2014-2015 Annual Program Assessment Report

Please submit report to your department chair or program coordinator, the Associate Dean of your College, and to james.solomon@csun.edu, director of assessment and program review, by September 30, 2015. You may, but are not required to, submit a separate report for each program, including graduate degree programs, which conducted assessment activities, or you may combine programs in a single report. Please identify your department/program in the file name for your report.

College: Science and Mathematics

Department: Biology

Program: B.A., B.S., M.S.

Assessment liaison: Cheryl Hogue

1. **Please check off whichever is applicable:**
   - **A. ___x_____ Measured student work.**
   - **B. ____x____ Analyzed results of measurement.**
   - **C. _____ Applied results of analysis to program review/curriculum/review/revision.**

2. **Overview of Annual Assessment Project(s).** On a separate sheet, provide a brief overview of this year's assessment activities, including:
   - an explanation for why your department chose the assessment activities (measurement, analysis, and/or application) that it enacted
   - if your department implemented assessment **option A**, identify which program SLOs were assessed (please identify the SLOs in full), in which classes and/or contexts, what assessment instruments were used and the methodology employed, the resulting scores, and the relation between this year's measure of student work and that of past years: (include as an appendix any and all relevant materials that you wish to include)
   - if your department implemented assessment **option B**, identify what conclusions were drawn from the analysis of measured results, what changes to the program were planned in response, and the relation between this year's analyses and past and future assessment activities
   - if your department implemented **option C**, identify the program modifications that were adopted, and the relation between program modifications and past and future assessment activities
   - in what way(s) your assessment activities may reflect the university's commitment to diversity in all its dimensions but especially with respect to underrepresented groups
   - any other assessment-related information you wish to include, including SLO revision (especially to ensure continuing alignment between program course offerings and both program and university student learning outcomes), and/or the creation and modification of new assessment instruments

3. **Preview of planned assessment activities for next year.** Include a brief description and explanation of how next year's assessment will contribute to a continuous program of ongoing assessment.

2. Overview of Annual Assessment Project(s).

Undergraduate B.A. and B.S. program: We have five Student Learning Outcomes (SLOs) for our undergraduate programs in Biology. They are:

SLO 1: Students can demonstrate knowledge of: a) the structure and metabolism of cells, b) the transmission and expression of genetic information, and c) the immediate and long term (evolutionary) consequences of interactions between organisms and their environment.

SLO 2: Students can demonstrate specialized knowledge in one or more disciplines of Biology.

SLO 3: Students are aware of and/or capable of using new and existing methods and technologies in these disciplines.

SLO 4: Students must demonstrate critical thinking in applying the methods of scientific inquiry, including obervation, hypothesis testing, data collection and analysis.

SLO 5: Ability to engage the biology literature and to communicate scientific information verbally and/or in writing.

During the 2014-2015 academic year, we measured four SLOs in five core classes in our Biology undergraduate programs: Biology 106, 107, 322, 360, and 380. The assessment instrument that we used was multiple choice questions that cover key concepts covered in these courses. Assessment questions are typically embedded in the final exam for a course, but in some cases the questions were given as a separate exam that could be administered on Moodle. The Department established Core Curriculum Groups (CCG) to discuss revisions of assessment questions so that they would better align with topics covered in the core classes. Last year these groups actively engaged in discussions about how to modify the assessment exams. In fall 2014 three of the CCGs revised their assessment questions—Biology 106, 107, and 380. Questions were not revised in Biology 360 as revision of questions in this course was done previously. Assessment questions were administered to students in sections of Biology 106, 107, 322, 360, and 380 in both fall 2014 and spring 2015. The Department also continued with PLF sessions (part of the Peer-Learning Facilitator Program) for all five core classes where students can review key concepts presented in the courses.

In comparing student performance on assessment questions for the 2013-14 and 2014-15 school years we noted an improvement in student scores. The mean percentage of correct answers on the assessment exams is presented in Table 1. The greatest difference was seen for Biology 106 where the mean

percent of correct answers achieved by students taking the assessment test increased by over 10%. Smaller increases in the mean number of correct answers were seen for the other two courses where the assessment questions were revised—Biology 107 and 380.

