## Course SLO Assessment Report - 4-Column

**El Camino College**

**El Camino: Course SLOs (MATH) - Math (Prospective Elementary School Teachers)**

### Course SLO Assessment Cycle:
- 2013-14 (Spring 2014)
- 2014-15 (Spring 2015)
- 2015-16 (Spring 2016)
- 2016-17 (Spring 2017)

### Input Date:
11/21/2013

### Course SLO Status:
Active

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<tr>
<td>El Camino: Course SLOs (MATH) - Math (Prospective Elementary School Teachers) - ECC: MATH 115 - Probability and Statistics for Prospective Elementary School Teachers - SLO #1 Research Study - Students will be able to design a research study, develop an appropriate assessment instrument, collect and analyze data using appropriate methods, and draw statistical inferences from the data in written form. (Created By El Camino: Course SLOs (MATH) - Math (Prospective Elementary School Teachers))</td>
<td>To assess this SLO, students complete a statistics research study. The rubric will be offered in the Standard and Target for Success section. <strong>Assessment Method:</strong> Laboratory Project/Report <strong>Standard and Target for Success:</strong> Standard for Success: 70% of the students will receive a grade of A, B or C on the statistics research project.</td>
<td>04/29/2014 - DATA The data for the research study for each of the 3 parts and the total points are reported below. The sample size for this assessment is 22 students. PART I 12 (54%) students scored a 3 5 (23%) students scored a 2 5 (23%) students scored a 1 0 (0%) students scored a 0 PART II 14 (62%) students scored a 3 4 (19%) students scored a 2 4 (19%) students scored a 1 0 (0%) students scored a 0 PART III 17 (77%) students scored a 3 5 (23%) students scored a 2 0 (0%) students scored a 1 0 (0%) students scored a 0 TOTAL POINTS FOR THE STATISTICS RESEARCH PROJECT 11 (50%) students scored a 11-10 (Grade of A) 6 (27%) students scored a 9 (Grade of B) 4 (18%) students scored a 6 (Grade of C) 1 (5%) students scored a 6 (Grade of D) 0 (0%) students scored a 0-5 (Grade of F)</td>
<td>05/15/2015 - We plan to examine how attendance impacts student performance on the Statistics Research Study. 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 scores on the Statistics Research Study rubric. We will collect this data at the end of the semester and report the findings on the next cycle of SLO assessment. <strong>Action Category:</strong> Teaching Strategies</td>
</tr>
</tbody>
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### Statistics Research Study Evaluation Form

**Part One:** The Design of the Research Study (3 points possible)
- Design presented with no errors, well-written, and complete. (3 points)
- Design presented with a few errors, errors in the writing, and/or missing a few components. (2 points)
- Design presented with several errors, errors in the writing, and/or missing some important components. (1 point)
- Design presented is substantially flawed. (0 points)

**Points Earned for Part One:** ________

**Part Two:** Data Analysis (3 points possible)
- Raw data and data analysis is presented with no errors, well-written, and complete. (3 points)
- Raw data and data analysis presented with a few errors, errors in the writing, and/or missing a few components. (2 points)
- Raw data and data analysis presented with several errors, errors in the writing, and/or missing some important components. (1 point)
- Raw data is missing. (0 points)
- Data analysis is substantially flawed. (0 points)

**Points Earned for Part Two:** ________

**Part Three:** Statistical Inferences (3 points)
- Raw data and analysis is presented with no errors, well-written, and complete. (3 points)
- Raw data and data analysis presented with a few errors, errors in the writing, and/or missing a few components. (2 points)
- Raw data and data analysis presented with several errors, errors in the writing, and/or missing some important components. (1 point)
- Raw data is missing. (0 points)
- Data analysis is substantially flawed. (0 points)

