

**Detailed Assessment Report for  
2005 - 2006 Geology BS**

## **MISSION**

---

The Department of Geosciences at Georgia State University is committed to excellence in instruction and research in the Earth Sciences. We recognize that to achieve and maintain excellence we must set forth goals in the form of Learning Outcomes and put into place a way of effectively assessing and improving results.

Note: Our program has around 40 majors.

We expect all our graduates to possess the following:

- \* a thorough base of geological knowledge and skills
- \* effective communication skills, both written and oral
- \* the ability to apply critical thinking to problem solving in geology
- \* a thorough grounding in modern analytical and technological applications to geology
- \* a command of geological laboratory and field skills
- \* the ability to work effectively in teams to solve geological problems
- \* an appreciation of contemporary geological and/or environmental issues and problems

## **STUDENT LEARNING OUTCOMES**

---

### **Outcome/Objective 1:**

Oral and Written Communication Skills

#### **Full Description:**

General Learning Outcome 1: Each graduate shall develop communication skills, both oral and written, including some or all of the following.

Specific Outcomes:

1a. Each graduate will participate in oral examinations and/or give an oral presentation in class

1b. Each graduate will write a literature review, grant proposal, term paper, or

short essays

1c. Each graduate will write a computational routine using a computer language for repetitive calculations

1d. Each graduate will prepare a course portfolio

1e. Each graduate will participate in essay tests

**A Student Learning Outcome?** Yes

**Associated General Education Outcomes:**

- 1: Written Communication--major
- 3: Oral Communication--major

**Institutional Priorities:**

- STU-1: Learning-centered environment that support individual learning

**Related Measures:**

- M. 1: Written Work Rubric
- M. 2: Oral Communication

**Related Actions:**

- A. 1: Increase written work
- A. 2: Improve oral communication

**Outcome/Objective 2:**

Skills in Collaborative Exercises and Activities

**Full Description:**

General Learning Outcome 2: Each graduate will have experience and develop skills in collaborative exercises and activities.

Specific Outcomes:

2a. Each graduate will participate in a collaborative research project or in-class debate

2b. Each graduate will participate in field trips

**A Student Learning Outcome?** Yes

**Associated General Education Outcomes:**

- 5: Collaboration--major

**Institutional Priorities:**

- [STU-1](#): Learning-centered environment that support individual learning

**Related Measures:**

- [M. 3](#): Skills in collaborative activities

**Related Actions:**

- [A. 3](#): Improve collaborative skills

**Outcome/Objective 3:**

Quantitative, technological, laboratory and field

**Full Description:**

General Learning Outcome 3: Each graduate shall develop skills in quantitative and technological laboratory and field procedures in geology.

Specific Outcomes:

3a. Each graduate will learn accepted lab techniques, protocol and analytical procedures

3b. Each graduate will learn theory as applied to laboratory exercises

3c. Each graduate will learn accepted field techniques and protocol

3d. Each graduate will write a computational routine using a computer language for repetitive calculations

**A Student Learning Outcome?** Yes

**Associated General Education Outcomes:**

- [7](#): Critical Thinking--major
- [11](#): Quantitative Skills--major
- [13](#): Technology--major

**Institutional Priorities:**

- [STU-1](#): Learning-centered environment that support individual learning

**Related Measures:**

- [M. 4](#): Quantitative Skills
- [M. 5](#): Technology Skills
- [M. 6](#): Field Skills
- [M. 8](#): Professional Skills

**Related Actions:**

- A. 4: Improve quantitative skills
- A. 5: Improve technology skills

#### **Outcome/Objective 4:**

Critical thinking in Science and Geology

##### **Full Description:**

General Learning Outcome 4: Each graduate shall develop skills in critical thinking as it relates to science in general and to geology in particular.

Specific Outcomes:

4a. Each graduate will learn to develop valid research questions and hypotheses

4b. Each graduate will learn the techniques of data acquisition and interpretation

4c. Each graduate will learn problem solving and formulation of new questions

**A Student Learning Outcome?** Yes

##### **Associated General Education Outcomes:**

- 7: Critical Thinking--major

##### **Institutional Priorities:**

- STU-1: Learning-centered environment that support individual learning

##### **Related Measures:**

- M. 7: Critical Thinking

##### **Related Actions:**

- A. 6: Improve critical thinking skills

#### **Outcome/Objective 5:**

Understanding of contemporary Geological Issues

##### **Full Description:**

General Learning outcome 5: Each graduate shall develop general geological knowledge and understanding of contemporary geological issues.

