Course SLO Assessment Report - 4-Column

El Camino College

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

Course SLOs 1 and ctu.unitid = 766	Assessment Methods & Standard and Target for Success / Tasks	Results	Action & Follow-Up
ECC: GEOG 9 - Weather and Climate - SLO #3 Nature of Science - Students can identify the key elements of the scientific method (hypotheses, tests, observations, conclusions/interpretation of observations) in popular accounts of scientific research in magazines, newspapers, etc. **Course SLO Assessment Cycle:** 2014-15 (Fall 2014) **Input Date:** 11/08/2013 **Course SLO Status:** Active	**Assessment Method Description:** Students were given a list of 10 statements and were asked to identify whether each statement was an example of a hypothesis, an observation, a test, or a theory/conclusion. The assessment was given at both the beginning and end of the semester. The post-assessment also asked about the extent of students' experience with the department's courses. **Assessment Method:** Exam/Test/Quiz **Standard and Target for Success:** 80% of the students will achieve a score of 80% or higher on the assessment. **Related Documents:** Assessment	02/07/2015 - Overall Scores The data demonstrate that at the end of the course students were better able to identify and distinguish between the different elements of the scientific method. Approximately 90% of students' scores fell in the range from 20% to 80% throughout the semester, indicating little change in those with the lowest scores. The other percentage breakdowns remained more or less the same as well. The notable changes between pre- and post-assessments (slight though they are) were a drop in the 40-60% range by 10% on the post-test, a 12% increase in the 60-80% range, and another decrease in 80%+ scores by roughly 5%. The potential gain was 6% (see below for a description of potential gain). Comments about the data analysis of the overall scores When calculating the gain, we set all values less than zero to zero. We're assuming that the students learned little and are guessing rather than that we've actually harmed their understanding. Since some students' scores cannot improve much because they achieved a high score on the pre-assessment, their "potential gain" defined as (Post Test Score – Pre-Test Score) / (100% – Pre-Test Score) was also calculated. The "potential gain" shows the percentage of "wrong answers" on the pre-test that became "right answers" on the post test. As with gain, potential gains less than zero were set to zero (consider situations like the following: if a student got 8 out of 10 on the pre-assessment and 7 out of 10 on the post-assessment, then their potential gain is -50%). Responses to Individual Questions Students' responses to all 10 questions were recorded for a subset of the assessments from each section of geography and geology courses: 5 assessments per section in most sections. (A few instructors compiled the data for all of their students.) A subset was used because of the time required to record and enter the information by hand. The statistics of the responses to individual questions was compiled for all courses, and for the following subgroups: geology courses, oceanography courses, geography courses, physical geography courses, and cultural geography courses. For the most part, the statistics of the different subgroups are similar,	02/07/2015 - The department paid for the scantrons used to assess the SLO out of its own budget. The college should have a mechanism for funding the assessment of SLOs. The item analysis of the scantrons was done by hand, and this limited the amount of data that we could reasonably collect. We would like to get training on how to do item analysis using scantron machines and to be given access to machines that can do the item analysis. (Perhaps such scantron machines are already available to us and we are unaware of it.) Alternately, perhaps we could send the scantrons to institutional research for analysis, and they could give us the results. **Action Category:** Program/College Support 02/07/2015 - Meteorology is a lecture-based course, but I incorporate hands-on activities and short lab-like exercises. Free online data, programs, and maps are plentiful; therefore, it will be useful and easy to complement the lecture instruction on the scientific method with student-centered learning on scientific discovery. After students have finished with the activities, immediate feedback will be given verbally. Furthermore, I will embed questions into lectures that encourage students to identify hypotheses, tests, observations, and conclusions. For instance, I will present a real world example of meteorology research and informally test their knowledge. Then we will discuss the correct answer and reasons behind it.