**Points Earned for Part Three:** ________

**ANALYSIS**

The data indicates that 95% of the students scored a grade of A, B, or C. On this project, only 50% of the students received an A grade. This is a semester long project and this percent is much lower than in semesters past. Typically about 80% of the students receive an A grade. This is due, in part, to the numerous absences that students in this class accrued. The frequent absences results in gaps in their success in various projects and exams during the semester. More students have frequent absences that in other semesters in the past. It is unclear if this is a trend or idiosyncratic of this group of students. Regardless, the Math for Teachers Program committee has determined that...
### Course SLOs

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<td>11/21/2013</td>
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<th>Course SLO Status:</th>
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<td>Active</td>
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### Assessment Method Description:

Two forms of assessments will be used to assess this SLO. First, the scores for the visual and mathematical statistics exam will be used; and second, the scores for Part II of the statistics research study project will be used.

### Assessment Method:

- Multiple Assessments

### Standard and Target for Success:

Standard for Success: 70% of the students will earn a grade of A, B, or C on the visual and mathematical statistics test and 70% of the students will score a 2 or 3 on Part II of the Statistics Research Study Project.

### Assessment Data and Analysis:

**DATA**

**VISUAL AND MATHEMATICAL STATISTICS TEST**

- 4 (19%) students earned an A grade
- 5 (23%) students earned a B grade
- 3 (16%) students earned a C grade
- 4 (19%) students earned a D grade
- 5 (23%) students earned an F grade

Mean for Test #1: 36.3. Standard Deviation for Test #2: 8.4. Twenty-one students completed this test.

**PART II – STATISTICS RESEARCH STUDY**

- 14 (62%) students scored a 3
- 4 (19%) students scored a 2
- 4 (19%) students scored a 1
- 0 (0%) students scored a 0

Fifty-eight percent of the students earned a grade of A, B or C on the Visual and Mathematical Statistics Test. Eighty-one percent of the students received a score of 2 or 3 on Part II of the Statistics Research Study. The Standard was not met.

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**El Camino: Course SLOs (MATH) - Math (Prospective Elementary School Teachers) - ECC: MATH 115 - Probability and Statistics for Prospective Elementary School Teachers - SLO #2 Analyze Statistical Procedure - Given a particular set of data, students will be able to determine the appropriate statistical procedures to analyze and display the data, complete the statistical methods, and explain the mathematical concepts in written and oral forms.**

(Created By El Camino: Course SLOs (MATH) - Math (Prospective Elementary School Teachers))

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### Results

- investigation into the impact of frequent absences into the success of these students is a worthy effort.

- Slightly more than half the students were able to design their research studies without any errors. This is much lower than in the past. Also, just under two-thirds of the class were able to complete the data analysis portion of the research study with no errors and this is also much lower than in the past.

### Standard Met?:

Yes

**Semester and Year Assessment Conducted:**

2013-14 (Spring 2014)

**Faculty Assessment Leader:**

Judy Kasabian

**Faculty Contributing to Assessment:**

Susanne Bucher, Judy Kasabian, Trudy Meyer, Susie Tummers

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**Assessment Method Description:**

Two forms of assessments will be used to assess this SLO. First, the scores for the visual and mathematical statistics exam will be used; and second, the scores for Part II of the statistics research study project will be used.

**Assessment Method:**

- Multiple Assessments

**Standard and Target for Success:**

Standard for Success: 70% of the students will earn a grade of A, B, or C on the visual and mathematical statistics test and 70% of the students will score a 2 or 3 on Part II of the Statistics Research Study Project.

**Assessment Data and Analysis:**

**DATA**

**VISUAL AND MATHEMATICAL STATISTICS EXAM (50 points possible)**

Scores of 45-50: A  
Scores of 40-44: B  
Scores of 33-39: C  
Scores of 28-32: D  
Scores of 27 and below: F

**PART II – STATISTICS RESEARCH STUDY**

Raw data and data analysis is presented with no errors, well-written, and complete. (3 points)

Raw data and data analysis presented with a few errors, errors in the writing, and/or missing a few components. (2 points)

Raw data and data analysis presented with several errors, errors in the writing, and/or missing some important components. (1 point)

05/07/2014 - Standard for Success: 70% of the students will earn a grade of A, B, or C on the visual and mathematical statistics test and 70% of the students will score a 2 or 3 on Part II of the Statistics Research Study Project.

