

Learning Outcomes Worksheet
Secondary Education Mathematics (2008 - 2009)
 Lock Haven University of Pennsylvania

Learning Outcome #1

Statement of Goal

Program completers: know, understand and apply the process of mathematical problem solving; recognize, use, and make connections between and among mathematical ideas and in contexts outside mathematics to build mathematical understanding; use varied representations of mathematical ideas to support and deepen students' mathematical understanding; demonstrate computational proficiency, including a conceptual understanding of numbers, ways of representing number, relationships among number and number systems, and the meaning of operations; emphasize relationships among quantities including functions, ways of representing mathematical relationships, and the analysis of change; use spatial visualization and geometric modeling to explore and analyze geometric shapes, structures, and their properties; demonstrate a conceptual understanding of limit, continuity, differentiation, and integration and a thorough background in techniques and application of the calculus; apply the fundamental ideas of discrete mathematics in the formulation and solution of problems; demonstrate an understanding of concepts and practices related to data analysis, statistics, and probability; and apply and use measurement concepts and tools.

This goal is aligned with NCTM/NCATE standards 1, 4, 5, 9, 10, 11, 12, 13, 14, and 15.

Where, When, and How Monitored (i.e., Evidence to Be Gathered)

Scores on the Praxis II Test: Mathematics: Content Knowledge (0061)

Expectation for Satisfactory Performance

A score of 136, which is a passing score determined by PDE

How Results Were Analyzed (When and By Whom?)

Results are monitored and analyzed by the Coordinator of Secondary Education Mathematics at the completion of each semester.

Results / Evaluation

Number of students who: <u> 10 </u> exceeded expectations <u> </u> met expectations <u> </u> did not meet expectations <u> </u> exempt <u> 10 </u> Total	Expectations were: <input checked="" type="checkbox"/> Wholly satisfied <input type="checkbox"/> Partially satisfied <input type="checkbox"/> Not satisfied
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Analysis (of Data on Performance) and Explanation

The pass rate for the Praxis II is 100%. Since the state of Pennsylvania requires that all students pass the Praxis II in order to be certified, Lock Haven University requires that all students take the exam prior to student-teaching and pass the exam before being recommended for certification and becoming a program completer. While some students have had to take the exam multiple times, they have all been successful at passing it before graduation.

With a mean score (152.86) well above the required passing score (136), our students seem to perform above average on this test. Since the overall score on the exam is recorded using students' actual score report as submitted in a portfolio, these data are accurate with respect to our ten program completers during the 2008 – 2009 academic year.

Action(s) to Maintain or Improve Level of Achievement

No immediate action is required to maintain performance. The program will continue to hold high standards for its students in all courses. In order to improve the level of achievement, a course in secondary mathematics from an advanced standpoint will be required.

Learning Outcome #2

Statement of Goal

Program completers: know, understand and apply the process of mathematical problem solving; reason, construct, and evaluate mathematical arguments and develop an appreciation for mathematical rigor and inquiry; communicate their mathematical thinking orally and in writing to peers, faculty and others; recognize, use, and make connections between and among mathematical ideas and in contexts outside mathematics to build mathematical understanding; use varied representations of mathematical ideas to support and deepen students' mathematical understanding; embrace technology as an essential tool for teaching and learning mathematics; support a positive disposition toward mathematical processes and mathematical learning; possess a deep understanding of how students learn mathematics and of the pedagogical knowledge specific to mathematics teaching and learning; and demonstrate the ability to increase students' knowledge of mathematics.

This goal is aligned with NCTM/NCATE standards 1, 2, 3, 4, 5, 6, 7, 8, and 16.

Where, When, and How Monitored (i.e., Evidence to Be Gathered)

Scores on a Lesson Plan Portfolio completed during Methods 2 (fall semester) are analyzed.

Expectation for Satisfactory Performance

A score of 1 (possible scores 0 or 1) on the first eleven parts of the rubric and a score of 1 (possible scores of 1 or 2) on the last two parts.

How Results Were Analyzed (When and By Whom?)

Results are monitored and analyzed by the Coordinator of Secondary Education Mathematics at the completion of the fall semester, after Methods 2.

Results / Evaluation

Number of students who: _____ exceeded expectations	Expectations were:
<u>8</u> met expectations	<input checked="" type="checkbox"/> Wholly satisfied
<u>2</u> did not meet expectations	<input type="checkbox"/> Partially satisfied
_____ exempt	<input type="checkbox"/> Not satisfied
<u>10</u> Total	

Analysis (of Data on Performance) and Explanation

In analyzing data from this assessment, we found that our candidates do have the ability to develop lessons that focus on the different aspects of teaching and learning assessed in this assignment. However, it does seem that some our candidates struggle to create lessons where students communicate mathematics in oral or written form. This may be due to the fact that candidates find it all too comfortable settling in to a more traditional approach to teaching, where student communication is not often the focus. It also appears that some candidates' lesson plans were not constructed in such a way to promote student learning. This, however, may be more of a problem in the development of the rubric, since if a candidate did not include a lesson focused on a certain topic they automatically received a zero in this category. Therefore, a closer look at these data reveals that only one candidate who included the topics showing this deficiency actually created a lesson that was unlikely to promote student learning.