Course SLOs 1 and ctu.unitid = 766	Assessment Methods & Standard and Target for Success / Tasks	Results	Action & Follow-Up
		suggesting that students in all the department's courses struggle with similar misconceptions and misunderstandings. The discussion below is based on data from geography courses. Explanations: Hypotheses vs. Theories Question 10 pre-assessment scores were very high at 72% across all other geography courses. Questions 6 (77%) and 10 (83%) were the highest correct pre-test results. Questions 4, 5, 8, and 9 were all in or near the 60-70% range. The lowest pre-test scores for all geography were questions 2 (13%) and 3 (33%). A few questions (1, 8, 10) got significantly poorer results on the post-test than on the pre-test. Because the test was given immediately before their final exam, I now wonder if the added stress negatively affected their performance. Question 2 was notable across most Earth Science course results. The correct answer to this question is "hypothesis." However, many students selected "theory" both at the beginning and the end of the semester. The interpretation might reflect that students are relying on their basic understanding of the words instead of following the terms learned in class. It is important to note that more students selected "hypothesis" (13% to 30%) and fewer selected theory (73% to 53%) at the end of the semester, even though the majority still answered incorrectly. Perhaps this can be attributed to more students comprehending the difference after a semester of practice. Question 3 also showed improvement over the course of the semester; however, a large percentage (40%) of students still answered incorrectly on the post-test. The statement describes a "theory," but uses the word "experiment" in the discussion of the supporting evidence. The wording may have misled many students to incorrectly choose "test" on the pre- and post-assessments. Observations vs. Theories The scientific method step "observation" is assessed on questions 1, 6, and 8. The scores for numbers 6 and 8 average-high. The students that did not select correctly commonly chose "theory" instead of "observation," suggesting that students have difficulty distinguishing between the evidence and the explanation supported by the evidence. The other important note about these questions is that student performance declined somewhat on the post-assessment (from 50% to 43% on question 1). While the decrease is not significant, the incorrect response was "theory," which again suggests	**Action Category:** Teaching Strategies

Course SLOs 1 and ctu.unitid = 766	Assessment Methods & Standard and Target for Success / Tasks	Results	Action & Follow-Up
		difficulty distinguishing between “theory and “observation.” Tests vs. Hypotheses The “test” step of the scientific method is addressed in Questions 4 and 7. Student success was relatively high on both pre-assessments and post-assessments (60% and 59% for the respective pre-tests and 77% and 55% for the respective post-tests). A common mistake across all Earth Science courses was to select “observation” instead of “test.” Summary of the Analysis of Responses to Individual Questions In short, the data suggest targeting 3 areas in which students struggle the most: - Distinguishing between hypotheses and theories/conclusions - Distinguishing between observations and the conclusion supported by the observations - Distinguishing between tests and hypotheses **Standard Met? :** No **Semester and Year Assessment Conducted:** 2014-15 (Fall 2014) **Faculty Assessment Leader:** Julienne Gard **Faculty Contributing to Assessment:** Matt Ebiner, Julienne Gard, Rebecca Donegan, Patti Neumann **Related Documents:** Scores and Analysis	
ECC: GEOL 2 - History of Planet Earth - SLO #3 Nature of Science - Students can identify the key elements of the scientific method (hypotheses, tests, observations, conclusions/interpretation of observations) in popular accounts of scientific research in magazines, newspapers, etc. **Course SLO Assessment Cycle:** 2014-15 (Fall 2014) **Input Date:** 11/08/2013 **Course SLO Status:** Active	**Assessment Method Description:** Students were given a list of 10 statements and were asked to identify whether each statement was an example of a hypothesis, an observation, a test, or a theory/conclusion. The assessment was given at both the beginning and end of the semester. **Assessment Method:** Exam/Test/Quiz **Standard and Target for Success:** 50% of the students will achieve a score of 80% or higher on the assessment. 80% of students will achieve a score of 50% or higher on the assessment. **Related Documents:** scientific method assessment	02/04/2015 - Overall Scores The data demonstrate that at the end of the course some students were better able to identify and distinguish between the different elements of the scientific method. Initially 82.8% of students’ scores fell in the range from 20% to 80%. By the end of the semester, 47% of students’ scores fell in the range from 40% to 100%, close to the goal of 80% of the students achieving 50% or better on the assessment. The average gain was -3.1% and the average potential gain was 13.5% (see below for a description of potential gain). However, only about 24% of students achieved an 80% of above on the post-assessment, so there is some way to go to meet this part of the standard (50% of students scoring an 80% or above). The assessment requires students to make some fine	02/04/2015 - The department paid for the scantrons used to assess the SLO out of its own budget. The college should have a mechanism for funding the assessment of SLOs. The item analysis of the scantrons was done by hand, and this limited the amount of data that we could reasonably collect. We would like to get training on how to do item analysis using scantron machines and to be given access to machines that can do the item analysis. (Perhaps such scantron machines are already available to us and we are unaware of it.) Alternately, perhaps we could send the scantrons to institutional research for analysis, and