**Action Category:**

Teaching Strategies
The data indicates that the students did not reach the benchmark of 70% of the students earning a grade of A, B, or C on the Visual and Mathematical Statistics Test. The students, did, however, exceed the 70% benchmark of scoring a 2 or 3 on Part II of the Statistics Research Study. The low scores on the test are particularly troubling because this is an important component of the course and it is essential that this group of pre-service teachers have a good understanding of statistics that they may encounter in the classroom. The issue of some students having frequent absences may be a key factor in the lower scores for this SLO than in semesters past. The issue of frequent absences is a topic that the Math for Teachers Committee plans to examine in the 2014-2015 academic year.

**Standard Met? :**
No

**Semester and Year Assessment Conducted:**
2013-14 (Spring 2014)

**Faculty Assessment Leader:**
Judy Kasabian

**Faculty Contributing to Assessment:**
Susanne Bucher, Judy Kasabian, Trudy Meyer, Susie Tummers

**Assessment Method Description:**
To assess this SLO, exam questions asking students to explain concepts in probability and statistics will be used.

For Statistics and Probability, the following questions were used.
1. Explain the steps in the p-value approach in hypothesis testing.
2. Explain the differences between an experimental study and an observational study.
3. Explain the differences between a retrospective observational study and a prospective observational study.
4. Explain the differences between a single blind experiment and a double blind experiment.
5. What types of sampling methods are inherently biased? Explain why this is so?
6. What does it mean to BIASED for statistics?
7. Explain the four scenarios in HYPOTHESIS TESTING.
8. If the student scores in the 74th percentile in math computation, explain how this score is

**Results**

05/08/2014 - Using the rubric to capsulate the data, the findings for 22 students are reported below.

<table>
<thead>
<tr>
<th>Score</th>
<th>Number of Students</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>5 students</td>
<td>22%</td>
</tr>
<tr>
<td>3</td>
<td>6 students</td>
<td>27%</td>
</tr>
<tr>
<td>2</td>
<td>9 students</td>
<td>41%</td>
</tr>
<tr>
<td>1</td>
<td>2 students</td>
<td>10%</td>
</tr>
</tbody>
</table>

The scores are based on the scores of the three class exams reported below.

**HYPOTHESIS TESTING TEST**
11 students scored between 90-100%; 3 students scored between 80-89%; 3 students scored between 68-79%; 3 students scored between 60-67%; and 0 students scored below 60%. Mean for Test #1: 42.5. Standard Deviation for Test #2: 5.9. Twenty-six students completed this test.

**VISUAL AND MATHEMATICAL STATISTICS TEST**
4 students scored between 90-100%; 5 students scored between 80-89%; 3 students scored between 68-79%; 4 students scored below 60%.

05/15/2015 - The three tests given this semester are computed to be a total of 45% of the students’ semester grade. Given the significant impact on student performance on the three tests on the semester grade and the results that the standard was not met, the committee will examine the impact of student attendance on their performance on the tests. A correlation will be determined to ascertain if there is any connection between student attendance (number of absences during the semester) and their performance on the three tests.

**Action Category:**
Teaching Strategies
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<tr>
<td>9. If the student scores in the 51st percentile in mathematical understanding of concepts, explain how this score is interpreted.</td>
<td>Students scored between 60-67%; and 5 students scored below 60%. Mean for Test #1: 36.3. Standard Deviation for Test #2: 8.4. Twenty-one students completed this test.</td>
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<td>10. Why are thousands and thousands of data points essential to determine a percentile score?</td>
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<td>11. The Pearson Correlation Coefficient for a particular piece of data is -.63. What type of correlation does this data have? Explain how you determined the type of correlation.</td>
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<td>12. Explain what the mean (average) of a set of data aims to do and how the standard deviation impacts what the mean attempts to do?</td>
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<td>13. Explain the differences between a percent score and a percentile score.</td>
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<td>14. Explain the differences between an “average” and a “weighted average”.</td>
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<td>15. In a multi-staged event, the mathematical probability is determined by the product of the fractions for each stage of the event. For example, in an experiment with three stages, the mathematical probability will have a fraction representing the likelihood of each stage of the experiment. To determine the mathematical probability, we would multiply the fractions together. Explain fully why multiplication is used.</td>
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<tr>
<td>16. Explain why the mathematical probability of an event must be between 0 and 1.</td>
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**Assessment Method:**
Exam/Test/Quiz

