Curriculum Decisions and Assessment in Science
STCH 420
Spring 2003

Instructors: Vicente Talanquer (vicente@u.arizona.edu)
Room 216, Old Chemistry
Phone 626-8169

Jo Quintenz (quintenz@u.arizona.edu)
Stacey Jones-Willy (sjoneswi@email.arizona.edu)
Room 210 LSS Phone 621-2511

Credits: 4

Class Times/Location: MWF 1:00-1:50 PM. PAS 170
Office Hours: Stop by our offices or make an appointment
Classroom Experiences: Field experiences in the secondary school classroom will run during
seven weeks of the semester (2/10-4/4). During these weeks we will meet
at our regular times plus an additional hour a week (to be arranged) to
analyze and discuss your classroom experiences.

Course Overview:

The focus of this course is on the practical aspects of planning lessons and assessments in a science
classroom at the secondary school level. As an integral part of the Science Teacher Preparation Program
in the College of Science, the purpose of STCH 420 is to help you develop your own teaching
philosophy.

This course has two main components. Part of the class will be taught in a University classroom, where
we will analyze, discuss, reflect on and gain practice in designing secondary school science curricula,
lesson plans, and assessment tools. Additionally, you will spend part of your time in a secondary school
classroom working with and observing science teachers, and collaborating with them in specific tasks
related to science curriculum development, lesson planning and delivery, and assessment. In the
laboratory portion of this course, you will be assigned to a mentor science teacher and will be spending a
total of 7 weeks in his/her classroom. **You will need to plan to be in the same classroom with the same
group of students for the entire 7 weeks.** In addition, **you will also need to commit at least one
additional hour a week to meet with your mentor teacher** to discuss your experiences and complete
your lab assignments.

By the end of the course you will be expected to:

- **Make coherent curriculum decisions that promote students’ engagement in learning and
understanding of science.**
- **Plan, implement, and assess lessons with the learning goals guiding your choices and actions.**

In particular, you will be able to:

a) Identify and describe the curriculum/teaching decisions that influence learning outcomes.
b) Identify and select coherent sets of long-term and short-term learning goals.
c) Select and create activities that build upon students’ interests and prior knowledge, and promote
understanding of central ideas in science.
d) Implement and evaluate diverse teaching strategies and materials to achieve the instructional goals and meet student needs.
e) Select and implement assessment strategies that support understanding.
f) Assess the alignment between different curriculum/teaching decisions that influence learning outcomes.
g) Reflect critically on your personal conceptions about science teaching and learning.

Topics Outline

Unit 1  Thinking about planning  (4 weeks)
How do you plan a lesson? What do you think about? How do you define your goals? How do you structure the content of a lesson? How do you assess the learning outcomes?

Unit 2  Thinking about purpose and structure  (3 weeks)
Why do we teach science in the secondary school? What do we expect the students to learn? In what ways can the curriculum represent science? How do teachers’ beliefs, preferences, and choices affect curriculum representation? How do you define learning goals? How do student interests and previous knowledge influence learning? How do you define or choose the central ideas you want your students to understand?

Unit 3  Thinking about assessment  (5 weeks)
In which ways should assessment guide your planning? How do you assess students’ understanding? In what ways can science teachers gather information about student learning? In what ways should assessment correspond to instructional goals?

Unit 4  Thinking about instruction  (4 weeks)
How do you select teaching strategies and create meaningful learning activities? What does it mean to plan a student-centered science lesson? How are teaching strategies and instructional models related to meaningful learning outcomes? What does it mean to teach for understanding?

Assignments:

In this course you will

- Complete daily assignments and activities based on the ideas discussed in the university classroom.
- Participate in a 7-week field experience in a secondary school classroom and complete the corresponding weekly assignments.
- Complete four examinations.
- Build and defend a course portfolio that presents a carefully selected sample of your work during the semester and illustrates your ability to reflect on your knowledge and skills (Final assessment).

All the written assignments should be composed on a word processor, with a 1½ -line spacing and a letter font-size between 11-12 points. The various activities and assignments developed in this course are worth the following percentage of your final grade:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percent Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily activities</td>
<td>25 %</td>
</tr>
<tr>
<td>Examinations</td>
<td>20 %</td>
</tr>
<tr>
<td>Field experience</td>
<td>40 %</td>
</tr>
<tr>
<td>Portfolio</td>
<td>15 %</td>
</tr>
</tbody>
</table>
Grading Scheme:

The individual assignments will be graded using the following numerical scale:

<table>
<thead>
<tr>
<th>0</th>
<th>4</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not turned in</td>
<td>Inadequate</td>
<td>Sufficient</td>
<td>Fair</td>
<td>Good</td>
<td>Very Good</td>
<td>Excellent</td>
</tr>
</tbody>
</table>

10  The product addresses *all* the questions or tasks presented in the assignment, and reflects a high degree of intellectual engagement with the questions or tasks. *All* the conclusions are justified with appropriate rationales and/or references. In addition, the product is clearly written and well organized, with no major grammar or spelling errors.

9   The product addresses *most* of the questions or tasks presented in the assignment, and reflects a high degree of intellectual engagement with the questions or tasks. *Most* conclusions are justified and the product is clearly written and well organized, with no major grammar or spelling errors.

8   The product addresses *most* of the questions or tasks presented in the assignment, but reflects a limited amount of intellectual engagement with the questions or tasks or the work and conclusions are incompletely justified. The product is clearly written and well organized, with no major grammar or spelling errors.

7   The product does not address all the questions or tasks presented in the assignment and reflects a limited amount of intellectual engagement with the questions or tasks. The work and conclusions are incompletely justified. The product reflects a moderate understanding of the goals of the assignment or a lack of attention to detail in producing a finished product.

6   The product does not address *most* of the questions or tasks presented in the assignment and reflects a limited amount of intellectual engagement with the questions or tasks. The work and conclusions are incompletely justified. The product reflects a lack of understanding of the goals of the assignment or a lack of attention to detail in producing a finished product.

4   The product does not address *most* of the questions or tasks presented in the assignment and the product is so poorly written that it indicates a serious lack of understanding and responsibility.

The following table will be used to assign the final grade for the overall course:

<table>
<thead>
<tr>
<th>Average</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>[9.0-10.0]</td>
<td>A</td>
</tr>
<tr>
<td>[8.0-9.0)</td>
<td>B</td>
</tr>
<tr>
<td>[7.0-8.0)</td>
<td>C</td>
</tr>
<tr>
<td>[6.0-7.0]</td>
<td>D</td>
</tr>
<tr>
<td>[0-6.0)</td>
<td>E</td>
</tr>
</tbody>
</table>

Incomplete grades will not be given. There will be no exceptions other than those associated with family tragedies or serious illness.

*All assignments turned in late will be assessed, but not graded.*
**STCH 420 Web Page:** The web page for this class may be found at http://www.chem.arizona.edu/tpp.

**Recommended Texts:**

The following books will be used as basic references in these and other courses in the College of Science Teacher Preparation Program.


**Other useful references:**

- **Arizona Science Education Standards. Internet access: http://www.ade.state.az.us/standards/science/**


Additionally, we recommend that you periodically review two of the journals published by the National Science Teacher Association (NSTA), *The Science Teacher* and *Science Scope*, which include interesting and useful articles for secondary school science teachers.