# PLO Assessment Report - Four Column Report
# El Camino College - MATHEMATICAL SCIENCES DIVISION
# El Camino: PLOs (MATH) - Math (Prospective Elementary School Teachers)

| PLOs | Assessment Methods & Standard and Rubric / Tasks | Results | Action & Follow-Up |
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| El Camino: PLOs (MATH) - Math (Prospective Elementary School Teachers) - PLO #1 Solving Application Problems - Students will be able to determine an appropriate strategy to solve an application problem, complete the solution of the problem, describe the procedures used to solve the problem, and explain the underlying mathematical concepts using written and oral means.<br>**PLO Assessment Cycle:**<br>2013-14 (Spring 2014)<br>2014-15 (Spring 2015)<br>2015-16 (Spring 2016)<br>2016-17 (Spring 2017)<br>**Input Date:**<br>07/01/2013<br>**PLO Status:**<br>Active | **Assessment Method Description:**<br>To assess this SLO, faculty teaching Math 110, Math 115, and Math 116 will use tests, quizzes, class activities, projects, homework, and writing assignments to determine the level of success students' have reached regarding this PLO.<br>**Assessment Method:**<br>Multiple Assessments<br>**Standard and Rubric:**<br>The following rubric will be used to assess this PLO.<br><br>Score of 4:<br>Students demonstrate a keen understanding of setting up and solving application problems.<br>Students are able to solve the application problems with no errors.<br>Students are able to provide an exemplary explanation of the mathematical concepts for the application problems.<br><br>Score of 3:<br>Students demonstrate a good understanding of setting up and solving application problems.<br>Students are able to solve the application with minor errors.<br>Students are able to provide a good explanation of the mathematical concepts for the application problems.<br><br>Score of 2:<br>Students demonstrate a fair understanding of setting up and solving application problems.<br>Students are able to solve the application problems with several errors.<br>Students are able to provide some information about the mathematical concepts for the application problems.<br><br>Score of 1:<br>Students are unable to demonstrate set up and solve application problems.<br>Students are not able to solve the application problems or they are able to solve the application problems with significant errors.<br>Students are not able to provide an explanation of | 04/24/2014 - DATA<br><br>The data for this PLO is reported below.<br><br>Math 110, 115, and Math 116 (99 students)<br>26 (26%) scored a 4<br>59 (59%) scored a 3<br>13 (13%) scored a 2<br>1 (2%) scored a 1<br>86% of the students completing Math 110, 115, and 116 scored a 3 or 4. Standard was met.<br><br>Math 110 Only (43 students)<br>9 (21%) scored a 4<br>31 (72%) scored a 3<br>3 (7%) scored a 2<br>0 (0%) scored a 1<br>93% of the students completing Math 110 scored a 3 or 4. Standard was met.<br><br>Math 115 and 116 (56 students)<br>17 (30%) scored a 4<br>28 (50%) scored a 3<br>10 (18%) scored a 2<br>1 (2%) scored a 1<br>80% of the students completing Math 115 and 116 scored a 3 or 4. Standard was met.<br><br>ANALYSIS<br>The data indicates that students completing Math 110, Math 115, or Math 116 are able understand application problems by demonstrating their ability to select an appropriate strategy to set up and solve the problem. Since application problems are common in many mathematics courses, Math 110, Math 115, and Math 116 students have experience with these sorts of problems in varying degrees of success and are able to reach the anticipated standard of success. Even though students have reached the standard of success, we notice that if students do not regularly attend class, there are obvious gaps in their understanding of the mathematics topics being investigated, limited experience probing mathematical ideas through inquiry activities, and little time to discuss mathematical ideas with their peers and instructor. | 05/15/2015 - We plan to examine how attendance impacts student performance on each of the three PLOs. We contend that if students are not in class, they not only miss mathematics content, but more importantly miss the opportunity to explore and investigate the underpinnings of a mathematical idea, discuss how think and reason mathematically, discover the connections within mathematics and between mathematics and other disciplines, and explain the concepts in their own words. We plan to examine the correlation between student attendance and their rubric score for each of the PLOs. We will collect this data at the end of the semester and report the findings on the next cycle of PLO assessment.<br><br>**Action Category:**<br>SLO/PLO Assessment Process |

