

CHICO STATE UNIVERSITY
ASSESSMENT SUMMARY UPDATE

PROGRAM: BS in Microbiology

Year of review	Student Learning Outcome	Describe assessment activity done this year for this SLO	Findings	Based on the results or evidence, what action was taken regarding program improvements?
2016-2017	<p>SLO 1 Students can demonstrate knowledge of cell structure and metabolism.</p> <p>SLO 3 Students can demonstrate knowledge as to how microorganisms interact with their environment.</p>	<p>Design, embedding in courses, utilization, scoring, summarizing, and reporting of an assessment instrument that measured curriculum performance in multiple specific student learning outcomes which support the physiology SLO.</p>	<p>The current biological sciences curriculum produced percent learning gains of 10% or higher in 23 of the development and physiology specific learning objectives. In comparison to past curriculum performance of 2011 2012 reporting, the current program improved percent learning gains of 10% or more in 11 of the development and physiology specific learning objectives.</p>	<p>The unique nature of the questions utilized by this assessment not only identified the percentage of students having mastered a specific learning outcome, but question results also identify among the students who were incorrect for a question which misconceptions students harbor. Instructors have been provided performance summaries for their individual courses, so that their future efforts not only provide experience and mastery of material but also correction of misconceptions.</p>
2015-2016	<p>SLO 1 Students can demonstrate knowledge of cell structure and metabolism.</p> <p>SLO 7 Students can demonstrate an understanding, and ability to use, the scientific method including observation, hypotheses testing, data collection, and analysis.</p>	<p>Design, embedding in nine courses, utilization, and scoring of an assessment instrument of 36 multiple choice questions that measured curriculum performance in multiple specific student learning outcomes which support the cellular and molecular, experimental design SLO's of the Biology and Microbiology degree programs.</p>	<p>Thirty-six measurable student outcomes were assessed in order to evaluate the effectiveness of our curriculum in providing students with the opportunity to master the cell and molecular SLO (Table 1 below, SLO numbers 1-36) of the BS in Biology and Microbiology. The percentage of students providing the correct answer to a specific question during the first and last weeks of the respective course was reported (Table 1). Evaluation of the 36 SLO's during the "last" week of Biology 409 and Biology 412, respectfully identified 15 and 12 of the 36 SLO's where 50% or more of students were capable of providing correct answers (Table 1, highlighted in blue). Because students may potentially have entered the biological sciences</p>	<p>The unique nature of the questions utilized by this assessment not only identified the percentage of students having mastered a specific learning outcome, but question results also identify among the students who were incorrect for a question which misconceptions students harbor. Instructors have been provided performance summaries for their individual courses, so that their future efforts not only provide experience and mastery of material but also correction of misconceptions.</p>

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			<p>programs with prior mastery of a SLO, the percent learning gain for each SLO was calculated using Biology 151 "first" week scores (Table 1, '15'16 %LG).</p>	
2014-2015	<p>SLO 3 Students can demonstrate knowledge as to how microorganisms interact with their environment.</p> <p>SLO 4 Students can demonstrate knowledge of the interaction between humans and microorganisms.</p>	<p>Design, embedding in courses, utilization, and scoring of an assessment instrument of multiple choice questions that measured curriculum performance in multiple specific student learning outcomes which support the scientific literacy SLO.</p>	<p>Twenty-eight outcomes were assessed in order to evaluate curriculum providing students with mastery of science literacy SLO's of the BS/BA in Biology and BS in Microbiology. First week versus last week assessment results for the introductory course Biology 151 revealed small- variable- bidirectional changes for the science literacy SLO's. However the end of semester assessment results for both the mid-program courses Biology 360 and Microbiology 371 indicated improvement across all 28 measured SLO's examined. The improved scores continued to remain high, higher than those from the introductory Biology 151 course, in the respective program upper division courses Biology 409 and Microbiology 371. Except for a 33% score for SLO 14 randomness in study design, scores from all other science literacy SLO's at the end of the semester of Biology 409 and Microbiology 412 had climbed to or above 60%.</p>	<p>The unique nature of the questions utilized by this assessment not only identified the percentage of students having mastered a specific learning outcome, but question results also identify among the students who were incorrect for a question which misconceptions students harbor. Instructors have been provided performance summaries for their individual courses, so that their future efforts not only provide experience and mastery of material but also correction of misconceptions.</p>
2013-2014	<p>SLO 3 Students can demonstrate knowledge as to how microorganisms interact with their environment.</p> <p>SLO 4 Students can demonstrate knowledge of the interaction between humans and microorganisms.</p>	<p>Design, embedding in courses, utilization, and scoring of an assessment instrument of 31 multiple choice questions that measured curriculum performance in multiple specific student learning outcomes which support the ecology SLO.</p>	<p>Student performance on a multiple choice type assessment was measured in order to evaluate programmatic performance. Average percentage of students correct was calculated from each of the 31 measured outcomes from each course examined. First week versus last week assessment results for the introductory course Biology</p>	<p>The unique nature of the questions utilized by this assessment not only identified the percentage of students having mastered a specific learning outcome, but question results also identify among the students who were incorrect for a question which misconceptions students harbor. Instructors have been provided performance summaries for their individual courses, so that their future efforts not only provide experience</p>

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			<p>152 revealed variable- small but generally positive learning gains in the student population for all but two questions. Comparing last week scores from Biology 152 with last week scores from biology 350 revealed no additional increase or gain in learning as student's progress through the higher ecology curriculum, with respect to the topics covered by the assessment. However, comparison of spring 2014 Biology 350 last week scores to Biology 350 last week scores from the previous assessment of spring 2010 revealed stability or improvement in learning gains for the majority of ecological topics examined.</p>	<p>and mastery of material but also correction of misconceptions.</p>
2012-2013	SLO 2 Students can demonstrate knowledge of evolutionary forces and their consequences.	Design, embedding in courses, utilization, and scoring of an assessment instrument of 14 multiple choice questions that measured curriculum performance in multiple specific student learning outcomes which support the evolution SLO.	<p>From each course average percentage of students correct was calculated for each of 14 questions examined. Percentage correct responses increased as students progressed through programmatic coursework for all but two questions. Percent learning gain was also calculated for each of the 14 assessment questions. Compared to a 2008 2009 academic year evolution assessment, the 2012 2013 Biology evolution curriculum resulted in increased percent learning gain for 7 out of 14 questions. Three questions demonstrating lower gains for 2012 2013 involved interpretation of evolutionary trees.</p>	<p>Suggestion for curricular revision to provide students with more experience with evolutionary tree interpretation.</p>