EFFECTIVE TEACHING AND LEARNING IN THE LARGE CLASSROOM SETTING

How will you know they know??

http://serc.carleton.edu/NAGTWorkshops/assess/lgclass.html

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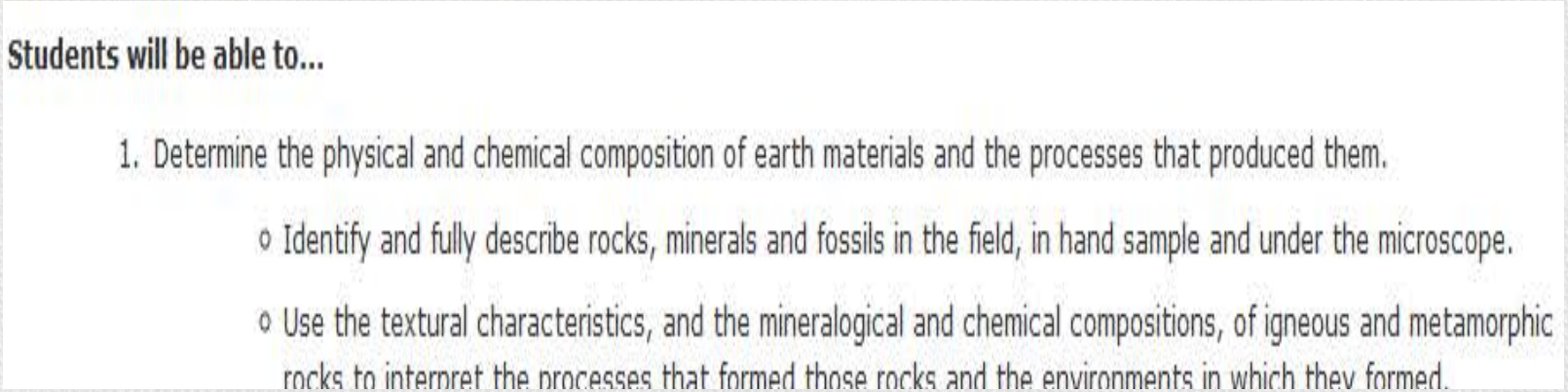
1st Fundamental Question:

- **"What do you want the students in your large class to be able to *do*?"**
- Student Learning Outcomes (SLO's):
  - "the knowledge, skills, attitudes, competencies, and habits of mind that students are expected to acquire" in your class. (http://www.learningoutcomeassessment.org/TFComponentSLOS.htm)
- Attributes of good Student Learning Outcomes:
  - Observable
  - Measurable
  - Able to be demonstrated

1st Fundamental Question, con't:

- **Weak SLO: "Students will understand rocks."**
  - What will they be able to *do*?
  - How will you know they "understand"?
- Better SLO from Cal State (University at) Chico:

(http://serc.carleton.edu/departments/assessment/CSUC_geo_outcomes.html)



Students will be able to...

1. Determine the physical and chemical composition of earth materials and the processes that produced them.
   - Identify and fully describe rocks, minerals and fossils in the field, in hand sample and under the microscope.
   - Use the textural characteristics, and the mineralogical and chemical compositions, of igneous and metamorphic rocks to interpret the processes that formed those rocks and the environments in which they formed.

- Many more examples at:

(http://serc.carleton.edu/departments/assessment/)

2nd Fundamental Question

- **How will you know your students can *do* what you want them to do?**

The Scarlet Letter: 

- Assessment "flavors":
  - **Formative**: "in order to modify teaching and learning activities to improve student attainment"
  - **Summative**: "monitor educational outcomes, often for purposes of external accountability"

(http://en.wikipedia.org/wiki/Formative_assessment)

Assessment of Student Learning

- What challenges does the large class present?
  - Lots of students!!!!
  - Must be efficient
  - Time: authentic assessment takes time for both students and instructors
  - Getting assessment on all students
  - Qualitative assessments: how to interpret the results
  - Getting students to do the assessment
  - Distinguishing mastery from surface learning
  - Student willingness to share honestly about their struggles
  - Generating authentic assessments takes time

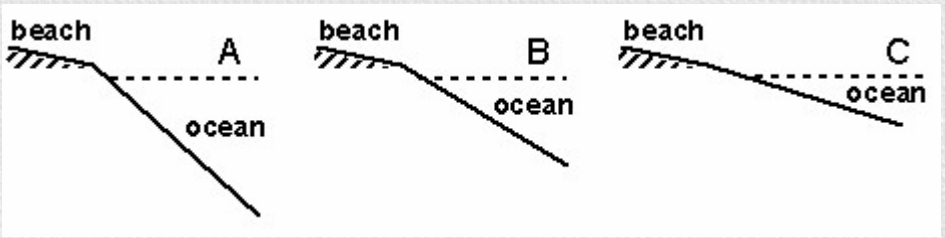
Assessment of Student Learning

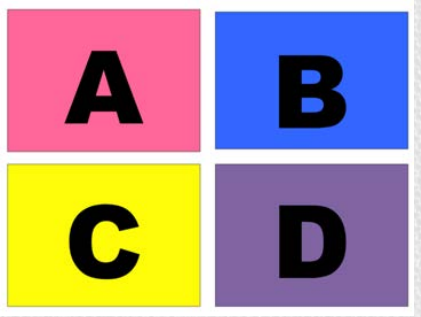
- Formative assessment lends itself to many informal approaches:
- **One-minute essays, or Questions-of-the-Day**
  - Just-in-time feedback ("How did the Grand Canyon form?" or "What was most confusing/interesting thing today?")
  - Great for keeping/encouraging attendance