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| | the mathematical concepts for the application problems. | **Standard Met:**<br>Yes<br>**Semester of Current Assessment:**<br>2013-14 (Spring 2014)<br>**Faculty Assessment Leader:**<br>Judy Kasabian<br>**Faculty Contributing to Assessment:**<br>Susanne Bucher, Judy Kasabian, Trudy Meyer, Susie Tummers<br>**Courses Associated with PLO Assessment:**<br>Math 110, Math 115, Math 116 | |
| El Camino: PLOs (MATH) - Math (Prospective Elementary School Teachers) - PLO #2 Explaining Mathematical Concepts - Students will be able to demonstrate and explain mathematical concepts using a variety of methods.<br><br>**PLO Assessment Cycle:**<br>2013-14 (Spring 2014)<br>2014-15 (Spring 2015)<br>2015-16 (Spring 2016)<br>2016-17 (Spring 2017)<br>**Input Date:**<br>07/01/2013<br>**PLO Status:**<br>Active | **Assessment Method Description:**<br>To assess this SLO, faculty teaching Math 110, Math 115, and Math 116 will use tests, quizzes, class activities, projects, homework, and writing assignments to determine the level of success students' have reached regarding this PLO.<br><br>**Assessment Method:**<br>Multiple Assessments<br>**Standard and Rubric:**<br>The following rubric will be used to assess this PLO.<br>Score of 4:<br>Students demonstrate a keen understanding of a variety of mathematical concepts.<br>Students are able to provide an exemplary explanation of a variety of mathematical concepts in written and oral means.<br><br>Score of 3:<br>Students demonstrate a good understanding of a variety of mathematical concepts.<br>Students are able to provide a good explanation of a variety of mathematical concepts in written and oral means.<br><br>Score of 2:<br>Students demonstrate a fair understanding of a variety of mathematical concepts.<br>Students are able to provide fair explanation about a variety of mathematical concepts in written and oral means.<br><br>Score of 1:<br>Students are unable to demonstrate any understanding of a variety of mathematical concepts.<br>Students are not able to provide an explanation of | 04/24/2014 - DATA<br>The data for this PLO is reported below.<br><br>Math 110, 115, and Math 116 (99 students)<br>23 (23%) scored a 4<br>41 (41%) scored a 3<br>31 (31%) scored a 2<br>4 (5%) scored a 1<br><br>64% of the students completing Math 110, 115, and 116 scored a 3 or 4. Standard was not met.<br><br>Math 110 Only (43 students)<br>7 (16%) scored a 4<br>19 (44%) scored a 3<br>17 (40%) scored a 2<br>0 (0%) scored a 1<br><br>60% of the students completing Math 110 scored a 3 or 4. Standard was not met.<br><br>Math 115 and 116 (56 students)<br>16 (28%) scored a 4<br>22 (40%) scored a 3<br>14 (25%) scored a 2<br>4 (7%) scored a 1<br><br>68% of the students completing Math 115 and 116 scored a 3 or 4. Standard was not met.<br><br>ANALYSIS<br>The data indicates that both as a collective and individual groups, Math 110, Math 115, and Math 116 are not able to adequately explain mathematical concepts in written and oral form. Explaining mathematical concepts requires students to have a deeper understanding of mathematical ideas, make connections between mathematical ideas, compare and contrast mathematical attributes, and to delve in | 05/15/2015 - We plan to examine how attendance impacts student performance on each of the three PLOs. We contend that if students are not in class, they not only miss mathematics content, but more importantly miss the opportunity to explore and investigate the underpinnings of a mathematical idea, discuss how think and reason mathematically, discover the connections within mathematics and between mathematics and other disciplines, and explain the concepts in their own words. We plan to examine the correlation between student attendance and their rubric score for each of the PLOs. We will collect this data at the end of the semester and report the findings on the next cycle of PLO assessment.<br><br>**Action Category:**<br>SLO/PLO Assessment Process |

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| | a variety of mathematical concepts in written and oral means. | mathematics beyond just finding an answer. This task is complex and given the varied mathematical experiences and knowledge levels of students, this PLO will always be challenging. In addition, explaining mathematical concepts is not universally taught in all mathematics classes so their experience with explanations is much more limited than other tasks we ask students to do. In addition, we notice that if students do not regularly attend class, there are obvious gaps in their understanding of the mathematics topics being investigated, limited experience probing mathematical ideas through inquiry activities, and little time to discuss mathematical ideas with their peers and instructor.<br><br>**Standard Met:**<br>No<br>**Semester of Current Assessment:**<br>2013-14 (Spring 2014)<br>**Faculty Assessment Leader:**<br>Judy Kasabian<br>**Faculty Contributing to Assessment:**<br>Susanne Bucher, Judy Kasabian, Trudy Meyer, Susie Tummers<br>**Courses Associated with PLO Assessment:**<br>Math 110, Math 115, Math 116 | |