Specific Outcomes:

5a. Each graduate will learn to read and comprehend a geological map and

construct a geological cross section from a map.

5b. Each graduate will construct an internally consistent geological map from a set of given observations.

5c. Each graduate will construct a contour map from numerical data.

5d. Each graduate will write a scientific report utilizing acceptable technical writing and organization, and with citations to appropriate geological literature.

5e. Each student will demonstrate understanding of contemporary environmental issues as related to exploitation and stewardship of the earth.

**A Student Learning Outcome?** Yes

**Associated General Education Outcomes:**

- 1: Written Communication--major
- 7: Critical Thinking--major
- 9: Contemporary Issues--major
- 11: Quantitative Skills--major

**Institutional Priorities:**

- STU-1: Learning-centered environment that support individual learning

**Related Measures:**

- M. 8: Professional Skills
- M. 12: Geology 1121 and 1122 laboratory test questions

**Outcome/Objective 6:**

Physical Constitution of the Earth

**Full Description:**

General Learning outcome 6: Each graduate shall develop a general understanding of the physical constitution of the earth.

Specific Outcomes:

6a. Each graduate will learn to characterize and identify common rocks and minerals in hand specimen and in thin section using the petrographic microscope.

6b. Each graduate will learn to characterize the fundamental attributes of atoms and atomic bonding as they relate to crystal structures.

6c. Each graduate will learn to relate physical properties of the rock forming

minerals to the crystal structure and chemistry of the minerals.

6d. Each graduate will learn to characterize the gross chemical layering of the earth (inner and outer core, mantle, crust) and explain what lines of evidence have been used to deduce this structure.

6e. Each graduate will learn to characterize the distribution of continents and ocean basins, and locations of major physiographic features such as mountain belts, oceanic ridges, oceanic trenches, and oceanic island chains.

**A Student Learning Outcome?** Yes

**Related Measures:**

- [M. 9:](#) Knowledge of Earth's Physical Constitution
- [M. 12:](#) Geology 1121 and 1122 laboratory test questions

**Related Actions:**

- [A. 7:](#) Strengthen knowledge of Earth's constitution

**Outcome/Objective 7:**

Earth's Internal and external processes

**Full Description:**

General Learning outcome 7: Each graduate shall develop a general understanding of both the internal and external dynamic processes of the earth system.

Specific Outcomes:

7a. Each graduate will be able to explain the fundamental concepts of plate tectonics, including mantle convection and the dynamic layered structure of the earth (inner and outer core, mesosphere, asthenosphere, lithosphere).

7b. Each graduate will be able to characterize the distribution and origin of magmas within the earth, including the concept of magmatic differentiation.

7c. Each graduate will be able to describe and explain rock structures at all scales ranging from intragrain deformation to orogenic belts.

7d. Each graduate will be able to describe and explain metamorphic processes that take place in the lithosphere.

7e. Each graduate will be able to explain the fundamental principles of the hydrologic cycle.

7f. Each graduate will be able to characterize the distribution and origin of

aqueous fluids within the earth.

7g. Each graduate will be able to explain the principles of weathering, sediment transport and deposition.

7h. Each graduate will be able to integrate igneous, metamorphic, and sedimentary phenomena with respect to seafloor spreading, continental drift, and orogenic and post-orogenic events.

**A Student Learning Outcome?** Yes

**Related Measures:**

- [M. 10](#): Knowledge of Earth Processes
- [M. 12](#): Geology 1121 and 1122 laboratory test questions

**Related Actions:**

- [A. 8](#): Strengthen knowledge of Earth processes

**Outcome/Objective 8:**

Earth and Solar System History

**Full Description:**

General Learning outcome 8: Each graduate shall develop a general understanding of the history of the earth and the solar system.