(http://serc.carleton.edu/introgeo/interactive/oneminwrite.html)

Assessment of Student Learning

- Informal formative assessment, con't :
  - **ConcepTests**
    - Grew out of the Physics community
    - After limited lecture, stop and ask a question that tests student understanding of the concept
    - Example: "At which location in the diagram below would the waves break closer to the beach?"

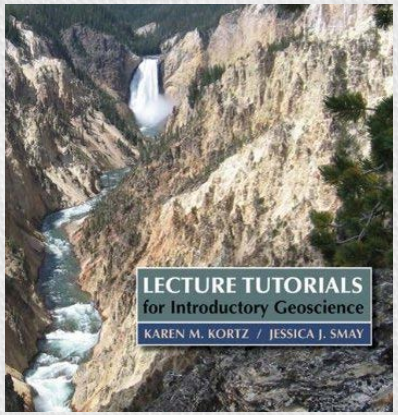




(http://serc.carleton.edu/NAGTWorkshops/assess/conceptests.html)

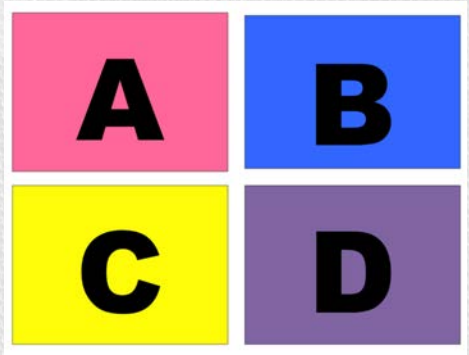
Assessment of Student Learning

- Informal formative assessment, con't :
  - **Lecture Tutorials**: e.g.
    - Improves student engagement
    - Provides feedback on learning
    - Can focus on student learning outcomes



http://serc.carleton.edu/NAGTWorkshops/teaching_methods/lecture_tutorials/index.html

  - **Clickers or ABCD Card**
    - Can provide instant feedback, and be fun
    - Easy to track attendance
    - Can be used for extra credit



(http://serc.carleton.edu/sp/library/classresponse/index.html)

Assessment of Student Learning

- **Tests in the large classroom setting:**
  - Challenges: difficult to grade, cheating, …
  - Strategies:
    - Multiple Choice has a bad rep, but there are good M/C questions and bad ones.
    - Focus on learning outcomes (always, in designing class activities, and in exams)
    - Scantron can be your friend
      - Quicker feedback to students
      - Know, quickly, most-missed questions. Can discuss them at next class meeting …

Geos 218: Exam 1

2nd most missed question (only 35% got it right ☹).

11. Washington, D.C. is on the North American plate and Paris, France is on the Eurasian plate, separated by the Mid Atlantic Ridge. The two cities are about 6000 km apart today. The North American and Eurasian plates are spreading apart at about 25 mm/year. At this rate, about how long will it take for the two cities to be another 1000 km (i.e., 7000 instead of 6000 km) apart? (If it helps, you may do the calculation on the exam.)

A. 4,000 years.
B. 40,000 years.
C. 400,000 years.
D. 4 million years.
E. 40 million years. ←

$$\frac{1000 \text{ (km)}}{25 \text{ (mm/yr)}} = \frac{1{,}000{,}000{,}000 \text{ (mm)}}{25 \text{ (mm/yr)}}$$

= 40,000,000 years = 40 million years

Assessment of Student Learning

- Tests in the large classroom setting, con't:
  - **The two-stage exam:**
    - In one class period, students take the exam by themselves, and turn it in. Then they retake the exam, while consulting with other students, +/- some additional questions. Typical grading: 80% Part I, 20% Part II
    - Advantages: students actually learn **during** exam; they like it (90% +);
    - Challenges: can be rushed; limits # questions; more work
    - Many variations on the theme (in-class, take home, lab …)

(http://serc.carleton.edu/NAGTWorkshops/coursedesign/tutorial/assessment.html#pyramid)

Assessment of Student Learning

- Workshop Activity:
  - We've looked at a wide range of assessments:
    - **One Minute Essays**
    - **ConcepTests**
    - **Lecture Tutorials**
    - **Clickers or ABCD Cards**
    - **Multiple Choice / Scantron Exams**
    - **Cooperative Exams**
  1. Pick One (I know it's hard) assessment type.
  2. Spend 15 minutes mapping out how you would use it in your large class. (What SLOs? Logistics? Etc. …)