| El Camino: PLOs (MATH) - Math (Prospective Elementary School Teachers) - PLO #3 Analyzing Mathematical Problems and their Solutions - Students will be able to analyze a solution to a mathematics problem, determine the appropriateness of the solution, and if errors are made, explain the misconceptions or errors made and how to solve the problem correctly using written and oral means.<br>**PLO Assessment Cycle:**<br>2013-14 (Spring 2014)<br>2014-15 (Spring 2015)<br>2015-16 (Spring 2016)<br>2016-17 (Spring 2017)<br>**Input Date:**<br>07/01/2013<br>**PLO Status:**<br>Active | **Assessment Method Description:**<br>To assess this SLO, faculty teaching Math 110, Math 115, and Math 116 will use tests, quizzes, class activities, projects, homework, and writing assignments to determine the level of success students' have reached regarding this PLO.<br>**Assessment Method:**<br>Multiple Assessments<br>**Standard and Rubric:**<br>The following rubric will be used to assess this PLO.<br><br>Score of 4:<br>Students demonstrate a keen understanding of the representation of the answers to a variety of problems in written and oral means.<br>Students are able to provide a clear and complete explanation of the appropriateness of answers to problems in written and oral means.<br>Students are able to provide a clear and complete explanation of the misconceptions or errors made in problems using written and oral means.<br><br>Score of 3: | 04/24/2014 - DATA<br>The data for this PLO is reported below.<br><br>Math 110, 115, and Math 116 (99 students)<br>26 (26%) scored a 4<br>47 (47%) scored a 3<br>25 (25%) scored a 2<br>1 (2%) scored a 1<br><br>73% of the students completing Math 110, 115, and 116 scored a 3 or 4. Standard was met.<br><br>Math 110 Only (43 students)<br>8 (19%) scored a 4<br>22 (51%) scored a 3<br>13 30%) scored a 2<br>0 (0%) scored a 1<br><br>70% of the students completing Math 110 scored a 3 or 4. Standard was met.<br><br>Math 115 and 116 (56 students)<br>18 (32%) scored a 4<br>25 (45%) scored a 3 | 05/15/2015 - We plan to examine how attendance impacts student performance on each of the three PLOs. We contend that if students are not in class, they not only miss mathematics content, but more importantly miss the opportunity to explore and investigate the underpinnings of a mathematical idea, discuss how think and reason mathematically, discover the connections within mathematics and between mathematics and other disciplines, and explain the concepts in their own words. We plan to examine the correlation between student attendance and their rubric score for each of the PLOs. We will collect this data at the end of the semester and report the findings on the next cycle of PLO assessment.<br><br>**Action Category:**<br>SLO/PLO Assessment Process |

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| | Students demonstrate a good understanding of the representation of the answers to a variety of problems in written and oral means.<br>Students are able to provide a good explanation of the appropriateness of answers to problems in written and oral means.<br>Students are able to provide a good explanation of the misconceptions or errors made in problems using written and oral means.<br><br>Score of 2:<br>Students demonstrate a limited understanding of the representation of the answers to a variety of problems in written and oral means.<br>Students are able to provide a limited explanation of the appropriateness of answers to problems in written and oral means.<br>Students are able to provide a limited explanation of the misconceptions or errors made in problems using written and oral means.<br><br>Score of 1:<br>Students are unable to demonstrate the representation of the answers to a variety of problems in written and oral means.<br>Students are not able to provide an explanation of the appropriateness of an | 12 (21%) scored a 2<br>1 (2%) scored a 1<br><br>77% of the students completing Math 115 and 116 scored a 3 or 4. Standard was met.<br><br>ANALYSIS<br>The data indicates that students completing Math 110, Math 115, and Math 116 are able to reach the standard of success for this PLO. Asking students to examining the reasonableness of their answer requires students to understand the underlying concepts that serve as the foundation for the problem. Determining what might be an expected answer (e.g. a prediction, hypothesis, or estimation) requires higher order thinking skills and content knowledge make a sound judgment. For prospective teachers, it is essential that they become competent in looking at a solution of the problem, determining the mistakes made, deciphering the misconceptions, and determining an appropriate way to help someone solve the problems correctly. This is what teachers do every day. The