Assessment: Course Four Column

FALL 2015

El Camino: Course SLOs (NSC) - Earth Sciences (Geography, Geology, Oceanography)

ECC: GEOG 9:Weather and Climate

Course SLOs	*Assessment Method Description*	*Results*	*Actions*
SLO #2 Relationship with Their Environment - Students recognize and can accurately articulate how weather and climate affect humans' lives and how human activities affect weather and climate. **Course SLO Status:** Active **Course SLO Assessment Cycle:** 2015-16 (Fall 2015) **Input Date:** 11/08/2013	**Exam/Test/Quiz -** Students were given 10 multiple choice questions about the impact humans have on the atmosphere and vice versa. They were then asked to give a written response for two short essay questions, approximately one paragraph per question. The assessment was given during the final week of the semester (Week 16). The assessment also asked about the extent of students' experience with the department's courses. **Standard and Target for Success:** 70% of the students will achieve a score of 70% or higher (7 of 10 correct multiple choice) on the assessment. **Related Documents:** Geography 9 SLO2 v2.pdf Geog-9-SLO2-Data.txt	**Semester and Year Assessment Conducted:** 2015-16 (Fall 2015) **Standard Met? :** Standard Not Met With only 33.3% of students scoring 7+ on the multiple choice, we did not meet the standard. Moreover, when students selected incorrect answers, they often chose partially incorrect answers (not the best answers). This suggests they have some knowledge of the impact humans have on the environment, and vice versa. For example: * Students did not read the choices carefully for #1, where "Humans and earth both negatively and positively affect each other" was correct. Instead, they selected "All of the above" which included three of the four types of human/earth relationships. * For #7, 36.7% selected d (monitor criteria pollutants), which is a positive action but not an intervention. The subtle difference between the two was not thought through carefully. * Although students all chose the incorrect answer for #6, 82.8% selected the next best answer, which is partially correct. The following is a list of common misconceptions suggested by the assessment data: * What he term "anthropogenic" means * Weather forecasting's primary goal is to help people decide on proper attire, rather than focus on safety	**Action:** The following revisions to the assessment are suggested by the data: * question #2 can be removed * question #3 can be removed * question #8 should changed the last choice "Monitoring criteria pollutants " to "Map criteria pollutants" better differentiate human intervention and action. * essay question #1 should replace "air pollution" with "air pollutants" to decrease the likelihood a student would talk about heat pollution instead of criteria pollutants (12/04/2017) **Action Category:** SLO/PLO Assessment Process **Action:** New Activity: Use the climographs we construct in class to demonstrate how climates have changed from one period to another. Showing different data for one place over a 100 year time span will underscore climographs importance for monitoring human effects on the

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		* Humans traveling to the mesosphere is harmful to the atmosphere * Geostrophic winds are responsible for creating dangerous gases * The purposes of greenhouses or anemometers * Humans create/emit ozone * Why the Eastern part of the US has more acid rain Using the >70% cutoff, students did well on questions #2 (urban heat island effect) with 90% accuracy, and #3 (ozone depletion) with 83.3% accuracy. Students that received 7+ correct on the multiple choice component grasped the material well enough that their essays were then considered for analysis. By randomly selecting and reading a number of essays, general observations are discussed below. After reading a random selection of the long answer responses, general trends showed the following: * Most students understood the relationship of low pressure, air instability, and weather * Most students understood the relationship of urban areas and pollution * Most students could identify both positive and negative outcomes of precipitation on the plains * Many students had difficulty identifying the later time of day as having the most pollutants in the air in cities * A few students mentioned heat pollution instead of particulate pollution in cities, which does not allow them to speak to how time of day comes into play (02/04/2016) **Faculty Assessment Leader:** Julienne Gard **Faculty Contributing to Assessment:** Matt Ebiner	atmosphere (Question 8). New Activity: Have students create a pollution contour map of the United States for acid rain. Prevailing winds and urban centers should also be drawn to emphasize movement of pollutants from west to east (Question 6). (12/04/2017) **Action Category:** Teaching Strategies