Table 1. Mean number of correct answers (%) on assessment questions for five core classes in the Biology Undergraduate Program is presented for school years 2013-2014 and 2014-2015.

Course	**SLOs Assessed**	**Mean Number Correct (%) 2013-2014**	**Mean Number Correct (%) 2014-2015**
Biol 106	1	56	67
Biol 107	1	53	59
Biol 322	1, 2	56	57
Biol 360	1, 2, 3	72	76
Biol 380	1, 3, 4	69	72

A 4% increase in mean numer of correct answers for Biology 360 was seen, but performance only increased by 1% for Biology 322. With respect to our goal of students achieving an overall mean score of 60% on assessment questions, we can see in Table 1 that we met this target again in Biology 360 and 380. We obtained a mean score of greater than 60% for Biology 106, and we are closer to achieving 60% in Biology 107 and 322.

Most of the sections of the core classes taught require the students to have an iPad. Mini assessments of iPad use in core classes has shown that it enhances student learning, and along with revisions of assessment questions may have contributed to the increase in assessment scores. Additionally, in 2012 we instituted a requirement of a grade of C or better in Biology 106/L and 107/L which are prerequisites for Biology 322, 360 and 380. This too may have contributed to improved performance on assessment questions given in these courses.

We looked at individual performance on assessment questions (see the Appendix, Figures 1- 5) and this will help us in continuing to address ways to enhance learning of the topics covered by these questions. CCGs will continue to examine our assessment tools for the core classes.

In addition to measuring SLO 4 in Biology 380, it was assessed in Biol 312 (n=19) and Biol 432 (n=21). Mean percent correct answers on assessment questions was 79% for Biology 312, and 85% for Biology 432. SLO 5 was evaluated in only one course with an enrollement of less than 20 students. We continue to strive to increase our sample sizes for this SLO and encourage more faculty to assess communication skills in our upper-division Biology courses.

M.S. Graduate Program: We have four SLOs for the graduate program in Biology. They are:

SLO 1: Students can demonstrate specialized knowledge in one or more disciplines of Biology.

SLO 2: Students are aware of and/or capable of using new and existing methods and technologies.

SLO 3: Students can demonstrate facility in applying the methods of scientific inquiry, including observation, hypothesis testing, data collection, and analysis.

SLO 4: Students can demonstrate professional level oral and written communication skills within a discipline of Biology.

Assessment of our graduate program has centered on the thesis research project. We continue to collect data on performance early in the career of the graduate student (in the first three semesters) and late in their career when they are completing their program. We developed a rubric that is used to measure student performance at the thesis proposal stage and at the thesis defense stage. For the thesis proposal we include in the rubric: time to complete presentation of the thesis proposal, scientific merit of the thesis research, knowledge of the field of study, methods that will be used to carry out the research, quality of the written proposal, presentation skills, and overall performance on the thesis research proposal. These same areas were also examined for the thesis defense along with career prospects after completing the M.S. degree. The rubric used for the thesis proposal and thesis defense will continue to be used to address the SLOs of our graduate program.

This past academic year we were able to accumulate more data on the thesis proposal. To date we have data on approximately 62 students. We found that early in the career of the graduate student that their mean score on the thesis proposal ranged from 3 to 4 (this is based on an evaluation scale of 1 to 5 with "1" being poor and "5" being excellent). Students scored particularly strong in scientific merit of their study, methodology they will use for their thesis research, and their presentation skills (See Figure 6 in the Appendix).

The average score for time to complete the thesis proposal, knowledge of the field of study, and writing skills was a 3. When we compare these results to all the data that has been collected to date on the thesis defense evaluation we see improvement in the scores for knowledge of the field of study and writing skills. Students assessed received a mean score of 4 in these two areas of the evaluation.

