



Geoscience | 2014-2015 Assessment Report

1. Please give a brief overview of the assessment data you collected this year. This can be in any form you feel is appropriate, such as a table, a short narrative of results, statistical analysis, highlighting findings that were of particular interest, etc. You will, however, likely want to submit results for each learning outcome you assessed this year individually.

LEARNING OUTCOME #6

1. INTRODUCTION

Students will demonstrate an understanding of how knowledge of Earth system science aids in land--use decisions and mitigation of natural hazards such as flooding, earthquakes and landslides.

Course Assessed

Physical Geology is a lower level course designed to introduce many aspects of the geosciences to major and non--major students. The course explores the building materials of Earth (rocks and minerals), some Earth history, and dynamic processes that shape and reshape the Earth—including some natural hazards.

Nature of Assessment

Assessment of Outcome #6 took place by evaluating student responses to a final exam question designed to assess students' ability to relate Earth system science to land-use and natural hazard decisions.

2. ASSESSMENT

Exam Question

58. A final exam question related to land-use decisions and the mitigation of natural hazards such as flooding, earthquakes and landslides. (5 pts)

Rubric Used

| Criterion | 0 = Unacceptable | 1 = Acceptable | 2 = Exceeds Expectations |
|---|--|--|--|
| A. Identifies landslide potential | Did not discuss any means of identification, or answered incorrectly | Brief description of angle of repose | In depth explanation of angle of repose, with some modifying factors (e.g. vegetation) |
| B. Discusses ways in which natural hazard potential can be mitigated | Did not consider any potential mitigation schemes, or answered incorrectly | Considered one or more mitigation strategies, but was brief in content | Considered several mitigation strategies, explained thoroughly |

3. RESULTS

| Student | A | B | Average |
|----------------|-----|-----|---------|
| 1 | 1 | 1 | 1 |
| 2 | 1 | 1 | 1 |
| 3 | 2 | 2 | 2 |
| 4 | 1 | 1 | 1 |
| 5 | 1 | 2 | 1.5 |
| 6 | 1 | 1 | 1 |
| 7 | 0 | 2 | 1 |
| 8 | 1 | 1 | 1 |
| 9 | 2 | 2 | 2 |
| 10 | 2 | 1 | 1.5 |
| 11 | 2 | 1 | 1.5 |
| 12 | 2 | 2 | 2 |
| 13 | 1 | 2 | 1.5 |
| 14 | 2 | 1 | 1.5 |
| 15 | 1 | 1 | 1 |
| 16 | 2 | 2 | 2 |
| 17 | 1 | 2 | 1.5 |
| Average | 1.4 | 1.5 | 1.4 |

4. DISCUSSION

We were somewhat pleased with the results of the assessment. All criteria assessed resulted in averages above the acceptable score of one (A=1.4, B=1.5). Although several students did very well with the question (Average 2: n=4), we would like to have seen the bulk of the classroom fielding this question better (Average 1: n=7). We do not believe that the outcome warrants a major overhaul of the course content. Rather, we think the question used for the imbedded assessment could be better written for future assessments. Many of the answers given lacked thoroughness, and so, the question would be rewritten to encourage students to think more specifically and expect more detailed responses.

LEARNING OUTCOME #7

1. INTRODUCTION

Students will demonstrate an understanding of the functioning of hydrologic systems and the challenge of maintaining surface and ground water quality.

An embedded assessment was performed using three questions from a two part final exam in GeoSci 432/632 Hydrogeology, Spring 2015. These questions assessed fundamental understanding of hydrologic systems in effectively managing groundwater systems. Student responses to each question were graded and converted to a proficiency rating of Outstanding, Good, Marginal and Unacceptable.

Question #4 on Take Home portion of 2015 final exam.

(20 pts) A question designed to assess students' ability to determine the rate of wastewater contamination flow using a map with wells and contour lines, along with aquifer parameters.

Question #6 on Take Home portion of 2015 final exam.

(15 pts) A question designed to assess students' ability to determine what information would be needed to calculate groundwater flow velocities in particular types of materials.

Question #7 on In-Class portion of 2015 final exam.

(15 pts) A question designed to assess students' understanding of hydrogeologic properties related to groundwater contamination.

2. ASSESSMENT RESULTS

| Geoscience Assessment 2014-2015 | | | | |
|---|------------------------|-------------|-----------|-----------|
| Learning Outcome 7: <i>Students will demonstrate an understanding of the functioning of hydrologic systems and the challenge of maintaining surface and ground water quality</i> | | | | |
| Embedded assessment results for three questions on the final exam administered in GeoSci 432/632 Hydrogeology, Spring 2015 | | | | |
| | Q4 a&b | Q4 c | Q6 | Q7 |
| Response Rating | --number of students-- | | | |
| Outstanding | 2 | 5 | 3 | 0 |
| Good | 4 | 1 | 1 | 3 |
| Marginal | 1 | 0 | 3 | 4 |
| Unacceptable | 0 | 1 | 0 | 0 |

Students demonstrated good to outstanding understanding of techniques to estimate contaminant flow (Q 4) and were able to properly interpret results relevant to assessing groundwater quality (Q 4c). The results on the more open-ended questions showed acceptable but lower proficiency. There were clearly several students that demonstrated outstanding to good knowledge and understanding, while other responses were marginal. I believe that students were most uncertain about how to address Q 7. Many did not adequately compare and contrast key hydrogeologic properties.

2. How will you use what you've learned from the data that was collected? Some examples are: particular improvements to the curriculum, incorporation of a different pedagogy, a change in assessment plan for the following year in order to obtain more specific feedback, better information or a better response rate, a determined need for faculty development in a particular area, better career alignment, a faculty retreat to discuss the data and how best to use it, etc.

For Learning Outcome #6, we do not believe that the outcome warrants a major change to the course content. Rather, we think the question used for the imbedded assessment could be changed for future assessments. The question would be rewritten to encourage students to think more specifically and expect more detailed responses.

For Learning Outcome #7, Question 4 will likely be retained for future assessments since it tests knowledge and understanding of groundwater quality issues. Questions 6 and 7 required students to draw on what they had learned through two field labs that they had completed. When these labs are taught in the future students will be directly asked to compare and contrast the different hydrogeologic settings that they are observing and studying at the time of the lab activities. The goal will be that they will be able to articulate important hydrogeologic properties for various settings that are important for maintaining groundwater quality.