ECC: GEOL 2:History of Planet Earth

Course SLOs	*Assessment Method Description*	*Results*	*Actions*
SLO #2 Relationship with Their Environment - Students recognize and can accurately articulate how the Earth affects humans' lives and how human activities affect the Earth. **Course SLO Status:** Active **Course SLO Assessment Cycle:** 2015-16 (Fall 2015) **Input Date:** 11/08/2013	**Essay/Written Assignment -** The assessment will be completed using a multiple choice survey and short essay response. **Standard and Target for Success:** It is expected that 50 % of the students will score 50 % or better on the assessment.	**Semester and Year Assessment Conducted:** 2015-16 (Fall 2015) **Standard Met? :** Standard Met The students easily surpassed the standard that 50% of students will score 50% or better on the assessment. Question #1 asked the students to describe the relationship between humans and plate tectonics. 96 % of the students surveyed answered the question correctly that scientists study plate tectonics to understand the relationship between plate motion and climate change and evolution and how they affect life on Earth. Students appear to understand this relationship very well. Question #2 asked the students what is the most important effect of plate tectonics on humans. 92 % of the students answered the question correctly that humans are the result of evolution and extinction events on Earth due to changing positions of the plate through geologic time. Students appear to understand this relationship very well. Question #3 asked the students what is the relationship between oceans and humans. Only 36 % of the students answered the question correctly that it is a combination of many factors including life, ocean circulation, climate change and other factors. However 52 % did answer the choice correctly that ocean circulation patterns are affected by plate tectonics, so overall the students appear to understand the relationship very well. Question #4 asked students about the position of humans on the Tree of Life. 84 % of the students answered the question correctly that humans are but a single branch on an intertangled web of life. Students appear to understand this relationship very well. Question #5 asked students about how has life and	**Action:** The assessment will be revised. It will include new and more challenging questions. (05/19/2017) **Action Category:** SLO/PLO Assessment Process

Course SLOs	Assessment Method Description	Results	Actions
		geological events proceeded through time to make human beings. 100 % of the students correctly responded that random geologic events, evolution, extinction and contingency have produced humans. Students appear to understand this relationship very well. Questions #6 - #9 asked students about Humans and the Earth today. Question #6 asked students how humans are affecting the atmosphere of the Earth today? 100 % of the students answered correctly that our activities are causing the atmosphere to change in composition. Students appear to understand this relationship very well. Question #7 asked students about the relationship between humans and other animals on planet Earth? 96 % of the students correctly responded that we are a part of a many branching tree of life, so we should honor and respect all animals. Students appear to understand this relationship. Question #8 asked students if a mass extinction event is happening at this time. 92 % of the students correctly responded that yes and humans are the cause of this mass extinction event. Students appear to understand this relationship. Question #9 asked students to characterize the relationship between humans and the Earth. 64 % of the students correctly responded that the relationship is very bad. Some students responded that they did not know how to characterize the relationship. However, overall the students understand the overall relationship. Question #10 was a survey question. 44 % of the students were taking this class for the first time, 24 % were Earth Science majors. An essay question asked students to describe and discuss how the amounts and distribution of organisms are changing and how these changes are affecting life on Earth, including humans. A range of answers were received,	

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		including the following: habitat loss, humans have changed nature's balance, humans are now a geologic force, humans are speeding up a natural process, increasing carbon dioxide levels will affect the atmosphere, species going extinct will affect predator/prey relationships, extinction of plants will affect animals, humans are over-using all natural resources. Overall the responses were consistent with what the students learned in the Geology 2 class. Their responses reflect an understanding of the relationship between humans and what is occurring today on planet Earth. (02/15/2016) **Faculty Assessment Leader:** Charles Herzig **Faculty Contributing to Assessment:** Charles Herzig	