In addition to scoring well on most of the criteria assessed, candidates demonstrated an overall ability to develop quality lesson plans. While each lesson plan in this assignment was not assessed using the detailed lesson plan rubric given to candidates, they have had enough training developing detailed lesson plans (in two different methods courses) to conclude that they have seen the usefulness of doing so.

Action(s) to Maintain or Improve Level of Achievement

The rubric will be tweaked to better distinguish between categories.

Learning Outcome #3

Statement of Goal

Program completers: communicate their mathematical thinking orally and in writing to peers, faculty and others; recognize, use, and make connections between and among mathematical ideas and in contexts outside mathematics to build mathematical understanding; use varied representations of mathematical ideas to support and deepen students' mathematical understanding; support a positive disposition toward mathematical processes and mathematical learning; possess a deep understanding of how students learn mathematics and of the pedagogical knowledge specific to mathematics teaching and learning; and demonstrate the ability to increase students' knowledge of mathematics.

This goal is aligned with NCTM/NCATE standards 3, 4, 5, 7, 8, and 16.

Where, When, and How Monitored (i.e., Evidence to Be Gathered)

Scores on a Teacher Work Sample completed during Student-Teaching are analyzed.

Expectation for Satisfactory Performance

A score of 1 (possible scores of 0 and 1) on each item on the checklist and 1 (possible scores of 0, 1, and 2) on the rubric.

How Results Were Analyzed (When and By Whom?)

Results are monitored and analyzed by the Coordinator of Secondary Education Mathematics after completion of the assignment during the student-teaching semester.

Results / Evaluation

E.g., Only 80% students rated as "competent" or higher.

Number of students who: _____ exceeded expectations <u>10</u> met expectations _____ did not meet expectations _____ exempt <u>10</u> Total	Expectations were: <input checked="" type="checkbox"/> Wholly satisfied <input type="checkbox"/> Partially satisfied <input type="checkbox"/> Not satisfied
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Analysis (of Data on Performance) and Explanation

These data provide evidence that our students performed quite well on this assignment. This is a surprisingly pleasant result since this assessment was new to our program, may not have been accurately explained to the students, and graded with a rubric that is seemingly generic. However, in all but eleven of the forty-eight criteria our students performed at the minimal acceptable level of performance.

There are a few disappointing results. In Factor 2, Unit Learning Goals and Standards, none of our candidates wrote goals that addressed their students' dispositions toward learning. This seems to indicate that either better instruction is needed on how to write goals for the affective domain or that the instructor should explain the criteria in a more comprehensive manner. In Factor 3, Assessment Plan, 57% of our students only partially met the Assessment Format criterion and 43% of them only partially met the Assessment Criteria criterion. Upon further analysis of the data, it appears that our candidates are including only pencil/paper assessments and that they are not specifying the minimal level of acceptable performance for their assessments. This seems to indicate that our students need to be more adequately instructed in creating non-traditional assessments and that they need to be reminded to state a minimal level of acceptable performance. In Factor 4, Instructional Design and Implementation, 57%, 43%, 57%, 43%, and 71% of our candidates only partially met the Assessment-based adaptations, Multiple learning strategies, Active Inquiry, Demonstration of Integration of Instruction Across Disciplines, and the Motivational elements criteria, respectively. This is a very disappointing result and seems to indicate that our candidates either need to be more comprehensively instructed in these areas or reminded to use the directions and rubric as a guide to complete this assignment. In addition to this, 71% of our candidates did not provide a graphical representation of the pre-assessment data. Since candidates didn't seem to have any difficulty providing graphical representation for other data, this seems to indicate an oversight by either the candidates or the instructor. Finally, in Factor 6, Reflection and Self-Evaluation, 43% of candidates only partially met the Implications for Future Teaching criterion and 57% only partially met the Implications for Professional Development criterion. This seems to indicate that we need to improve our instruction on how to use reflection as a tool for future growth rather than simply a mechanism for expressing thoughts and opinions.

Action(s) to Maintain or Improve Level of Achievement

Parts of the directions on the assignment are being tweaked so the expectations are clearer to the students.

Learning Outcome #4

Statement of Goal

E.g., Students will appropriately analyze and propose solution for an assigned problem in their senior capstone.

Where, When, and How Monitored (i.e., Evidence to Be Gathered)

E.g., Each capstone project evaluated by two faculty members using approved program rubric.

Expectation for Satisfactory Performance

E.g., All students rated as “competent” or higher.

How Results Were Analyzed (When and By Whom?)

E.g., The department met on March 22 to review the data.

Results / Evaluation

E.g., Only 80% students rated as “competent” or higher.

Number of students who: _____ exceeded expectations _____ met expectations _____ did not meet expectations _____ exempt _____ Total	Expectations were: <input type="checkbox"/> Wholly satisfied <input type="checkbox"/> Partially satisfied <input type="checkbox"/> Not satisfied
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Analysis (of Data on Performance) and Explanation

E.g., Department failed to communicate capstone expectations clearly to new faculty.

Action(s) to Maintain or Improve Level of Achievement

(Please include specific dates that plans will be completed and/or reviewed.)

E.g., Review expectations for project at fall faculty retreat and revise instructions by September 15.