3. Preview of planned assessment activities for next year.

Undergraduate Programs. Core classes in Biology will continue to be used to measure most of our SLOs. Collection of longitudinal data improved and in future years we anticipate having a data set where we will be able to follow a given student's performance in lower-division and upper-division courses. We will reevaluate the rubric developed for SLO 5 and continue to encourage faculty to assess communication skills in upper-division courses. Due to the large enrollment in our core classes, assessing writing and/or oral presentations would be challenging. Upper-division courses are smaller and many require writing assignments.

We will continue to encourage faculty teaching upper-division lab courses to measure SLO 4. We have a set of assessment questions that were developed to address this SLO.

M. S. Graduate Program. We will continue to collect longitudinal data on individual student performance early in the graduate program, the thesis proposal stage, and at the end of the graduate program, the thesis defense stage.

APPENDIX.

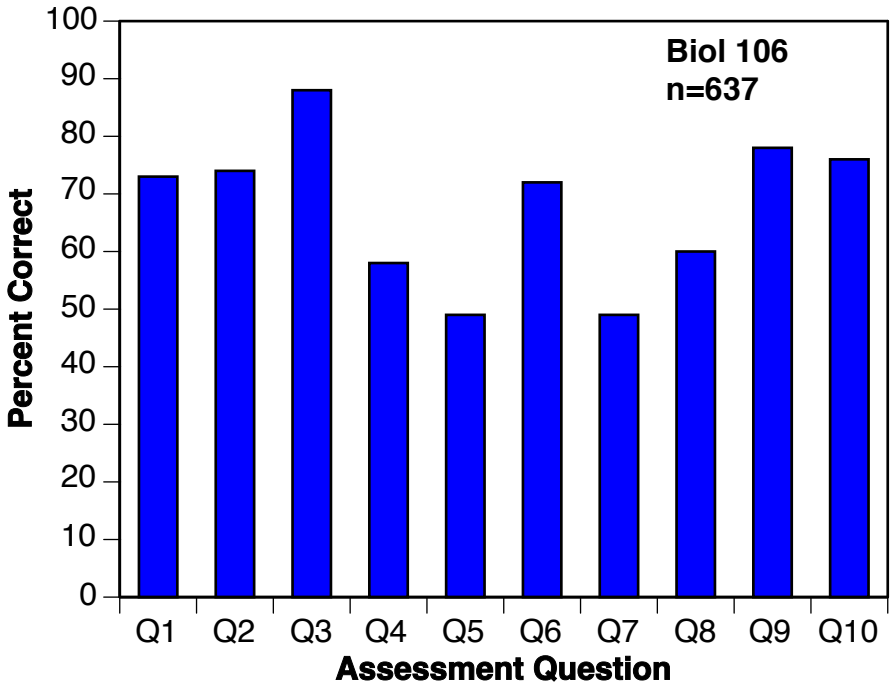

Figure 1. Assessment of SLO 1 in Biol 106. Ten assessment questions were given to students in six sections of Biol 106 during the 2014-2015 school year. The percentage of students that answered each assessment question correctly is shown.