Specific Outcomes:

8a. Each graduate will be able to relate general principles of stellar nucleosynthesis and the nebular hypothesis for origin of the solar system.

8b. Each graduate will be able to explain how earth history is divided into the standard geological time scale, and relate the general historical character of each major time division.

8c. Each graduate will be able to identify some common representatives of both vertebrate and invertebrate fossils and place them correctly within the geologic time scale.

8d. Each graduate will be able to explain the fundamentals of biological evolution, particularly in regard to the fossil evidence for biological change through geologic time.

8e. Each graduate will be able to identify various sedimentary structures, relate them to modern depositional environments, and interpret the geological significance of paleoenvironmental reconstruction.

**A Student Learning Outcome?** Yes

**Related Measures:**

- [M. 11](#): Knowledge of Earth History
- [M. 12](#): Geology 1121 and 1122 laboratory test questions

**Related Actions:**

- [A. 9](#): Reexamine Learning Outcomes for Geology Program

**Outcome/Objective 9:**

Critical Thinking--Core

**Full Description:**

The objective of the Geosciences Department (Geology BS program) is to develop and implement a means of assessing our student`s ability to thinking critically within our undergraduate core courses (GEOL 1121 and GEOL 1122).

**A Student Learning Outcome?** Yes

**Associated General Education Outcomes:**

- [8](#): Critical Thinking--core

**Strategic Plan Initiatives:**

- [A-2](#): Undergraduate Experience

**Institutional Priorities:**

- [PRO-2](#): Excellence in the liberal arts and sciences

**Related Measures:**

- [M. 13](#): Critical thinking core

**Related Actions:**

- [A. 10](#): Review critical thinking in core

## MEASURES

---

**Measure 1:**

Written Work Rubric

**Measure Full Description:**

Faculty teaching majors courses rated "typical C student" according to the following rubruic:

0 - not assessed



1- student's writing is vague and confusing. Very little is communicated student has serious issues with grammar word usage etc.

2 - student has difficulty with organization, does best with simple concepts some of their writing is vague, there are spelling and grammar issues.

3 - student has some difficulty with organization, spelling and grammar.

4 - student can write an organized essay/report. It may lack some polish but is basically sound.

5- students can write a well organized professional quality essays/reports

**Related Outcome(s)/Objective(s):**

- [Obj. 1](#): Oral and Written Communication Skills

**Target Level:**

4 - student can write an organized essay/report. It may lack some polish but is basically sound.

**Findings:**

Eight faculty scored majors using this measure. The average score is 3.2 with a standard deviation of 0.75.

**Target Level Achievement:** Partially Met

**Further Action Planned?** Yes

**Measure 2:**

Oral Communication

**Measure Full Description:**

Faculty teaching majors courses rated "typical C student" according to the following rubric:

0 – skills not assessed

1 - verbal expression is vague and confusing. Very little is communicated student has serious issues with grammar word usage .

2 - student struggles with logical sequencing of ideas or are vague in their oral expression.

3 - student can articulate most of their ideas, sometimes they are vague or confusing. Their oral presentation is not well organized.

4 - student can clearly articulate their ideas and can construct a well organized, oral presentation perhaps with a few rough edges

5 - student can clearly articulate their ideas in a succinct and professional fashion and can construct a well organized, professional oral presentation.

**Related Outcome(s)/Objective(s):**

- [Obj. 1](#): Oral and Written Communication Skills

**Target Level:**

4 - student can clearly articulate their ideas and can construct a well organized, oral presentation perhaps with a few rough edges.

**Findings:**

Five faculty scored majors using this measure. The average score is 3.6 with a standard deviation of 0.55.

**Target Level Achievement:** Partially Met

**Further Action Planned?** Yes

**Measure 3:**

Skills in collaborative activities

**Measure Full Description:**

Faculty teaching majors courses rated "typical C student" according to the following rubric:

0 – Skills not assessed

1 - student only works alone.

2 - student struggles in a group setting, is passive or otherwise contributes little to group work may distract group with chatting etc.

3 - student can work in group setting, makes contributions but may distract group from its purpose with complaints off topic chatter etc.

4 - student works well in a group making contributions to group work while being open to contributions by others.

