

Assurance of Student Learning Reflection 2024-2025	
<i>Ogden College of Science & Engineering</i>	<i>Mathematics Department</i>
<i>730 Middle Grades Mathematics</i>	
<i>Hope Marchionda</i>	
Is this an online program? ☐ Yes ☒ No	Please make sure the Program Learning Outcomes listed match those in CourseLeaf. Indicate verification here ☒ Yes, they match! (If they don't match, explain on this page under Evaluation)

Instructions: For the 2024-25 assessment, we are asking you to reflect on the last three-year cycle rather than collect data. It's important to take time to look over the results from the last assessment cycle and really focus on a data-informed direction going forward. In collaboration with your assessment team and program faculty, review each submitted template from 2021-2024 and consider the following for each Program Learning Outcome, add your narrative to the template, and submit the draft to your **ASL Rep** by **May 15, 2025**.

Program Student Learning Outcome 1	
Program Student Learning Outcome	Effectively communicate mathematical ideas in verbal and written forms.
Evaluation	This program learning outcome is still relevant. The Middle Grades Mathematics major is specifically designed for those students who are preservice teachers. As such, students are expected to be able to communicate mathematics both verbally and in writing. This is relevant because when they graduate, they will be facilitating the learning of mathematics for an untold number of students over the course of their careers. This SLO remained the same for all three years of the reflection period.
Measurement Instruments	Measurement Instrument: Capstone Project for the major: MATH 490 – Seminar in Middle Grades Mathematics. Students work independently with a faculty member on a mathematics research project, culminating in both a final paper and final presentation, in which they are assessed on their ability to effectively communicate mathematics in both verbal and written forms. How we measured this changed from 2021-2022 to 2022-223. For 2021-2022, the criteria for success was that at least 80% of students will average a 2 or better on a 0 to 4 scale on rubric measures of the application of mathematics in their senior project. Beginning in 2022, the criteria for success was that we expect at least 70% of students will average “sufficient” or higher across all domains on the project rubric. Please note that a 2 or better for 2021-2022 corresponds to “sufficient” in 2022. The difference in the instruments is that in 2021-2022 only two domains on the rubric were used to measure students’ success on this SLO. These two metrics were Quality of Mathematics and Quantity of Mathematics. Beginning in 2022, we used all domains on the rubric to measure this SLO which are Writing of Paper, Delivery of Presentation, Quality of Mathematics, Quantity of Mathematics, Mathematical Accuracy, and Mathematical Understanding. The change was made because we are assessing students’ ability to communicate mathematical ideas verbally and in writing and all areas of the rubric assess this.

Criteria & Targets	For all years of review the target was 70% of students will average “sufficient” or higher across all domains on the project rubric. Each year we met the success target with the following percentage: 2021-2022: 75% of students met the target (just two domains) 2022-2023: 100% of students met the target 2023-2024: 100% of students met the target 2024-2025: 100% of students met the target
Results & Conclusion	The results are as expected. Prior to and over the course of the review period, the faculty who teach the courses that are dedicated to the major collaborate to ensure that course content is aligned across sections (and semesters) and that the courses are taught using research based pedagogy regardless of the instructor teaching the courses. While 100% students met the target, faculty involved in the projects have noticed that there are areas of improvement, especially related to the prerequisite knowledge and skills students are lacking. We hypothesize that these observations are related to students who started high school during the covid era. As such, there are ongoing conversations related to how we can maintain high expectations while supporting students as their progress from student to teacher.
<u>**IMPORTANT - Plans for Next Assessment Cycle:</u>	As this learning outcome was modified beginning with the 2022-2023 academic year, we do not plan to make changes. Rather, we plan to continue to collect data during the next three-year cycle. As Mathematics Education professionals, we are continuously working to improve our curriculum both within and across courses in our programs, using both formative and summative assessment data, along with the expertise of our faculty. Over the past several years, we have made some significant changes to the Middle Grades Math program, improving the quality of the courses, the program, and in turn the students & graduates. We are very pleased to see the effects of these changes showing up in our assessments, but we know we can always find ways to innovate and improve and will continue to do so.