Course SLOs 1 and ctu.unitid = 766	Assessment Methods & Standard and Target for Success / Tasks	Results	Action & Follow-Up
		distinctions. Lower scores might be explained by limited reading comprehension. To determine if this is the case, we need to gather more data about students' reading comprehension level, perhaps using a proxy like their English class at El Camino College. Comments about the data analysis of the overall scores: When calculating the gain, we set all values less than zero to zero. We're assuming that the students learned little and are guessing rather than that we've actually harmed their understanding. Since some students' scores cannot improve much because they achieved a high score on the pre-assessment, their "potential gain" defined as (Post Test Score – Pre-Test Score) / (100% – Pre-Test Score) was also calculated. The "potential gain" shows the percentage of "wrong answers" on the pre-test that became "right answers" on the post test. As with gain, potential gains less than zero were set to zero (consider situations like the following: if a student got 8 out of 10 on the pre-assessment and 7 out of 10 on the post-assessment, then their potential gain is -50%!). Responses to Individual Questions Students' responses to all 10 questions were recorded for a subset of the assessments from each section of earth science and geography courses: 5 assessments per section in most sections. (A few instructors compiled the data for all of their students.) A subset was used because of the time required to record and enter the information by hand. The statistics of the responses to individual questions was compiled for all courses, and for the following subgroups: geology courses, oceanography courses, geography courses, physical geography courses, and cultural geography courses. For the most part, the statistics of the different subgroups are similar, suggesting that students in all the department's courses struggle with similar misconceptions and misunderstandings about the scientific method. The discussion below is based on data from Geology 2. Explanations: Hypotheses vs. Theories Pre-assessment scores on questions 2, 3, 5, 9, and 10 show that many students enter the course unable to identify explanations (hypotheses and theories) fairly well: about 50% or less on all questions. Students often had a hard time distinguishing between hypotheses and	they could give us the results. **Action Category:** Program/College Support **Follow-Up:** 02/04/2015 - additional information will be provided at a later date. 02/04/2015 - To begin to address the issue of reading comprehension, we will add a question to the assessment which asks students about the last English class in the college writing sequence that they completed (English 84, A, B, 1A, 1B, or 1C). **Action Category:** SLO/PLO Assessment Process **Follow-Up:** 02/04/2015 - additional information will be provided at a later date. 02/04/2015 - Simply practicing distinguishing between the elements of the scientific method – and getting feedback – would probably help improve student outcomes. We will create an online practice assessment that randomly draws from a question pool. Students can use the assessment to check their understanding and get feedback. The online assessment could be a homework assignment. Students could take it again and again to improve their score, encouraging them to work on the concepts. The online assessment might be used to identify the students who are struggling most and the topics that cause them the most confusion. **Action Category:** Teaching Strategies **Follow-Up:**