ECC: GEOL 36:Geology Laboratory of Coastal California

Course SLOs	*Assessment Method Description*	*Results*	*Actions*
SLO #1 Basic Knowledge - Students can identify the salient features of the basic concepts of geology. (This includes the ability to recall the definitions of the specialized vocabulary of geology.) **Course SLO Status:** Active **Course SLO Assessment Cycle:** 2015-16 (Fall 2015) **Input Date:** 11/08/2013	**Exam/Test/Quiz -** An objective exam given at the beginning and end of the semester. **Standard and Target for Success:** 4 - extensive knowledge of the basic concepts (85% or above on the "objective" exam) 3 - considerable knowledge fo the basic concepts (above 70% on the "objective" exam) 2 - some knowledge of the basic concepts (above 55% on the "objective" exam) 1 - little or no knowledge of the basic concepts (below 55% on the "objective" exam) At least 70% of the students will achieve a level 3 or level 4 on the assessment. **Related Documents:** BK-F13-Assessment-Geol36-SLO2013 assessment Geol 30.36 questions.doc BK-F13-Assessment-Geol36-SLO2013 assessment Geol 30.36 questions.doc	**Semester and Year Assessment Conducted:** 2013-14 (Fall 2013) **Standard Met? :** Standard Met The data from the pre-test and post-test scores show a significant improvement in student performance on the test of their basic knowledge of the subject. At the beginning of the semester, about 63% of the students did not have “considerable” knowledge of the subject matter (a score of 70% or more). At the end of the semester, about 26% of the students had “extensive” knowledge of the subject matter (a score of 85% or more) and about 47% had “considerable” knowledge (score of 70% or more). Even though the remaining 26% of the students did not achieve “considerable” knowledge as we might have hoped, most of them (about 2/3) went from the “little or no” knowledge category (below 55%) to the “some” knowledge category (more than 60%), showing improved knowledge of the subject matter.” There wasn't as much improvement overall as I have seen in other SLO assessments of other classes because this class was half geology majors, so there was not as much general ignorance of the subject matter during the pre-test. Since some students cannot improve by 20% or more because they achieved a score of 80% or more on the pre-test, their “potential gain” defined as (Post Test Score – Pre-Test Score) / (100% - Pre-Test Score) might be a better measure of student improvement than their gain. In other words, the “potential gain” shows the percentage of “wrong answers” on the pre-test that became “right answers” on the post test. By this measure, 31% of students showed no improvement (a gain of less than 10%). This was mostly due to the fact that the class was 50% geology majors who did so well on the pre-test. The questions which students got wrong most often were: Pre-Test: Questions 15 and 18, but none of these were	**Action:** Questions 12 and 18 are some of the questions that students got WRONG most often on the POST TEST: (these questions were mineral versus element and metamorphic rocks). There are others, like questions 1, 7, and 30, that could use more improvement. I have thought of strategies for conveying this material better in the future. For example, one strategy would be to stress these concepts in my LAB class more, since I already do so in my lecture class. Another strategy could be to add these questions to the lab manual, since it has barely been updated in five years. (12/15/2014) **Action Category:** Teaching Strategies **Action:** Based on the data, I decided to CHANGE THE ASSESSMENT next time I conduct it: Questions 3, 6, 13, and 19 are some of the questions that students got RIGHT most often on the POST TEST in the questions pertaining to the type of hazard the San Andreas is, what palte we are on, what is granite, and the causes of sandstone). We decided to ELIMINATE these QUESTIONS because we appear to be covering the material well. We decided to ADD SOME NEW QUESTIONS so that the assessment covers additional course material

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		missed as much during the post-test Post-test: Questions 12 and 18. Question 9 interestingly had almost the same number wrong on the pre-test, which indicates that these concepts were not stressed as much in my class as much as other professors' classes. In general, I was pleased by the results, and think that they are good for a student population with a wide range of reading and test-taking skills and backgrounds in science who are taking an introductory, general education science course. The results do not indicate a major need for changes. However, I may be able to improve instruction on specific topics. Although the pre-test scores were high because so many of the students were geology majors, I do not think the test should be made harder. Since the class is a general ed class and is designed for non-science majors, too, I think the SLO assessments should reflect that. (12/01/2013) **Faculty Assessment Leader:** Joe Holliday **Faculty Contributing to Assessment:** T. James Noyes **Related Documents:** BK-F13-Data-Geol36-SLO2013 Assessment Scores Geo 36 sec 1299.xls BK-F13-Data2-Geol36.pdf	and/or probes students' understanding in more depth: (topics for the new questions include more global warming and field trip questions.) Based on the data, I decided to CHANGE THE ASSESSMENT. We decided to RE-WRITE QUESTIONS to make it clearer, correct errors in the questions, and/or better diagnose students' understanding: I will re-write question 9 and 15 to be clearer. I did improve some questions from the last SLO assessment, such as questions 7 (contours) and 20 (granite), so that they showed the true learning instead of test-taking skills. (12/01/2013) **Action Category:** SLO/PLO Assessment Process
	Exam/Test/Quiz - The students fill out a multiple choice test that is given as a pre-test at the beginning and post-test at the end f the semester. (Acti	**Semester and Year Assessment Conducted:** 2015-16 (Fall 2015) **Standard Met? :** Standard Met An objective exam given to 24 students at the beginning and end of the semester. 4 - extensive knowledge of the basic concepts (85% or above on the "objective" exam) 3 - considerable knowledge for the basic concepts (above 70% on the "objective" exam) 2 - some knowledge of the basic concepts (above 55% on the "objective" exam) 1 - little or no knowledge of the basic concepts (below 55% on the "objective" exam)	**Action:** Action #1 Questions 9 and 12 are the questions that students got WRONG most often on the post test: (these questions were about contour maps and igneous rocks). Perhaps it is because these concepts are not stressed too much in Geology 36, because it is a field class that doesn't emphasize contours and the trip goes to places