**Standard and Target for Success:**
Standard for Success: 70% of the students will earn a rubric score of 3 or 4.

The following rubric will be used to assess this SLO.
Score of 4:
Students are able to explain statistical and probability concepts and use appropriate methodologies for K-8 students in an exemplary fashion.
Score of 3:
Students are able to explain statistical and probability concepts and use appropriate methodologies for K-8 students in a competent fashion.
Score of 2:
Students are able to explain statistical and probability concepts and use appropriate methodologies for K-8 students in an adequate fashion.
Score of 1:

**ANALYSIS**
This semester, the students had a more difficult time grasping the conceptual understanding of the mathematical topics of the course. The hypothesis testing test and visual and mathematical statistics test were lower than in years past. The students as a collective group scored higher on the probability test, which is typical for this course. A significant number of students miss more class meetings this semester than in the past. This may influence their performance on tests, which focus more on the conceptual underpinnings of mathematics rather than just following an algorithm. The underlying principles of mathematics are discovered and discussed during class time and students who miss class are unable to experience this important component of the class.

**Standard Met?**
Yes

**Semester and Year Assessment Conducted:**
2013-14 (Spring 2014)

**Faculty Assessment Leader:**
Judy Kasabian

**Faculty Contributing to Assessment:**
Susanne Bucher, Judy Kasabian, Trudy Meyer, Susie Tummers
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<tr>
<td>Students are unable to explain statistical and probability concepts and use appropriate methodologies for K-8 students in an exemplary fashion.</td>
<td>Assessment Method Description: To assess this SLO, scores on the probability exam will be used. Assessment Method: Exam/Test/Quiz Standard and Target for Success: Standard for Success: 70% of the students will earn a grade of A, B or C. PROBABILITY EXAM (50 points possible) Scores of 45- 50: A Scores of 40-44: B Scores of 34-39: C Scores of 30-33: D Scores of 29 and below: F</td>
<td>05/08/2014 - Data for the probability exam is listed below. PROBABILITY TEST 9 (41%) students earned an A grade; 8 (36%) students earned a B grade; 2 (9%) students earned a C grade; 1 (5%) students earned a D grade; 2 (9%) students earned an F grade. Mean: 42.3. Standard Deviation: 7.0. Twenty-two students completed this test. 86% of the students earned a grade of A, B, or C.</td>
<td>05/15/2015 - A study examining the correlation between the number of absences and a student’s score on the probability test will be conducted to determine if there is a positive, negative, or no correlation.</td>
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<td>Action Category: Teaching Strategies</td>
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<tr>
<td>El Camino: Course SLOs (MATH) - Math (Prospective Elementary School Teachers) - ECC: MATH 115 - Probability and Statistics for Prospective Elementary School Teachers - SLO #4 Solve and Interpret Experimental and Mathematical Probability - Students will be able to solve, explain, and interpret informal, experimental, and mathematical probability concepts and application problems both in written and oral forms. (Created By El Camino: Course SLOs (MATH) - Math (Prospective Elementary School Teachers))</td>
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El Camino: Course SLOs (MATH) - Math (Prospective Elementary School Teachers) - ECC: MATH 116 - Geometry and Measurement for Prospective Elementary School Teachers - SLO #1 Identify Geometric Shapes - Students will identify two- and three-dimensional geometric shapes, explain their attributes and discuss the relationships among the geometric shapes. (Created By El Camino: Course SLOs (MATH) - Math (Prospective Elementary School Teachers))

