

EWU Programmatic SLO Assessment

Degree/Certificate: Middle-level Science Endorsement

Major/Option: Natural Science

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Part I – Program SLO Assessment Report for 2014-2015

1. **Student Learning Outcomes I and V: Understands the process of science; understands the process of learning science through inquiry**
2. **Overall evaluation of progress on outcome:** Indicate whether or not the SLO has been met, and if met, to what level.

_____ SLO is met after changes resulting from ongoing assessments, referencing assessment results from the previous year to highlight revisions;

_____ SLO is met, but with changes forthcoming;

___X___ SLO met without change required

3. **Strategies and methods: For this report we have relied mostly on class performance since few of our students took the West E Middle Level Science exam during the year 2013-2014*. The process of science is emphasized in the following 5 classes that constitute the core of the Natural Science Program. Mean scores on investigations in each class are summarized in the table below. Note that scores in BIOL115, GEOL115 and PHYS115 include other elementary education majors who do not have an emphasis in science as their major within the BAE in Elementary Education.**
 - Our program serves a wide band of students who wish to teach science anywhere from K-8th grade. Approximately 80% of our students were not interested in teaching grades 6-8 reporting they mostly wanted to teach grades 4 and 5. Since teachers do not have to have the actual middle level endorsement to teach elementary school, these students did not take the exam.

4. **Observations gathered from data:**

- a. Findings:

BIOL115	Students design and implement a quarter long term investigation into factors that affect plant growth. Average grade = 86% (n = 44)
GEOL115	Students investigate an earthquake question using various forms of data. Average grade = 76% (n = 39)
PHYS 115	Students develop an inquiry activity for teaching physics. Average grade = 98% (n = 45)
NTSC301	Students design and implement an investigation into local soils. Average grade = 88% (n = 7)
NTSC390	Students developed a 5-E inquiry lesson for middle school students. Average grade = 86% (n = 7)

West-E scores: Two of the three students who completed the Natural Science Program and took the WEST-E, passed the Inquiry Domain.

- b. **Analysis: The scores for assignments we reported above were the culminating experiences but students had many more opportunities to practice the scientific method. In fact the design of the 115 series is about learning principles through inquiry but also allowing them to see how science can be taught through modeling inquiry. We are satisfied that students are learning the process.**
 - c. **In the NTSC 390, students work with an inquiry pedagogy assessment that is accepted by the National Science Teachers Association. Students did well in that task.**
5. **What program changes will be made based on the assessment results?**
- a) Describe plans to improve student learning based on assessment findings (e.g., course content, course sequencing, curriculum revision, learning environment or student advising). **We seem to be doing pretty well in this area of preparation.**
 - b) Provide a broad timeline of how and when identified changes will be addressed in the upcoming year. **No plans to change.**
6. Description of revisions to the assessment process the results suggest are needed and an evaluation of the assessment plan/process itself. **None.**

SLO II, III, IV – We have grouped these three standards together as they are integrated in our courses.

Student Learning Outcome II: Understands how energy and matter flow through physical, life and earth systems.

Student Learning Outcome III: Understands the evolution of a natural system and factors that result in evolution or equilibrium.

Student Learning Outcome IV: Understand how systems are organized.

2. Overall evaluation of progress on outcome: Indicate whether or not the SLO has been met, and if met, to what level.

SLO is met after changes resulting from ongoing assessments, referencing assessment results from the previous year to highlight revisions;

SLO is met, but with changes forthcoming;

SLO met without change required

3. Strategies and methods: These SLOs were assessed in all of the core classes. However scores represent performance on a number of assessment tools within the three senior level courses.

PHYS 115	Assessment of Physical Science: Student performance on exams on energy transfer and simple machines. Mean = 78% (n=45)
NTSC301	Assessment of Earth Science : Scores represent a combination of performance on quizzes and exams. Mean = 81% (n=7)
NTSC302	Understanding of the Life Science SLOs is assessed through 5 exams. Mean = 81% (n=10)
NTSC390	Students took a WEST-E like exam that we created from middle level released items and higher level WEST E biology and Earth science endorsement release items. Mean = 68% (n=7)(students were not graded on this nor did they prepare to take the exam. Also in some cases, students had not yet taken PHYS115.)

