and the pedagogical approach used in the investigation.

Integrated Whole Group Meetings: The Social Studies, Business, Math, and Science methods classes will meet a number of times throughout the semester both during regular classroom meeting times and several evenings. The focus of these meetings is for interdisciplinary groups of students to meet and develop an integrated teaching unit to be taught in the schools during your field experience.

Student Evaluation

The assessment of your performance in this class will be based on the assignments described below. At the end of the semester you will be expected to create and hand in an assessment portfolio which brings together each of these assignments for a final evaluation. Below is a brief description of each assignment. Further description of each assignment and the assessment portfolio will be given in class.

Journal - You will be asked to record your own thoughts and reflections from your field experience in this course. You be required to make one journal entry each week you are in the classroom on e-
mail with two other students in the class as well as the instructor. You are also responsible to respond
to other student e-mail journal entries, giving comments, questions, and reflections.

**Thematic Interdisciplinary Unit** - You will develop a minimum of a one-two day teaching unit to
be taught in your field experience C&I 301/302 during the last two weeks of November. This unit
should include an appropriate theme, a rationale, unit goals, two lesson plans, appropriate
technology, an assessment scheme, and reflection on the implementation of the unit. Due December
3rd.

**Year Long Curriculum Course and Sequence** - You will be expected to develop a yearlong scope
and sequence for the subject you expect to teach. The scope and sequence should include a central
theme, a conceptual framework, model both national and state standards, and incorporate appropriate
forms of technology and instruction pedagogy.

**Educational Philosophy** – You will be asked to write a one page educational Philosophy which you
should eventually include in your teaching portfolio.

**Resources** – Identify and collect 10 different classroom activities you plan on using in your
classroom. In addition create a bibliography and if possible collect a minimum of 20 resources for
you to use, as a science teacher (no more than 1/3 of them can be from the Internet).

**Readings Assignments/Participation** - You will be expected to complete all readings and associated
assignments and participate in discussions involving the chapter readings and articles given in class.
You are also expected to be in class actively participating in discussions and activities.

**Grades**

Each assignment will have a certain number of factors, which will be assessed using a set of
criteria (See sample below for an example of criteria used). The number of factors measured in each
assignment are as follows: Journalizing 5; Integrated Thematic Unit 4; Year Long Curriculum
Course and Sequence 4; Educational Philosophy 2; Resources 3; Participation 2 (1 for Attendance, 1
for student evaluation) Total: 20. The specific factors measured will be assigned prior to the
assignment being initiated and often times developed by the students in class.

Your final grade will be determined by the following. A number score will be given to each
criteria (4-excellent, 3-good, 2-needs work, 1 lacking) and summed for all 20 factors. Grades will be
based on the following:

- 70-80 - A
- 60-70 - B
- 50-60 - C
- 40-50 - D

Keep track of your work and evaluations in your portfolio as the semester goes along. This
portfolio will have six sections; one representing each area being evaluated listed above (Not
including reading assignments/participation). In each section there will be three parts; the assignment
requirements, evidence collected for the assignment, and the evaluation given for the assignment. At
the completion of the semester you will be asked to hand in the assessment portfolio and a grade will
be given to each student based on the above grading scale accompanied with a written narrative
summarizing the students work throughout the semester.
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<tr>
<th>WK</th>
<th>DATE</th>
<th>TOPIC</th>
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<tbody>
<tr>
<td>1</td>
<td>Aug 28</td>
<td>Introduction: Why do we teach? What is Science Teaching?</td>
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<td></td>
<td>Aug 30</td>
<td>What is learning in science? Inquiry &amp; Conceptual Change</td>
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<td>2</td>
<td>Sept 4</td>
<td>What is learning in science? Inquiry &amp; Conceptual Change (Joint Methods Meeting #1)</td>
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<td>Sept 6</td>
<td>In the Field</td>
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<td>3</td>
<td>Sept 11</td>
<td>Creating Effective Science Learning Environments Part#1</td>
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<td>Sept 13</td>
<td>In the Field</td>
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<td>4</td>
<td>Sept 18</td>
<td>Creating Effect Sci. Learning Enviro. Part#2</td>
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<td>Sept 20</td>
<td>In the Field</td>
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<td>5</td>
<td>Sept 25</td>
<td><em>First Teaching Episode</em> (Math/Sci Methods Integrated Activity)</td>
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<td>Sept 27</td>
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<td>Oct 2</td>
<td>Process Skills/Affective Domain (Joint Methods Meeting #2)</td>
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<td>Oct 9</td>
<td>Science Education Curriculum</td>
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<td>Oct 11</td>
<td>MEA Conference (<strong>In the Field</strong>)</td>
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<td>Oct 16</td>
<td>Assessment in Science Education (Math/Sci Methods Integrated Activity)</td>
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<td>Oct 18</td>
<td>In the Field</td>
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<td>Oct 23</td>
<td>Assessment in Science Education (Joint Methods Meeting #3)</td>
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<td>Oct 25</td>
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<td>10</td>
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<td>Nov 1</td>
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<td>Date</td>
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<td>Nov 8</td>
<td><strong>In the Field</strong> (Integrated Unit Teaching)</td>
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<td><strong>In the Field</strong> (Integrated Unit Teaching)</td>
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<td>Nov 20</td>
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<td>Thanksgiving No Class</td>
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<td>Nov 14</td>
<td>Nov 27</td>
<td>Integrated Unit Presentation</td>
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<td>Nov 29</td>
<td>Education Technology and Science</td>
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<td>Nov 15</td>
<td>Dec 4</td>
<td>Research in Science Education</td>
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<td>Dec 6</td>
<td>Teacher Resources/ Special Topics</td>
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<td>Nov 16</td>
<td>TBA</td>
<td>Final Exam/Presentations</td>
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**Bold** – Field Experiences in the Schools