Assessment and Improvement Report: 2015

Department: Biology

Assessment Coordinator: Deb Donovan

Departmental Mission: The mission of the Biology Department is to provide an outstanding learning environment that integrates education, scholarship, and service in order to actively engage students in the biological sciences and foster their development as lifelong learners. Successful graduates of our Department will understand fundamental biological principles in depth, will have laboratory and field skills to answer biological questions, will have enhanced critical thinking and quantitative skills, will be able to communicate precisely and analytically in written and oral forms, and will be able to engage independently and collaboratively to be thoughtful and productive contributors to society.

Department Student Learning Outcomes: Upon graduation, Biology majors in each of the following degree programs will be able to:

Biology BS

1. have in-depth knowledge from the major areas of biology (ecology, genetics, evolution, cell and molecular biology, and organismal biology) and be able to integrate principles from these areas.

2. be proficient in a variety of science practices including acquiring laboratory and field skills necessary to answer biological questions, communicating precisely and analytically in written and oral forms, and engaging collaboratively in the scientific process. (this SLO applies to all degree programs)

3. have effective quantitative reasoning skills. (this SLO applies to all degree programs)

Biology BA

4. have knowledge from the major areas of biology (ecology, genetics, evolution, cell and molecular biology, and organismal biology) (instead of SLO #1 above)

Biology/Anthropology BA

5. have knowledge from major areas of biology (genetics, evolution, and organismal biology) and be able to integrate principles from these areas with principles from Biological Anthropology (instead of SLO #1 above)

Biology/Anthropology BS

6. have in-depth knowledge from major areas of biology (ecology, genetics, evolution, and organismal biology) and be able to integrate principles from these areas with principles from Biological Anthropology (instead of SLO #1 above)

Biology/Mathematics BS

7. have in-depth knowledge from major areas of biology (genetics, evolution, cell and molecular biology, and organismal biology) and be able to integrate principles from these areas with principles from Mathematics (instead of SLO #1 above)
**Student Learning Outcomes Assessed This Year:**

<table>
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<th>Assessment Measures</th>
<th>SLOs Assessed</th>
<th>Degree Program</th>
<th>Results</th>
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<td>Content assessment* administered to all students at the beginning and end of the core biology series (Biol 204 &amp; 206) and at the end of their final quarter at WWU</td>
<td>1, 4, 5, 6, 7</td>
<td>Biology BS, Biology BA, Biology/Anthropology BA, Biology/Anthropology BS, Biology/Math BS</td>
<td>As noted below, we are participating in a pilot of a new general Biology concept inventory and we were constrained by the timeline of the developers. Thus, we do not have all of the data yet (we should get the final results in early July). I can update this report at that time. We do have data from the students in Biol 204 (the first class of the core series). Below are some general observations from the data (NOTE: an in-depth analysis of the data has not been done yet): Our students start the core series with a good (although not sophisticated) understanding of: • natural selection &amp; evolution • flow of energy &amp; matter through organisms • trophic levels &amp; food webs • population &amp; community ecology They have a weaker understanding of: • cell structure &amp; function • cell signaling • protein structure &amp; function.</td>
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* The Biology Department is participating in the pilot of a general biology concept inventory that is being developed by researchers from several institutions. The concept inventory, called BioMaps, is closely linked with the core concepts from Vision and Change in Undergraduate Biology Education: A Call to Action (AAAS, 2011) and the Biology Department devoted several faculty meetings last year analyzing our curriculum to determine how well it aligns with Vision and Change. To do this, we used the BioCore guide, which was developed by Sarah Brownell and her colleagues (Brownell et al., 2014) to assist departments in evaluating their curriculum against the Vision and Change core concepts. This same group of researchers is developing BioMaps. Thus, by using these Vision and Change-aligned tools, we have been able to assess the breadth and depth of our curriculum, and we can now assess our students’ knowledge of the core concepts. BioMaps has been developed such that each question has a stem
followed by several answers that can either be true or false. The answers range in difficulty such that we would expect students early in the program to get some correct answers right while missing more sophisticated correct answers. We would then expect students at the end of the program to get the more sophisticated answers. This makes BioMaps particularly useful for *programmatic* assessment. BioMaps became ready for pilot at the beginning of spring quarter, and we just received the data for students currently enrolled in the first course of the Biology core series (Biol 204 – Introduction to Ecology, Evolution, and Biodiversity). At the end of the quarter, students completing the core series and the graduating seniors will take the assessment. Thus, by early summer we will have data from students at three key points in the program. According to the developers, BioMaps should be generally available for use next year and we plan to make it a key component of our departmental assessment.