Course SLOs 1 and ctu.unitid = 766	Assessment Methods & Standard and Target for Success / Tasks	Results	Action & Follow-Up
		theories. Question 2 is an interesting case: it describes the idea of continental drift with no supporting evidence, so given the statement, students should select “hypothesis.” However, many students selected “theory” both at the beginning and the end of the semester, presumably because they used prior knowledge to answer the question on the pre-assessment and knowledge gained during the semester The takeaway from this is that students are not simply using the criteria that they have learned for identifying elements of the scientific; they are using other sources of information as well when making their selections. Given the kinds of prior knowledge that students bring to bear on the assessment, it might be interesting to see what kind of results we would get if used less discipline -specific questions. It is noteworthy, though, that more students selected “hypothesis” (22%) and fewer selected theory (15.3%) at the end of the semester which shows that some students were applying the criteria that we had taught them instead of trying to invoke prior knowledge. Question 3 is also interesting. The statement describes a “theory/conclusion”, but in doing so uses the word “experiment” in the discussion of the supporting evidence. Apparently this led a fair number to students to naively select “test”, even at the end of the semester (17% of students). Observations vs. Theories Questions 1, 6, and 8 describe observations. Once again he most common mistake was to select “theory” instead of “observation,” suggesting that students are having difficulty distinguishing between the evidence (observations) and the explanation supported by the evidence (the interpretation of the observations). Student performance did improve on the post assessment, but this is another area in which the largest gains might be made. Tests vs. Hypotheses Students had a difficult time identifying tests both on the pre-assessment and post-assessment (questions 4 and 7). The most common mistake when answering these questions on the post-assessment was to select “hypothesis” instead of “test” (about 20% of students). Summary of the Analysis of Responses to Individual Questions In short, the data suggest targeting 3 areas in which students struggle the most:	**Follow-Up:** 02/04/2015 - additional information will be provided at a later date.

Course SLOs 1 and ctu.unitid = 766	Assessment Methods & Standard and Target for Success / Tasks	Results	Action & Follow-Up
		• Distinguishing between hypotheses and theories/conclusions • Distinguishing between observations and the conclusion supported by the observations • Distinguishing between tests and hypotheses We could have collected more data (and thus more accurate data) about responses to individual questions if we had the time and/or technology to examine more of the assessments in detail. Also, this was a small, single section course. Identifying and targeting the misconceptions of these students would probably produce the largest improvements in student outcomes. **Standard Met? :** No **Semester and Year Assessment Conducted:** 2014-15 (Fall 2014) **Faculty Assessment Leader:** Sara Di Fiori **Faculty Contributing to Assessment:** Sara Di Fiori	
ECC: GEOL 32 - Geology Laboratory of Owens Valley and Sierra Nevada - 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 Assessment Cycle:** 2014-15 (Fall 2014) **Input Date:** 11/08/2013 **Course SLO Status:** Active	**Assessment Method Description:** An objective exam given at the beginning and end of the semester. **Assessment Method:** Exam/Test/Quiz **Standard and Target for Success:** 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) At least 50% of the students will achieve a level 3 or level 4 on the assessment.	02/10/2015 - The standard/target was 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 scientific method. At the beginning of the semester, about 50% of the students did not have “considerable” knowledge of the scientific method(a score of 70% or more). At the end of the semester, about 39% of the students had “extensive” knowledge of the scientific method (a score of 85% or more) and about 44% had “considerable” knowledge (score of 70% or more). Even though the remaining 17% 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 because over half (61%) 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	02/10/2015 - Based on the data, I decided to change the assessment next time I conduct it: For instance, I will change question 2, because even I didn't agree with the agreed-upon answer (conclusion). Questions 4, 5, and 8 are questions that students got right most often on the post-test in the questions pertaining to comparing the shapes of continents (test), similar rocks on different continents (observation), and fossils found on different continents (observation), respectively. 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 added so that the assessment covers additional course material and/or probes students’ understanding in more depth: additional topics for the new questions include more hypotheses, since the students didn't fo as well with these.

Course SLOs 1 and ctu.unitid = 766	Assessment Methods & Standard and Target for Success / Tasks	Results	Action & Follow-Up
		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, 42% of students showed no improvement (a gain of less than or equal to 10%). 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 1, 4, 6, and 10. Post-test: Questions 2 and 10. Unlike the last SLO analysis in Spring 2014, there were no questions that had more correct answers on the pre-test, which suggests that these concepts were adequately studied in the class. 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 (questions 2 and 10). Although the pre-test scores were overall high because most 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. **Standard Met? :** Yes **Semester and Year Assessment Conducted:** 2014-15 (Fall 2014) **Faculty Assessment Leader:** Joe Holliday **Reviewer's Comments:** T. James Noyes: I think that the description of the teaching strategies could be more detailed. What might be done with the additional time? This can be specified when the "follow up" to the action is done.	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 2 and 10 will be rewritten to better assess the students’ understanding of the parts of the scientific method. I did change the rubric this time to fit the agreed upon answers from other faculty, but the results for question 2 were worse than last semester. **Action Category:** SLO/PLO Assessment Process 02/10/2015 - Questions 2 and 10 are the questions that students got wrong most often on the post test: (these questions were about continents moving (#2) and continents touching (#10), both of which were supposed to be hypotheses. 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 hypothesis concept to clarify the scientific method. Another strategy would be to change question 2, which even I didn't agree with the agreed-upon answer. **Action Category:** Teaching Strategies