| Assessment Method Description: Exams, tests, class activities and observations will be used to assess student knowledge of two- and three-dimensional shapes. Assessment Method: Exam/Test/Quiz Standard and Target for Success: Assessment Rubric Score of 4: Students demonstrate a proficient understanding | | 09/06/2014 - The average for the class was 3.24. This is lower than the average for Spring 2013, however, there were 34 students in the class, compared to 23. 88% of the class scored 3 or 4. The target was met. | |
| | | | Action Category: Teaching Strategies |
| Semester and Year Assessment Conducted: 2013-14 (Spring 2014) | | | |
| Faculty Assessment Leader: Judy Kasabian Faculty Contributing to Assessment: Susanne Bucher, Judy Kasabian, Trudy Meyer, Susie Tummers | | | |

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### Course SLO Assessment Cycle:
- 2013-14 (Spring 2014)
- 2014-15 (Spring 2015)
- 2015-16 (Spring 2016)
- 2016-17 (Spring 2017)

### Input Date:
11/21/2013

### Course SLO Status:
Active

### Assessment Method Description:
Exams, tests, class activities, lab work and observations will be used to assess student ability to use geometric tools to construct geometric figures.

### Standard and Target for Success:
Rubric for Assessment

### Results

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<thead>
<tr>
<th>Score of 4:</th>
<th>Action &amp; Follow-Up</th>
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<tr>
<td><em>Students use geometric tools proficiently to create exemplary constructions.</em></td>
<td>09/15/2015 - Span the constructions out over the entire course of the class and create a specific activity for students to complete prior to completing the construction project.</td>
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<tr>
<td><em>Students are able to explain steps in their constructions with no errors.</em></td>
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| Score of 3: | |
|------------||
| *Students demonstrate a good understanding of two- and three-dimensional shapes.* | |
| *Students are able to explain attributes of the shapes with no errors.* | |
| *Students compare shapes and can discuss relationships among the shapes using exemplary explanations.* | |

| Score of 2: | |
|------------||
| *Students demonstrate a fair understanding of two- and three-dimensional shapes.* | |
| *Students are able to explain attributes of the shapes with minor errors.* | |
| *Students compare shapes and can discuss relationships among the shapes using good explanations.* | |

| Score of 1: | |
|------------||
| *Students are unable to demonstrate an understanding of two- and three-dimensional shapes.* | |
| *Students are unable to explain attributes of the shapes or do so with significant errors.* | |
| *Students are not able to compare shapes and cannot discuss relationships among the shapes.* | |

### Target:
The class average for this SLO will be 3.0.

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#### Assessment Method:
Exam/Test/Quiz

#### Standard and Target for Success:
Rubric for Assessment

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### Course SLOs

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| 2015-16 (Spring 2016) 2016-17 (Spring 2017) | Score of 3:  
• Students use geometric tools but may have a few problems in their constructions.  
• Students are able to explain steps in their constructions with minor errors.  

Score of 2:  
• Students use geometric tools fairly and have problems with their constructions.  
• Students are able to explain steps in their constructions but have several errors.  

Score of 1:  
• Students use geometric tools poorly and are unable to complete their constructions.  
• Students are not able to explain steps in their constructions or have significant errors.  

TARGET: A class average of at least 3.0. | 09/06/2014 - Class average was 3.26. The target was met and 88% of the class achieved a 3 or 4 on the assessment. The average was a little bit lower than Spring 2013, however, there were 11 more students in this class.  
**Standard Met?:** Yes  
**Semester and Year Assessment Conducted:** 2013-14 (Spring 2014)  
**Faculty Assessment Leader:** Susie Tummers  
**Faculty Contributing to Assessment:** Susie Tummers | 09/15/2015 - Prior to each exam, work with students to consider the appropriateness of an answer. Encourage students to improve problem solving skills and in particular, highlight the concept of students asking "Does my answer make sense?"  
**Action Category:** Teaching Strategies |