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		At least 50% of the students will achieve a level 3 or level 4 on the assessment. The data from the pre-test and post-test scores show a significant improvement in student performance on the test of their basic knowledge of the subject. At the beginning of the semester, about 79% of the students did not have "considerable" knowledge of the subject matter (a correct score of 12 questions, or 70% or more). At the end of the semester, about 35% of the students had "extensive" knowledge of the subject matter (a score of 85% or more) and about 41% had "considerable" knowledge (score of 70% or more). Even though the remaining 59% of the students did not achieve "considerable" knowledge as we might have hoped, about half went from the "little or no" knowledge category (below 55%) to the "some" knowledge category (more than 60%), showing improved knowledge of the subject matter." There wasn't as much improvement overall as observed in other SLO assessments of other general education Geology classes last semester, because one third of the students in this class were geology majors, who brought a well-developed knowledge base into the field laboratory class. Since some students cannot improve by 20% or more because they achieved a score of 80% or more on the pre-test, their "potential gain" defined as (Post Test Score – Pre-Test Score) / (100% - Pre-Test Score) might be a better measure of student improvement than their gain. In other words, the "potential gain" shows the percentage of "wrong answers" on the pre-test that became "right answers" on the post test. By this measure, 50% of students showed no improvement (a gain of less than or equal to 5%). This was mostly due to the fact that the class was about half the class was composed of geology majors who performed well on the pretest. The questions which students got wrong most often were: Pre-Test: Questions 15 and 16. Post-test: Questions 9 and 12..	without igneous rocks. I have thought of strategies for conveying this material better in the future. For example, one strategy would be to spend more time on the topics in order to clarify the complex vocabulary of geology. Other strategies will also be to provide more hands-on examples, and perhaps add the SLO assessment questions to the laboratory manual. (02/17/2017) **Action Category:** Teaching Strategies **Action:** Action #2 Based on the data, I decided to CHANGE THE ASSESSMENT next time I conduct it: Questions 2, 6, 7, 11, and 13 are questions that students got RIGHT most often on the post test in the questions pertaining to folding, oceanic crust, plate tectonics, fossils, and sedimentary rocks. It might be a good idea to eliminate these questions because we appear to be covering the material well, and then substitute other more detailed questions for areas that require improvement such as topographic maps. SOME NEW QUESTIONS WILL BE

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		Questions 5, 7, 8, and 17 had more correct answers on the pre-test, which suggests that these concepts were not adequately studied in the class, or perhaps the students were confused by the terminology. Overall, I was pleased by the results. They are satisfactory for a student population with a wide range of reading comprehension and test-taking skills, and possessing a diversity of preparation for studying science in an introductory, general education science course. The results do not indicate a major need for changes. However, I will improve instruction on specific topics based on the results of the post-test. Although the pre-test scores were overall high because many of the students are geology majors, I do not think the test should be made more difficult. Since the class is a general education class and is designed for non-science majors to participate, I think the SLO assessments should reflect a broad range of abilities of a diverse background of students. The success of the non-science majors in the class is reflected by the overall 10 % improvement of scores from the pre-test to the post-test. (02/01/2016) **Faculty Assessment Leader:** Joseph Holliday **Faculty Contributing to Assessment:** Joseph Holliday **Related Documents:** SLO Fall 2015 Rubric Geology 36.docx SLO Fall 2015 Geology 36 data & analysis.docx SLO Fall 2015 Geo 36 analysis.xlsx SLO Fall 2015 assessment Geol-36.doc	ADDED so that the assessment covers additional course material and/or probes students' understanding in more depth: (additional topics for the new questions include climate change and details from the field trip). Based on the data, I will rewrite the questions to change the assessment in order to better diagnose students' understanding of the materials. The purpose will be to make the questions clearer, with more obvious correct answers to the questions. Questions 9 and 12 will be rewritten to better assess the students' understanding of the concepts. I did rewrite some questions from the previous SLO assessment of this basic question examination, so that the results of the assessment indicate learning has occurred instead of simply measuring whether the students have acquired better test-taking skills. (02/17/2017) **Action Category:** SLO/PLO Assessment Process