5 - student functions as a leader in a group setting by making proactive positive contributions while honoring and encouraging the contributions of others

**Related Outcome(s)/Objective(s):**

- [Obj. 2](#): Skills in Collaborative Exercises and Activities

**Target Level:**

4 - student works well in a group making contributions to group work while being open to contributions by others.

**Findings:**

Five faculty scored majors using this measure. The average score is 3.2 with a standard deviation of 0.45.

**Target Level Achievement:** Partially Met

**Further Action Planned?** Yes

**Measure 4:**

Quantitative Skills

**Measure Full Description:**

Faculty teaching majors courses rated "typical C student" according to the following rubric:

0 – Skills not assessed

1 - student is math phobic has difficulty interpreting graphs

2 - student can move between graphs and numbers with assistance and does not understand basic algebraic concepts

3 - student can move between graphs and numbers can perform algebraic and trigonometric operations with assistance

4 - student can move between graphs and numbers easily can perform algebraic and trigonometric operations

5 - student is comfortable with math, can move between graphs and numbers easily can perform algebraic and trigonometric operations can fit curves and or perform other advanced mathematical operations.

**Related Outcome(s)/Objective(s):**

- [Obj. 3](#): Quantitative, technological, laboratory and field

**Target Level:**

4 - student can move between graphs and numbers easily can perform algebraic and trigonometric operations

**Findings:**

Seven faculty scored majors using this measure. The average score is 3.5 with a standard deviation of 0.79.

**Target Level Achievement:** Partially Met

**Further Action Planned?** Yes

**Measure 5:**

Technology Skills

**Measure Full Description:**

Faculty teaching majors courses rated "typical C student" according to the following rubric:

0 – Skill not assessed

1 - student is computer phobic does not know how to use a computer

2 - student is familiar with windows based applications, can save files, open applications and documents

3 - student is familiar with entering numbers into excel

4 - student can perform calculations in excel and make graphs

5 - student can use a variety of quantitative applications eg. arc view, rockware

**Related Outcome(s)/Objective(s):**

- [Obj. 3:](#) Quantitative, technological, laboratory and field

**Target Level:**

4 - student can perform calculations in excel and make graphs

**Findings:**

Six faculty scored majors using this measure. The average score is 3.8 with a standard deviation of 0.41.

**Target Level Achievement:** Partially Met

**Further Action Planned?** Yes

**Measure 6:**

Field Skills

**Measure Full Description:**

Faculty teaching majors courses rated "typical C student" according to the following rubric:

0 – Skill not assessed

1 - student is unfamiliar with field techniques and protocols

2 - student does not understand aspects of using a brunton, cannot read a topographic map reliably

3 - student can use a brunton correctly part of the time, and can tell up from down on a topographic map

4 - student can use a brunton, and locate themselves using a topographic map with assistance.

5 - student can use a brunton, locate themselves using a topographic map without assistance.

**Related Outcome(s)/Objective(s):**

- [Obj. 3](#): Quantitative, technological, laboratory and field

**Target Level:**

4 - student can use a brunton, and locate themselves using a topographic map with assistance.

**Findings:**

Two faculty scored majors using this measure. The average score is 4.0 with a standard deviation of 0

**Target Level Achievement:** Met

**Further Action Planned?** No

**Measure 7:**

Critical Thinking

**Measure Full Description:**

Faculty teaching majors courses rated “typical C student” according to the following rubric

0 – skill not assessed

1 - student operates in the domain of memorization, does not know how to analyze information

2 - student is not clear on how one develops valid research questions and

hypothesis, acquire and interpret data and solve problems

3 - with extensive guidance student can develop valid research questions and hypothesis, acquire and interpret data and solve problems

4 - student can develop valid research questions and hypothesis, acquire and interpret data and solve problems with some guidance

5 - student can develop valid research questions and hypothesis, acquire and interpret data and solve problems.

**Related Outcome(s)/Objective(s):**

- [Obj. 4](#): Critical thinking in Science and Geology

**Target Level:**

4 - student can develop valid research questions and hypothesis, acquire and interpret data and solve problems with some guidance

**Findings:**

Seven faculty scored majors using this measure. The average score is 3.3 with a standard deviation of 0.76.