WEST-E Data on Middle Level Science:

4. Observations gathered from data:

Findings: **Nine students took the Middle Level Science Exam during 2014-2015. 4 of the 9 passed it initially. Of the 5 that failed all but 1 passed after taking it a second time. The failing individual took it a third time and then dropped out of the program.**

Analysis of findings: **Analysis of the domains reveal that students did best in the Earth science domain, then science process, then physics and least in the life science. Three of the students who passed the first time had the benefit of the changes we implemented this year, which included aligning the upper level biology course with the WEST E exam. These three students also had the Biol320 course we added this year. Students who passed the exam the first time, did significantly higher than those who failed in all 4 domains. Another factor that we think influenced the scores of the students who took the exam mid-year was that they now were held to the requirement that if they did not pass, they would not move forward to student teach. Consequently there has been a change in the culture about taking the West-E exams. Anecdotally, students seem a lot more serious this year about preparing for the West E exam where prior, students often reported that they would take it and see how they did before spending much time on preparation.**

5. What program changes will be made based on the assessment results?

Describe plans to improve student learning based on assessment findings (e.g., course content, course sequencing, curriculum revision, learning environment or student advising). **After much analysis, we have redesigned this program to include more rigorous science coursework. Though improvements we made this year, did see an increased performance for the students who had the benefit of this year's program, we still do not feel it is enough. Consequently we will soon be taking a new program through CPAC that increases the number of courses in life science by 1 and increases the physics course work by 1. We also increased the math**

requirement. We are also going to put students in major level courses instead of designated courses for the natural science major so that they compete with students going on into higher-level courses. We will maintain the requirement of the inquiry sequence and will also require a capstone course where we will be able to evaluate their performance in the middle school classroom. Though students are currently evaluated by members of the Dpt. of Education, we will be able to see how their content knowledge supports their teaching of science.

Provide a broad timeline of how and when identified changes will be addressed in the upcoming year. **Implement Fall Quarter of 2016. The specialized courses of our current program will not be available as of next fall and we have already begun to blend in the juniors into the new program in anticipation of it passing CPAC.**

7. Description of revisions to the assessment process the results suggest are needed and an evaluation of the assessment plan/process itself.

NEW: PART II – CLOSING THE LOOP

FOLLOW-UP FROM THE 2013-2014 PROGRAM ASSESSMENT REPORT

In response to the university's accrediting body, the [Northwest Commission on Colleges and Universities](#), this section has been added. This should be viewed as a follow up to the previous year's findings. In other words, begin with findings from 2011-12, and then describe actions taken during 2012-13 to improve student learning along, provide a brief summary of findings, and describe possible next steps.

Working definition for closing the loop: *Using assessment results to improve student learning as well as pedagogical practices. This is an essential step in the continuous cycle of assessing student learning. It is the collaborative process through which programs use evidence of student learning to gauge the efficacy of collective educational practices, and to identify and implement strategies for improving student learning.* Adapted 8.21.13 from <http://www.hamline.edu/learning-outcomes/closing-loop.html>.

1. **Student Learning Outcome(s)** assessed for 2012-13 **All the same SLOs as above.**
2. Strategies implemented – **We were successful in adopting three new courses for our program.**
3. **Summary of results** (may include comparative data or narrative; description of changes made to curriculum, pedagogy, mode of delivery, etc.): Describe the effect of the changes towards improving student learning and/or the learning environment. **Though we believe**

changes in our program were sufficient to meet students who took the WEST-E exam after our changes this year, we do not feel it is enough.

4. What **further changes to curriculum, pedagogy, mode of delivery**, etc. are projected based on closing-the-loop data, findings and analysis? **See changes proposed for 2015/2016.**

Definitions:

1. **Student Learning Outcome:** The student performance or learning objective as published either in the catalog or elsewhere in your department literature.
2. **Overall evaluation of progress on outcome:** This checklist informs the reader whether or not the SLO has been met, and if met, to what level.
3. **Strategies and methods used to gather student performance data,** including assessment instruments used, and a description of how and when the assessments were conducted. Examples of strategies/methods: embedded test questions in a course or courses, portfolios, in-class activities, standardized test scores, case studies, analysis of written projects, etc. Additional information could describe the use of rubrics, etc. as part of the assessment process.
4. **Observations gathered from data:** This section includes findings and analyses based on the above strategies and methods, and provides data to substantiate the distinction made in #2. For that reason this section has been divided into parts (a) and (b) to provide space for both the findings and the analysis of findings.
5. **Program changes based on the assessment results:** This section is where the program lists plans to improve student learning, based on assessment findings, and provides a broad timeline of how and when identified changes will be addressed in the upcoming year. Programs often find assessment is part of an ongoing process of continual improvement.
6. **Description of revisions to the assessment process the results suggest are needed.** Evaluation of the assessment plan and process itself: what worked in the assessment planning and process, what did not, and why.

Some elements of this document have been drawn or adapted from the University of Massachusetts' assessment handbook, "Program-Based Review and Assessment: Tools and Techniques for Program Improvement" (2001). Retrieved from http://www.umass.edu/oapa/oapa/publications/online_handbooks/program_based.pdf