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**El Camino: Course SLOs (MATH) - Math (Prospective Elementary School Teachers) - ECC: MATH 116 - Geometry and Measurement for Prospective Elementary School Teachers - SLO #3 Solve and Interpret Geometric Application Problems - Students will use the concepts of measurement to solve geometric application problems, determine the appropriateness of a solution, and if errors are made, explain the misconceptions or errors made and how to solve the problem correctly using written or oral means. (Created By El Camino: Course SLOs (MATH) - Math (Prospective Elementary School Teachers))**

**Course SLO Assessment Cycle:**  
2013-14 (Spring 2014)  
2014-15 (Spring 2015)  
2015-16 (Spring 2016)  
2016-17 (Spring 2017)  

**Input Date:** 11/21/2013  
**Course SLO Status:** Active

**Assessment Method Description:**  
Exams, tests, class activities, and observations will be used to assess student ability to solve geometric application problems.  

**Assessment Method:**  
Exam/Test/Quiz  

**Standard and Target for Success:**  
Rubric for Assessment  

Score of 4:  
• Students demonstrate a proficient understanding of the concepts of measurement.  
• Students are able to solve geometric application problems with no errors.  
• Students are able to provide an exemplary explanation of their work in solving the application problem using written or oral means.  

Score of 3:  
• Students demonstrate a good understanding of the concepts of measurement.  
• Students are able to solve geometric application problems with minor errors.  
• Students are able to provide a good explanation of their work in solving the application problem using written or oral means.  

Score of 2:  
• Students demonstrate a fair understanding of the concepts of measurement.  

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<td></td>
<td>• Students are able to solve geometric application problems with several errors.</td>
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<td></td>
<td>• Students are able to provide a fair explanation of their work in solving the application problem using written or oral means.</td>
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<td></td>
<td>Score of 1:</td>
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<tr>
<td></td>
<td>• Students are unable to demonstrate an understanding of the concepts of measurement.</td>
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<tr>
<td></td>
<td>• Students are not able to solve geometric application problems.</td>
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<tr>
<td></td>
<td>• Students are unable to provide an explanation of their work in solving the application problem using written or oral means.</td>
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<td>TARGET: A class average of at least 3.0.</td>
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</table>

**Assessment Method Description:**
Exams, class activities, the area project and observations will be used to assess student ability to explain the derivation of geometric formulas.  

**Assessment Method:**
Exam/Test/Quiz  

**Standard and Target for Success:**
Rubric for Assessment  

Score of 4:  
• Students demonstrate a proficient understanding of explaining the derivation of geometric formulas using both words and diagrams.  
• Students are able to explain the derivation with no errors.  

Score of 3:  
• Students demonstrate a good understanding of explaining the derivation of geometric formulas using both words and diagrams.  
• Students are able to explain the derivation with few errors.  

Score of 2:  
• Students demonstrate a fair understanding of explaining the derivation of geometric formulas using both words and diagrams.  
• Students are able to explain the derivation with several errors.  

Score of 1:  
• Students are unable to demonstrate any understanding of explaining the derivation of geometric formulas.  

09/06/2014 - Class average was 2.97. The target was not met and only 74% of the students achieved a 3 or 4. This is always the most difficult assessment for students because it involves a great understanding of the background on the formulas they will be teaching.  

**Standard Met? :**
No  

**Semester and Year Assessment Conducted:**
2013-14 (Spring 2014)  

**Faculty Assessment Leader:**
Susie Tummers  

**Faculty Contributing to Assessment:**
Susie Tummers  

09/15/2015 - Encourage students to bring forward a rough draft of their area project as a way to ensure their explanations are detailed enough.  

**Action Category:**
Teaching Strategies
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<th>Course SLOs</th>
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<td>geometric formulas using both words or diagrams.</td>
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<td>• Students are unable to explain the derivation.</td>
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<td><strong>TARGET:</strong> A class average of at least 3.0.</td>
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