**Target Level Achievement:** Partially Met

**Further Action Planned?** Yes

**Measure 8:**

Professional Skills

**Measure Full Description:**

Faculty teaching majors courses rated "typical C student" according to the following rubric

0 – Skill not assessed

1 - student cannot interpret maps and cross sections

2 - student can answer questions given information in the form of maps and cross sections

3 - with difficulty student can construct maps and cross sections given numerical data or appropriate observations

4 - with some assistance student can construct maps and cross sections given numerical data or appropriate observations

5 - student can construct maps and cross sections given numerical data or appropriate observations.

**Related Outcome(s)/Objective(s):**

- [Obj. 3](#): Quantitative, technological, laboratory and field
- [Obj. 5](#): Understanding of contemporary Geological Issues

**Target Level:**

4 - with some assistance student can construct maps and cross sections given numerical data or appropriate observations

**Findings:**

Four faculty scored majors using this measure. The average score is 4.0 with a standard deviation of 0.

**Target Level Achievement:** Met

**Further Action Planned?** No

**Measure 9:**

Knowledge of Earth's Physical Constitution

**Measure Full Description:**

Faculty teaching majors courses rated "typical C student" according to the extent of their understanding of the physical constitution of earth: common rocks and minerals, atomic structure, mineral structure and earth's structure

0 – Skill not assessed

1 - >50%

2 - >60%

3 - >70%

4 - >80%

5 - >95%

**Related Outcome(s)/Objective(s):**

- [Obj. 6](#): Physical Constitution of the Earth

**Target Level:**

4 - >80%

**Findings:**

Five faculty scored majors using this measure. The average score is 3.4 with a standard deviation of 0.55.

**Target Level Achievement:** Partially Met

**Further Action Planned?** Yes

**Measure 10:**

Knowledge of Earth Processes

**Measure Full Description:**

Faculty teaching majors courses rated "typical C student" according to the extent of their understanding of internal and external earth processes: plate tectonics, distribution of magmas in earth, deformation and metamorphism, hydrologic cycle, and the rock cycle

0 – Skill not assessed

1 - - >50%

2 - >60%

3 - >70%

4 - >80%

5 - >95%

**Related Outcome(s)/Objective(s):**

- [Obj. 7:](#) Earth`s Internal and external processes

**Target Level:**

4 - >80%

**Findings:**

Six faculty scored majors using this measure. The average score is 3.7 with a standard deviation of 0.52.

**Target Level Achievement:** Partially Met

**Further Action Planned?** Yes

**Measure 11:**

Knowledge of Earth History



**Measure Full Description:**

Faculty teaching majors courses rated "typical C student" according to their extent of their understanding of the history of the earth and solar system: the nebular hypothesis, the nature of geologic time, vertebrate and invertebrate animals, evolution and the fossil record, sedimentary structures and environments

0 – Skill not assessed

1 - - >50%

2 - >60%

3 - >70%

4 - >80%

5 - >95%

**Related Outcome(s)/Objective(s):**

- [Obj. 8](#): Earth and Solar System History

**Target Level:**

4 - >80%

**Findings:**

No faculty scored majors using this measure.

**Further Action Planned?**

Yes

**Measure 12:**

Geology 1121 and 1122 laboratory test questions

**Measure Full Description:**

Laboratory mid term and final tests from GEOL1121 and GEOL1122 were analyzed to see how well students who are likely to enter the major performed on test questions linked to the learning outcomes. Out of 271 multiple choice exam questions 156 directly measured learning outcomes. The following learning outcomes were addressed by questions asked on the exams: 5a, 6a, 6c, 7a, 7b, 7c, 7d, 7f, 7g, 8d and 8e. The exams were analyzed at the testing center using the research analysis option. This method reports results on exam questions for the upper 27%, middle 46% and lower 27%. We examined the performance of the upper 27% of students, since majors invariably do very well in the introductory sequence.

**Related Outcome(s)/Objective(s):**

- [Obj. 5](#): Understanding of contemporary Geological Issues
- [Obj. 6](#): Physical Constitution of the Earth
- [Obj. 7](#): Earth's Internal and external processes
- [Obj. 8](#): Earth and Solar System History

**Target Level:**

Students should score greater than 90% on introductory level questions relating to a given learning outcome.