Course SLOs 1 and ctu.unitid = 766	Assessment Methods & Standard and Target for Success / Tasks	Results	Action & Follow-Up
ECC: GEOL 4 - History of Planet Earth Laboratory - SLO #3 Nature of Science - Students can identify the key elements of the scientific method (hypotheses, tests, observations, conclusions/interpretation of observations) in popular accounts of scientific research in magazines, newspapers, etc. **Course SLO Assessment Cycle:** 2014-15 (Fall 2014) **Input Date:** 11/08/2013 **Course SLO Status:** Active	**Assessment Method Description:** Students were given a list of 10 statements and were asked to identify whether each statement was an example of a hypothesis, an observation, a test, or a theory/conclusion. The assessment was given at both the beginning and end of the semester. The post-assessment also asked about the extent of students' experience with the department's courses. **Assessment Method:** Exam/Test/Quiz **Standard and Target for Success:** 50% of the students will achieve a score of 80% or higher on the assessment. 80% of students will achieve a score of 50% or higher on the assessment. **Related Documents:** S14-SLO-Sci-ASSESSMENT-KEY.docx	02/04/2015 - The discussion below is based on data from Geology 4. Overall Scores The data demonstrate that at the end of the course some students were better able to identify and distinguish between the different elements of the scientific method. Initially 82.8% of students' scores fell in the range from 20% to 80%. By the end of the semester, 47% of students' scores fell in the range from 40% to 100%, close to the goal of 80% of the students achieving 50% or better on the assessment. The average gain was -3.1% and the average potential gain was 13.5% (see below for a description of potential gain). However, only about 24% of students achieved an 80% of above on the post-assessment, so there is some way to go to meet this part of the standard (50% of students scoring an 80% or above). The assessment requires students to make some fine distinctions. Lower scores might be explained by limited reading comprehension. To determine if this is the case, we need to gather more data about students' reading comprehension level, perhaps using a proxy like their English class at El Camino College. Comments about the data analysis of the overall scores: When calculating the gain, we set all values less than zero to zero. We're assuming that the students learned little and are guessing rather than that we've actually harmed their understanding. Since some students' scores cannot improve much because they achieved a high score on the pre-assessment, their "potential gain" defined as (Post Test Score – Pre-Test Score) / (100% – Pre-Test Score) was also calculated. The "potential gain" shows the percentage of "wrong answers" on the pre-test that became "right answers" on the post test. As with gain, potential gains less than zero were set to zero (consider situations like the following: if a student got 8 out of 10 on the pre-assessment and 7 out of 10 on the post-assessment, then their potential gain is -50%!). Responses to Individual Questions Students' responses to all 10 questions were recorded for a subset of the assessments from each section of earth science and geography courses: 5 assessments per section in most sections. (A few instructors compiled the data for all of their students.) A subset was used because of the time required to record and enter the information by hand.	02/04/2015 - To begin to address the issue of reading comprehension, we will add a question to the assessment which asks students about the last English class in the college writing sequence that they completed (English 84, A, B, 1A, 1B, or 1C). **Action Category:** SLO/PLO Assessment Process **Follow-Up:** 02/04/2015 - additional information will be provided at a later date 02/04/2015 - The department paid for the scantrons used to assess the SLO out of its own budget. The college should have a mechanism for funding the assessment of SLOs. The item analysis of the scantrons was done by hand, and this limited the amount of data that we could reasonably collect. We would like to get training on how to do item analysis using scantron machines and to be given access to machines that can do the item analysis. (Perhaps such scantron machines are already available to us and we are unaware of it.) Alternately, perhaps we could send the scantrons to institutional research for analysis, and they could give us the results. **Action Category:** Program/College Support **Follow-Up:** 02/04/2015 - additional information will be provided at a later date 02/04/2015 - Simply practicing distinguishing between the elements of the scientific method – and getting feedback – would probably help improve student outcomes. We will create an online practice assessment that randomly draws from a question pool. Students can use the