Program Student Learning Outcome 2	
Program Student Learning Outcome	Successfully solve a variety of problems using appropriate mathematical tools.
Evaluation	This program learning outcome is still relevant. Problem solving and the skills associated with problem solving permeate all the courses our students take during the course of this major, so we expect students to utilize numerous strategies to solve a wide variety of problems.
Measurement Instruments	Measurement Instrument: Final Exam in MATH 411 – Problem Solving for Middle Grades Teachers. Students in this class learn formal and informal problem-solving strategies, and apply these strategies, along with mathematical understanding gained in previous coursework, to solve a wide variety of problems. Much like the senior seminar course, this course requires students to draw upon skills and concepts from across the program and apply them in new and creative ways. The criteria for success was that we expect at least 70% of students will average 7.5/10 or higher on the problem-solving rubric across all problems.
Criteria & Targets	For all years of review the target was 70% of students will average 7.5/10 or higher on the problem-solving rubric across all problems. Each year we met the success target with the following percentages:

	2021-2022: This SLO was not assessed during this cycle 2022-2023: 100% of students met the target 2023-2024: 100% of students met the target 2024-2025: 100% of students met the target Since SLO 2 was different for 2021-2022 academic year, there is no data to report on for year.
Results & Conclusion	The results are as expected. As stated above, students utilize problem solving skills throughout the courses required in this major. This course capitalized on the prior knowledge and skills students have learned over the course of the major to bridge the different problem-solving approaches used in various branches of mathematics. While we are required to run this as an online course since it is cross listed with the graduate section that is part of an online program, the course is still run as a discussion-based course. This benefits all students as they are required to engage in productive struggle throughout the course. As such, we expect a higher percentage to meet this target.
<u>**IMPORTANT - Plans for Next Assessment Cycle:</u>	As this learning outcome is a new SLO beginning with the 2022-2023 academic year, we do not plan to make changes. Rather, we plan to continue to collect data during the next three-year cycle so that we have more data on this SLO for the upcoming Academic Program Review.

Program Student Learning Outcome 3	
Program Student Learning Outcome	Propose and rigorously prove mathematical conjectures.
Evaluation	This program learning outcome is still relevant. Making conjectures and proving them both informally and formally is an important aspect of engaging in process of doing mathematics. This program requires a sequence of courses that help students refine the skills required to write mathematical proofs.
Measurement Instruments	Measurement Instrument: Final Exam in MATH 403 – Geometry for Middle Grades Teachers. As the second geometry course students in the Middle Grades Mathematics program take, MATH 403 is a proof-based course. Students make conjectures and prove theorems throughout the course, culminating in the final exam. This exam assesses students' ability to propose and formally prove mathematical conjectures from across the geometry curriculum, making it an especially appropriate instrument for this learning outcome. The criteria for success was that we expect at least 70% of students will average 7.5/10 or higher on the problem-solving rubric across all proof-based problems.
Criteria & Targets	For all years of review the target was 70% of students will average 7.5/10 or higher on the problem-solving rubric across all proof-based problems. 2021-2022: This SLO was not assessed during this cycle 2022-2023: 75% of students met the target 2023-2024: 100% of students met the target 2024-2025: 71.4% of students met the target Since SLO 3 was different for 2021-2022 academic year, there is no data to report on for year.

Results & Conclusion	The results are as expected. As stated above, students take a variety of courses that scaffold the process of making conjectures and justifying those conjectures formally and informally. This course capitalizes on the skills students have learned over the course of the major and requires them to engage in formal proof writing in a branch of mathematics where they already have a solid foundation of conceptual understanding of basic concepts.
<u>**IMPORTANT - Plans for Next Assessment Cycle:</u>	As this learning outcome is a new SLO beginning with the 2022-2023 academic year, we do not plan to make changes. Rather, we plan to continue to collect data during the next three year cycle so that we have more data on this SLO for the upcoming Academic Program Review.

To add more outcomes, if needed, select the table above and copy & paste below.