students in Math 110, Math 115, and Math 116 have the opportunity to examine mathematics through this lens and it is not an easy task to complete successfully. We have come to know that it takes time and a great deal of practice to make headway on this endeavor. Most other mathematics courses do not focus on this task so our students come to the Math for Teachers Program courses with little or no experience finding errors and deciphering misconceptions in work completed by others. In addition, we notice that if students do not regularly attend class, there are obvious gaps in their understanding of the mathematics topics being investigated, limited experience probing mathematical ideas through inquiry activities, and little time to discuss mathematical ideas with their peers and instructor.<br><br>**Standard Met:**<br>Yes<br>**Semester of Current Assessment:**<br>2013-14 (Spring 2014)<br>**Faculty Assessment Leader:**<br>Judy Kasabian<br>**Faculty Contributing to Assessment:**<br>Susanne Bucher, Judy Kasabian, Trudy Meyer, Susie Tummers<br>**Courses Associated with PLO Assessment:**<br>Math 110, Math 115, Math 116 | |

# PLO Assessment Report - Four Column Report
# El Camino College - MATHEMATICAL SCIENCES DIVISION
# El Camino: PLOs (MATH) - Pre-Engineering

| PLOs | Assessment Methods & Standard and Rubric / Tasks | Results | Action & Follow-Up |
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| El Camino: PLOs (MATH) - Pre-Engineering - PLO #1 Academic Success Strategies - Students will analyze the preparation, assess the cognitive skills, and apply academic success strategies required in engineering.<br>**PLO Assessment Cycle:**<br>2013-14 (Spring 2014)<br>2015-16 (Spring 2016)<br>**Input Date:**<br>07/01/2013<br>**PLO Status:**<br>Active | **Assessment Method Description:**<br>Students were asked to write a one page essay describing the preparation, training, practice, obligations, and ethics required in the engineering profession.<br>**Assessment Method:**<br>Essay/Written Assignment<br>**Standard and Rubric:**<br>The rubric was based on a 4 point scale with the lowest being 0, corresponding to No Understanding, 1 corresponding to Some Understanding, 2 corresponding to Most Understanding, and 3 corresponding to Complete Understanding. Students who earned a 2 or 3 were deemed Successful at mastering the PLO, while those scoring 0 or 1 were Unsuccessful. If a student correctly analyzed just one of the concepts listed in PLO #1, the student would earn 1 point, if the student analyzed three of the ideas listed, the student would earn 2 points, and if they analyzed all five correctly, they would earn 3 points, which is the maximum. Since the last time that students were assessed for PLO #1, which was during the Spring 2013 semester, no students earned a score of 0 or 1, 36% earned a score of 2, 64% earned a score of 3, the success rate was 100%. For this Spring 2014 semester, because the 100% success rate cannot be improved upon, the target was set for 75% of the students to earn a score of 3, corresponding to complete understanding. | 05/27/2014 - This Spring 2014 semester out of the total 26 students enrolled in the one and only section of Engineering 1 , no students earned a score of 0 or 1, while 7 students (27%) earned a score of 2, and 19 students (73%) earned a score of 3. Since the success rate for this PLO was 100%, no improvement is possible in the overall student success rate. However, the target of 75% success at the Complete Understanding level, corresponding to a score of 3 was not met. The instructor suggested that students need to be encouraged to comprehend and address the question completely and provide answers for all elements in the question. Also, the instructor plans to emphasize and repeat important issues. This course, Engineering 1, which corresponds to Program Level Outcome #1, is designed to stimulate student interest in pursuing a career in the field of Engineering. Assessments conducted in the course consist of multiple choice and short answer exams, as well as essay questions. There are no mathematical or engineering type problems to be solved in the class, nor is there a prerequisite for the course. There is only one section of the course offered each semester. Also, since there has been only one instructor teaching the course for the past number of years, there are no colleagues who also teach the course, who could benefit from his suggestions. Based on the nature of the course, there is no need to change the PLO statement.<br>**Standard Met:**<br>No<br>**Semester of Current Assessment:**<br>2013-14 (Spring 2014)<br>**Faculty Assessment Leader:**<br>William Latto<br>**Faculty Contributing to Assessment:**<br>Milan Georgevich<br>**Courses Associated with PLO Assessment:**<br>Engineering 1 | 05/27/2015 - Emphasize and repeat important issues<br>**Action Category:**<br>Teaching Strategies |