Course SLOs 1 and ctu.unitid = 766	Assessment Methods & Standard and Target for Success / Tasks	Results	Action & Follow-Up
		The statistics of the responses to individual questions was compiled for all courses, and for the following subgroups: geology courses, oceanography courses, geography courses, physical geography courses, and cultural geography courses. For the most part, the statistics of the different subgroups are similar, suggesting that students in all the department's courses struggle with similar misconceptions and misunderstandings about the scientific method. Explanations: Hypotheses vs. Theories Pre-assessment scores on questions 2, 3, 5, 9, and 10 show that many students enter the course unable to identify explanations (hypotheses and theories) fairly well: about 50% or less on all questions. Students often had a hard time distinguishing between hypotheses and theories. Question 2 is an interesting case: it describes the idea of continental drift with no supporting evidence, so given the statement, students should select "hypothesis." However, many students selected "theory" both at the beginning and the end of the semester, presumably because they used prior knowledge to answer the question on the pre-assessment and knowledge gained during the semester The takeaway from this is that students are not simply using the criteria that they have learned for identifying elements of the scientific; they are using other sources of information as well when making their selections. Given the kinds of prior knowledge that students bring to bear on the assessment, it might be interesting to see what kind of results we would get if used less discipline -specific questions. It is noteworthy, though, that more students selected "hypothesis" (22%) and fewer selected theory (15.3%) at the end of the semester which shows that some students were applying the criteria that we had taught them instead of trying to invoke prior knowledge. Question 3 is also interesting. The statement describes a "theory/conclusion", but in doing so uses the word "experiment" in the discussion of the supporting evidence. Apparently this led a fair number to students to naively select "test", even at the end of the semester (17% of students). Observations vs. Theories Questions 1, 6, and 8 describe observations. Once again he most common mistake was to select "theory" instead	assessment to check their understanding and get feedback. The online assessment could be a homework assignment. Students could take it again and again to improve their score, encouraging them to work on the concepts. The online assessment might be used to identify the students who are struggling most and the topics that cause them the most confusion. **Action Category:** Teaching Strategies **Follow-Up:** 02/04/2015 - additional information will be provided at a later date.

Course SLOs 1 and ctu.unitid = 766	Assessment Methods & Standard and Target for Success / Tasks	Results	Action & Follow-Up
		of “observation,” suggesting that students are having difficulty distinguishing between the evidence (observations) and the explanation supported by the evidence (the interpretation of the observations). Student performance did improve on the post assessment, but this is another area in which the largest gains might be made. Tests vs. Hypotheses Students had a difficult time identifying tests both on the pre-assessment and post-assessment (questions 4 and 7). The most common mistake when answering these questions on the post-assessment was to select “hypothesis” instead of “test” (about 20% of students). Summary of the Analysis of Responses to Individual Questions In short, the data suggest targeting 3 areas in which students struggle the most: • Distinguishing between hypotheses and theories/conclusions • Distinguishing between observations and the conclusion supported by the observations • Distinguishing between tests and hypotheses We could have collected more data (and thus more accurate data) about responses to individual questions if we had the time and/or technology to examine more of the assessments in detail. Also, this was a small, single section course. Identifying and targeting the misconceptions of these students would probably produce the largest improvements in student outcomes. **Standard Met? :** No **Semester and Year Assessment Conducted:** 2014-15 (Fall 2014) **Faculty Assessment Leader:** Sara Di Fiori **Faculty Contributing to Assessment:** Sara Di Fiori **Reviewer's Comments:** same subset of students from Geology 2 (and same assessment)	