**Findings:**

Learning Outcome	Average Score on Questions	Number of Questions
5	87%	29
6	94%	40
7	89%	60
8	88%	27

**Target Level Achievement:** Partially Met

**Further Action Planned?** Yes

**Measure 13:**

Critical thinking core

**Measure Full Description:**

We measure critical thinking by devising standard geological exercises such as cross-section analysis and specially structured questions devised to take a key concept and apply it in a way that was not specifically covered within the lecture or laboratory.

**Related Outcome(s)/Objective(s):**

- [Obj. 9](#): Critical Thinking--Core

**Target Level:**

Our target performance is 70-80% level of success on our multiple choice questions and other selected exercises.

**Findings:**

Our target performance has been partially met. In some cases fewer than 70-80% of our GEOL 1121 and GEOL 1122 students are able to successfully complete the exercises or answer the critical thinking questions on the examinations.

**Target Level Achievement:** Partially Met

**Further Action Planned?**

Yes

## **ACTIONS**

---

### **Action 1:**

Increase written work

#### **Full Description**

All majors will take at least two courses that have Writing Across the Curriculum components.

#### **Related Objectives:**

- [Obj. 1](#): Oral and Written Communication Skills

#### **Related Measures:**

- [M. 1](#): Written Work Rubric

**Person/group responsible for the action**

Department Chair (Tim La Tour)

**Target date to implement the action**

Fall 2006

**Priority**

High

### **Action 2:**

Improve oral communication

#### **Full Description**

Faculty will be encouraged to use more verbal assessments in majors courses.  
Faculty will meet to share strategies for guiding students towards improved oral and written communication.

#### **Related Objectives:**

- [Obj. 1](#): Oral and Written Communication Skills

#### **Related Measures:**

- [M. 2](#): Oral Communication

**Person/group responsible for the action**

Department Chair (Tim La Tour)

**Target date to implement the action**

Fall 2006

**Priority** Med

**Action 3:**

Improve collaborative skills

**Full Description**

Strategies for guiding students through group work will be shared with faculty.

**Related Objectives:**

- [Obj. 2:](#) Skills in Collaborative Exercises and Activities

**Related Measures:**

- [M. 3:](#) Skills in collaborative activities

**Person/group responsible for the action** Department Chair (Tim La Tour)

**Target date to implement the action** Fall 2006

**Priority** Med

**Action 4:**

Improve quantitative skills

**Full Description**

Faculty will meet to discuss strategies for strengthening student's quantitative skills. The department will explore collaborations with the math department to modify calculus sequence to better meet our major's needs.

**Related Objectives:**

- [Obj. 3:](#) Quantitative, technological, laboratory and field

**Related Measures:**

- [M. 4:](#) Quantitative Skills

**Person/group responsible for the action** Department Chair (Tim La Tour)

**Target date to implement the action** Fall 2006

**Priority** Med

**Action 5:**

Improve technology skills

**Full Description**

The department has recently acquired laptops for use in major's courses, which has facilitated the use of computer-based activities in classes. We anticipate that as more faculty use the computers in their courses, students technology skills will improve.

**Related Objectives:**

- [Obj. 3](#): Quantitative, technological, laboratory and field

**Related Measures:**

- [M. 5](#): Technology Skills

**Person/group responsible for the action**

Department Chair (Tim La Tour)

**Target date to implement the action**

Fall 2005

**Priority**

Low

**Action 6:**

Improve critical thinking skills

**Full Description**

The department will create a Geoscience Learning Community which has as one of its foci, a research experience. Improvements in critical thinking skill should be realized by increasing the student's participation in research.

**Related Objectives:**

- [Obj. 4](#): Critical thinking in Science and Geology

**Related Measures:**

- [M. 7](#): Critical Thinking

**Person/group responsible for the action**

Department Chair (Tim La Tour)

**Target date to implement the action**

Spring 2007

**Priority**

High

**Action 7:**

Strengthen knowledge of Earth`s constitution

**Full Description**

Faculty will meet to discuss strategies for strengthening students knowledge of Earth's constitution.

