I. Abstract
This poster describes how a non-laboratory science course, 'Introduction to Geology' (aka 'rocks for jocks'), was redesigned with the goal of improving student engagement and learning at a time when the college's general education science curriculum has been revised. Although it previously included lab and field exercises, the course has been redesigned to focus on giving students the skills to think critically about science issues long after they have taken this course; the experiential component has been greatly augmented, with greater emphasis on interpreting data.

II. Why Redesign the Course?

A. Develop 'Dream Statement'
'Three years after the course ends, I want my students to be able to know: what science 'is' and how it differs from other endeavors; the basic earth processes and principles; why it is important to know about geology; and be able to apply this scientific and geologic background in order to think critically about any scientific issue (e.g. as portrayed in the media).'

B. Refine Course Goals
Simplify existing language (italics) and add one goal (bold)
1. Understand the Scientific Method.
2. Identify & understand the processes of formation of the major geologic materials (rocks/minerals, resources).
3. Appreciate the Earth's interior and surface processes.
4. Gain an overview of the physical and biological history of the Earth, including its formation.
5. Identify the ways in which geology affects your life.
6. Discover interactions between geology and other realms of knowledge."

"previously mentioned in passing, but not a major goal

C. Modify Existing Course Structure

1. Field trip moved to the out-of-class time, freeing up 3 hours of class time.
2. Expanded in-class experiential components.
3. Reduced lecture time; lectures revised, additional topic added.
4. Modified existing lab exercises, added new lab exercises.

D. Add Content Topic on Geologic Resources

Fossil fuels: petroleum, natural gas, coal, etc. Understand the processes of formation of fossil fuel reservoirs; tie to a new lab exercise on fossil fuels.

Field Trip

Before: observe outcrop, ID rocks, interpret their formation, determine geologic history. After: also determine outcrop configuration from written description. Advantages: develop critical analysis skills; apply prior knowledge (integration)

Examples of New and Redesigned Activities

Module Tests (new)
Class is organized into 3 modules; the first 2 have tests. Students take the test individually & then, for 25% of the grade, take the test in small groups, using scratch-off test sheets. Advantages: immediate feedback; group learning.

Lab Exercises

Rock/Mineral tests: before & after: interpret how the materials formed. After, students also have to construct a dichotomous key so that they can re-identify specimens at a later date (e.g. on the fieldtrip, in the final exam).

Field Trip

Combined results for both sections. Course goals are met. Gen ed goals: critical reading, writing, analytic skills, academic skills, information literacy, significant learning goal. Foundation knowledge, application of knowledge/skills, integration, learning how to learn, caring, human dimension (Fink: see fig on overview poster). NOTE: asterisked goals were not targeted in course, but included on survey for completeness.

Lab exercises

Before: 5-12 test sheets. Students had to interpret what each specimen was. After: also students write a brief question (38%)

Other course modifications include:

• Geologic journals: weekly entries on geologic news, reflection at end of seminar.
• Add content topic on geologic resources (fossil fuels, minerals, water).
• Use of 'clickers' in classroom.
• Think-pair-share.
• Rubrics provided for all written assignments.

III. The Redesign Process

A. Develop 'Dream Statement'
'Three years after the course ends, I want my students to be able to know: what science 'is' and how it differs from other endeavors; the basic earth processes and principles; why it is important to know about geology; and be able to apply this scientific and geologic background in order to think critically about any scientific issue (e.g. as portrayed in the media).'

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IV. Results

A. Course Assessment and Observations

• Increased active participation in class.
• Geological journals highly effective for student engagement and ‘relevance of geology’
• Results of cumulative final exam in Fall 2006 improved over previous semesters.

B. Goals Survey

• Goals Survey designed and administered to both sections of GEOCL 101 in Fall 2006.
• Survey has 3 sections: course content goals, RCNJ general education goals, and significant learning goals (Fink). Note: not all goals were specifically treated in this course, but were included in the survey for completeness.

C. Results (below) are generally favorable:

Course content goals: 73-92% responded ‘SA’ or ‘A’
Gen. Ed. goals: 50-85% responded ‘SA’ or ‘A’ [except the writing question (28%)]
Significant learning goals: 77-96% responded ‘SA’ or ‘A’ for those goals specifically targeted in the course.

V. References and Acknowledgements

• For discussion on course redesign: RCNJ Faculty Resource Center Teaching Circles on course redesign. Fall 2005 - Fall 2006.
• For discussion and comments on this poster: Fall 2005 Teaching Circle participants (Phil McLeish, Kay Fowler, Lyndasa Perez-Strumolo).
• Course site: photos.ramapo.edu/~erainfor/Courses/GEOL101.html