

## College of Geosciences QEP Proposal

### Academic Year 2007-8

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#### **Abstract**

The College of Geosciences proposes to increase the quantity and quality of research- and inquiry-based learning (ribl) in the introductory courses (lecture and labs) of each of the College's departments or degree programs (i.e, atmospheric science, geography, geology/geophysics, oceanography, and the environmental degree programs). The program will begin by inviting faculty and graduate students who teach these courses to become involved in the project. Once participants have self-identified, a workshop session will be conducted to: 1) acquaint instructors with the nature, and convince them of value, of ribl, 2) team up faculty and grad students by discipline to identify teaching/learning modules that can be created and infused into their introductory courses. Creation of the modules will begin at the workshop, but meetings of participants will occur monthly to share ideas and report progress. After modules are pilot tested, they will be inserted at the appropriate time into the introductory courses. If faculty prefer, grad students will teach the modules, minimizing the impact on faculty workload or preparation. Formative assessment of the modules will be performed after the modules are taught, and summative assessment will occur via the courses' hour or final exams. If the results of the program are positive, QEP Council members will disseminate the outcome with the goal of convincing other faculty members to increase the level of ribl in their courses. The associate dean for academic affairs and the Council will explore options to recognize and reward faculty who participate.

## **Part I—Learning Outcomes**

The primary goal of the Geosciences proposal is to increase the quantity and quality of ribl in the College's introductory courses. This will be accomplished by creating teaching/learning modules that can be infused into each department's introductory lab course. Teams of faculty and graduate students who teach these courses will work cooperatively to build appropriate, exemplary modules that fit the course syllabi. Until the modules are created, specific learning outcomes are difficult to identify. In general the Geosciences QEP Council anticipates that students who engage with these modules will

- improve their ability to examine, identify, and gather information pertaining to authentic questions, problems, and issues around which the modules will be built;
- become more skilled at formulating conclusions and justifying why the conclusion they select is best; and
- gain greater ability to interpret and communicate the results of their analyses.

The modules will expose students to real-world problems and real-world data. Students will apply appropriate concepts and models to analyze data, draw conclusions, and apply their results, taking into account the constraints that today's environment (physical, economic, political and social) imposes.

The College inventory of research- and inquiry-based courses indicates that only a small minority of the faculty who teach sections of these introductory courses report that their classes include research- or inquiry-based strategies. Thus, this proposal should have a significant effect on the College's offerings, its faculty, and on the students who complete these large-enrollment courses. The average size of lecture sections for each department's introductory courses range between 90 and 180 students, typically with five or more lab sections associated with each lecture section.

Both the Associate Dean for Academic Affairs (V. Tchakerian) and the members of the Geosciences QEP Council are willing to identify and enlist faculty in their departments who

teach these courses. Our proposal ensures that faculty and graduate students will actively cooperate with the QEP Council members in developing the program.

## **Part II—Process**

The Geosciences QEP Council proposes one program for the College that will include similar efforts by all four of the College's departments.

### *Goals*

The project's first goal is to increase ribl activities in introductory courses, both in lecture and laboratory sections. The expected outcomes are that actively engaging students in authentic, active, ribl activities will increase student learning and that infusing ribl activities into introductory courses will provide students with the scaffolding necessary to carry out more sophisticated ribl activities in upper-division courses.

The second goal is to engage faculty and graduate students who teach these courses in the project, first by raising their awareness of the nature and efficacy of ribl strategies and second by assisting them in introducing ribl activities into their courses.

The third goal is to assess the effectiveness of the project. Data concerning both student performance and attitudes will be collected.

### *Procedure*

The project will begin by identifying willing faculty (and their graduate assistants) who teach one or more sections of an introductory course from each of the College departments. Faculty will be provided with one or two short readings (articles, book chapters, etc.) that explain the nature of ribl and its value. Before the start of the fall semester, the Geosciences QEP Council will organize workshop for the participants (i.e., Geosciences QEP Council members, faculty, and graduate assistants). The workshop will open with a presentation by a ribl "expert" (e.g., a representative of CTE) who will inform participants of the nature of ribl, about how it can be implemented in introductory courses, and about evidence supporting the effectiveness of these strategies. Participants will also be made aware of the QEP process and its relation to other campus assessment programs.

After participants are better informed about ribl and QEP, they will break up into disciplinary teams to begin the process of identifying topics and methods of introducing or increasing ribl in their courses. Each group will be responsible for creating one or more ribl modules that can be inserted into their discipline's course. It is expected that implementation of these modules will require approximately one week of class or lab time.

Sustaining the module-creation effort will be accomplished through monthly lunch meetings, during which teams will report progress, discuss problems, and share information. Graduate students will be involved in every step of the process and may, in fact, carry much of the module-creation load.

Modules will be completed and pilot tested before the conclusion of the fall semester. Revisions will be made, if necessary. During the spring semester, the modules will be used in lectures and laboratory sections. If faculty feel unable or unwilling to use the modules, graduate students will be prepared to teach them, relieving the faculty, at least initially, of undertaking extra work to implement the modules. This strategy will make it more convenient for faculty who are resistant to changing their lectures or classroom procedure to include the ribl modules in their courses.

Assessment of students attitudes will be conducted at the conclusion of the final class session when the modules are conducted. Summative assessment will occur when the next hour exam is administered or on the final exam.

The Geosciences QEP Council will develop a plan to disseminate the results of this project across the College and the departments. The goal is to further increase ribl in both introductory and upper-division courses in Geosciences. With the assistance of the Associate Dean for Academic Affairs the Council will determine what incentives the College can provide to encourage faculty to participate in the future.

#### **Part IV—Budget**

Kick-off workshop	\$ 350.00
Materials (\$250 X 4 depts.)	1000.00
Copying (\$150 X 4 depts.)	600.00
Brown bag lunches	400.00
Grad student support (\$4000 X 4 depts.)*	<u>16000.00</u>
<b>Total</b>	<b>18350.00</b>

\* We are hoping for some College funds to support this level of grad student support.