**Related Objectives:**

- [Obj. 6](#): Physical Constitution of the Earth

**Related Measures:**

- [M. 9](#): Knowledge of Earth`s Physical Constitution

**Person/group responsible for the action**

Department Chair (Tim La Tour)

**Target date to implement the action**

Fall 2006

**Priority**

Med

**Action 8:**

Strengthen knowledge of Earth processes

**Full Description**

Faculty will meet to discuss strategies for strengthening students knowledge of Earth processes.

**Related Objectives:**

- [Obj. 7](#): Earth`s Internal and external processes

**Related Measures:**

- [M. 10](#): Knowledge of Earth Processes

**Person/group responsible for the action**

Department Chair(Tim La Tour)

**Target date to implement the action**

Fall 2006

**Priority**

Med

**Action 9:**

Reexamine Learning Outcomes for Geology Program

**Full Description**

We have realized that there are a number of inconsistencies and gaps within our learning outcomes document that need to be addressed. We are planning to revise the learning outcomes for the major to better represent our goals for our students. In particular learning outcomes related to learning outcome #5a, b, c, etc. and not related to the primary goal of learning outcome #5. Our assessment strategies did not cover this learning outcome very effectively. We also have noticed that learning outcome 8 is not assessed in any required major's courses. This will be the subject for further faculty reflection.

**Related Objectives:**

- [Obj. 8](#): Earth and Solar System History

**Related Measures:**

- [M. 11](#): Knowledge of Earth History

**Person/group responsible for the action**

Department Chair(Tim La Tour)

**Target date to implement the action**

Fall 2006

**Priority**

High

**Action 10:**

Review critical thinking in core

**Full Description**

The results of the general education assessment in critical thinking will be presented to the faculty in Geosciences for review and discussion. We will explore ways to get more faculty participation in the assessment process.

**Related Objectives:**

- [Obj. 9](#): Critical Thinking--Core

**Related Measures:**

- [M. 13](#): Critical thinking core

**Person/group responsible for the action**

Seth Rose

**Target date to implement the action**

Spring 2007

**Priority**

Low

### **Additional resources**

None

## **ANALYSIS**

---

### **Strength**

Our department has high standards for its majors that are reflected in our high performance target levels for our learning outcomes assessments measures. Most of our majors meet these target performance levels. However, our goal is that all of our majors meet our target performance levels. Therefore, we focused many of our assessment measures on our weakest students; the "C" students. Although the assessment has revealed that we are only meeting a few of our learning assessment measures target performance levels, we are very close to many of them. All of our students have the mapping and field skills that the faculty believe are important for working as a professional geologist. Performance on other learning outcomes is below our target levels but not far below. The average "C:" student is close to meeting target performance levels for their technology skills and content knowledge of earth processes.

Our progress in moving students towards our target levels cannot be gauged because we do not have assessment data from previous years. Our assessment efforts last year primarily taught us about pitfalls in the assessment process ([Link to AY-05 Geology Learning Outcomes Report](#)). We completely revised our assessment procedures based on the lessons learned from last year. Therefore, we have meaningful data to work with this year and can move forward from here. As discussed in action #9, we are planning to further fine tune our learning outcomes and assessment procedures. However, on the whole we are pleased with the results of this year's outcomes assessment.

### **Attention Needed**

The typical "C" student in our program needs most improvement in writing, critical thinking and collaboration skills. These are areas which traditionally have not been directly addressed in undergraduate geoscience courses. Therefore, most of the faculty have very few models from their own experience in lecture courses to refer to in their attempts to coach students on these skills. A number of our planned actions focus on getting faculty to share with each other, strategies for helping students with skills such as oral and written communication and quantitative work. The traditional place in the career a geoscientist where communication skills and critical thinking are addressed by geoscience faculty (as opposed to English, Philosophy or Math faculty), is at the graduate level in the context of a research project. In this context these skills are taught not through explicit instruction but through a combination of modeling, dialog and critique. As discussed in action #6 the Geoscience Department has received funding to initiate a Geoscience Learning Community which will involve undergraduates in research projects. We expect that the research context will provide faculty with a more natural setting for addressing critical thinking skills.