Innovations and Assessment in the College Science Classroom

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To improve our classrooms:
- changed our classes from a lab-lecture format to a studio classroom
- spent more class time on cooperative/collaborative learning
- developed students involved in original scientific investigations
- covered more substantive topics in greater depth
- emphasized knowledge-based learning
- emphasized development of comprehension, application, analysis, synthesis, evaluation and other skills
- helped our students develop good habits of the mind and fundamental skills useful for lifelong learning

Some instructors have collected data showing that a studio/colaborative classroom promotes better learning, including problem solving skills and understanding of key principles, improved student attitudes and better performance outcomes. While documenting student attitudes and grades is not difficult, it is extremely difficult to make objective comparisons of learning outcomes between classes taught as studio classes, and those taught in more traditional formats. As in the format of the classes different, comparison of exams and project performance is difficult. Fortunately, we have had a significant background to address these issues.

The survey will be given twice during the semester: refer to your survey to monitor your increasing mastery of the material through the semester.

How can we tell if we have been successful?

To try to answer this question, we used a number of different approaches to assessment.

A Battery of Assessment Methods

- Informal evaluation
- portfolios
- survey of students in studio and control classes
- Knowledge Surveys
- Test and quizzes
- Post-course interviews
- Grades

Knowledge Survey

This is an important survey, not a test. The purpose of this survey is to provide a study guide that describes the organization, content, and level of thinking required in this course and to help you monitor your progress as you proceed through the term. In this knowledge survey, we encourage you to answer the questions with your present knowledge. Read each question carefully and then answer it before reading the one that follows. The questions require that you describe your confidence in each of the following instructions.

Mark (x) "Could answer "now" or your response if you feel confident that you can answer the question sufficiently well for general purposes.
Mark (x) "Could answer "later" or your response if you can answer at least 50% of the questions when you know the answers or can look up the information needed to answer the questions within 20 minutes of completing the survey.
Mark (x) "Could not answer" or your response if you cannot answer or do not know the answer even when you know the answers or can look up the information needed to answer the questions within 20 minutes of completing the survey.

In the knowledge survey, you will be asked to indicate how well you think you can adequately answer the question for general purposes. The survey will help you to identify areas in which you need to improve your content mastery.

Be sure to do your best to complete a honest assessment of your present knowledge. When you mark (x) on the last column of these knowledge questions, consider the following:

- Your instructor may have you demonstrate your level of mastery by actually answering one or more of these questions on the survey, this demonstration might take place as part of a test or a quiz in the future.

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Scene Sample Questions

- What are the chemical formulas for calcium, carbon, copper, phosphorus, and sodium?
- How are grays commonly stated?

What are four ways of thinking about the concept of "knowledge"?

- Why are "considerations" so important in understanding the concept of "knowledge"?
- How do you identify the "true" and "false" in the concept of "knowledge"?
- How do you demonstrate the "true" and "false" in the concept of "knowledge"?

In general, high-density minerals have high refractive indices compared to low density minerals.

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Science Sample Questions

- What are the chemical formulas for calcium, carbon, copper, phosphorus, and sodium?
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