ECC: GEOL 4:History of Planet Earth Laboratory

Course SLOs	*Assessment Method Description*	*Results*	*Actions*
SLO #2 Relationship with Their Environment - Students recognize and can accurately articulate how the Earth affects humans' lives and how human activities affect the Earth. **Course SLO Status:** Active **Course SLO Assessment Cycle:** 2015-16 (Fall 2015) **Input Date:** 11/08/2013	**Essay/Written Assignment -** Students will complete a multiple choice survey activity and a short essay. **Standard and Target for Success:** It is expected that 50 % of the students will achieve a 50 % or better success rate on the assessment.	**Semester and Year Assessment Conducted:** 2015-16 (Fall 2015) **Standard Met? :** Standard Met The students easily surpassed the standard that 50% of students will score 50% or better on the assessment. In question #1 students were asked to describe the relationship between humans and the Principle of Uniformitarianism. 93 % of the students correctly responded that scientists study the Principle of Uniformitarianism to understand the relationship between the modern Earth and events and life in the past. It appears that students understand this relationship very well. Question # 2 asked students what is the most important effect of plate tectonics on humans. 93 % of the students correctly responded that humans are the result of evolution and extinction events on Earth due to changing positions of the plates through geologic time. It appears that students understand this relationship very well. Question # 3 asked students what is the relationship between fossils and humans. 93 % of the students correctly responded that it is important to study fossils bcause they tell us about life in the past, changes in climate in the past, and answer questions about human origins. Students understand this relationship very well. Question # 4 asked students what is the importance of geologic maps. 100 % of the students answered correctly that geologic maps may be used to locate mineral resources important to their lives and geologic hazards. Students understand this relationship very well. Question # 5 asked students how minerals are important to human beings. 100 % of the students answered correctly that minerals may be used to create technology that	**Action:** The assessment will be revised. It will include new and more challenging questions. (05/19/2017) **Action Category:** SLO/PLO Assessment Process

Course SLOs	Assessment Method Description	Results	Actions
		benefits their lives. Students understand this relationship very well. Questions # 6 - # 9 asked students about humans and the Earth today. Question # 6 asked students if humans are affecting the surface of the Earth today. There were a variety of responses, with no clear majority, ranging from humans have no effect, humans are causing great changes, the surface does not change, or none of the above choices. The correct response is that humans are causing the changes we want. Perhaps rewording the question for future assessments might be an effective solution to achieving the correct result. Question # 7 asked students what is the relationship between humans and minerals on Earth today. 100 % of the students responded correctly that humans might consider sustainable usage of minerals and recycling. Students understand this relationship very well. Question # 8 asked students if fossils are really that important to humans and the Earth today. 93 % of the students correctly responded that yes, fossils tell the story about the past and may be used to understand climate change and extinction today. Students understand this relationship very well. Question # 9 asked students why it is important to display fossils, rocks, and minerals at museums. 100 % of the students correctly responded that this is important for humans to understand how the Earth works and to understand life in the past and how we got here. Students understand this relationship very well. Question # 10 is a survey question about the composition of the students and Earth Sciences. 29 % of the students stated this is their first Earth Science class, and 36 % of the students stated that they are a major in the Earth Sciences. An essay question asked students to discuss how geologic	

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		maps may be used to understand changes on the Earth's surface during the 21st Century and the effects of humans on the surface of the Earth during the 21st Century. A range of responses were received, including: do not use geologic maps, use Google Earth instead, must update geologic maps quickly - although geologic processes take a long time, apply GIS to geologic maps, it is difficult to update the maps quickly, it is possible to document human effects, use geologic maps mostly to identify geologic hazards, make the maps available to the general public at City Halls, or create an app for the public using digital technology. Overall the students do understand the relationship between geologic processes that take a long time and the need to be able to update geologic maps quickly to understand changes occurring on the Earth today, either due to natural forces or caused by humans. Some of the students were creative in their responses regarding how to update the maps quickly and make the updates more accessible to the public. Overall, the students understand the relationship between geologic maps and changes on Earth today and the effects of humans on the surface of the Earth today. (02/15/2016) **Faculty Assessment Leader:** Charles Herzig **Faculty Contributing to Assessment:** Charles Herzig	