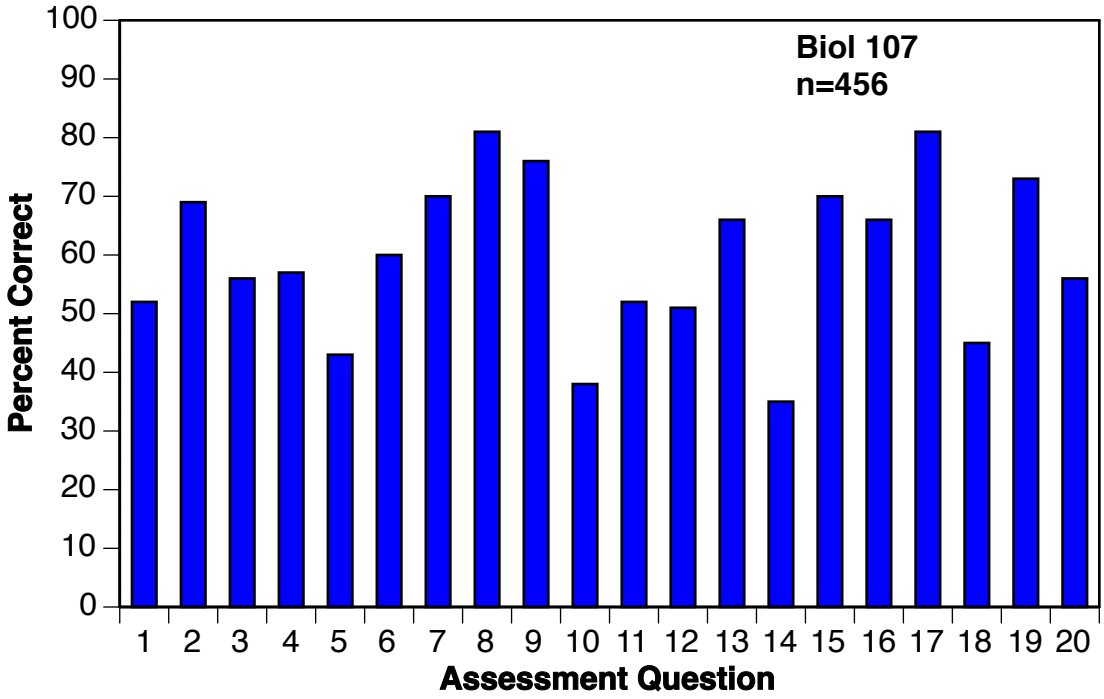

Figure 2. Assessment of SLO 1 in Biol 107. Twenty assessment questions were given to students in six sections of Biol 107 during the 2014-2015 school year. The percentage of students that answered each assessment question correctly is shown.

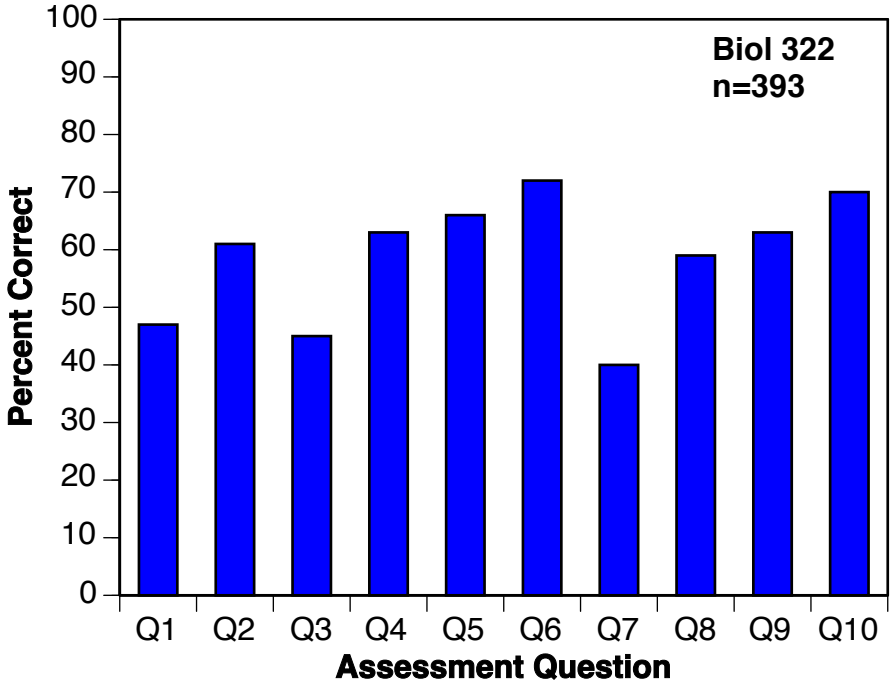

Figure 3. Assessment of SLOs 1 and 2 in Biol 322. Ten assessment questions were given to students in five sections of Biol 322 during the 2014-2015 school year. The percentage of students that answered each assessment question correctly is shown. The sample size for question Q1 differed from the remaining questions and was 283.

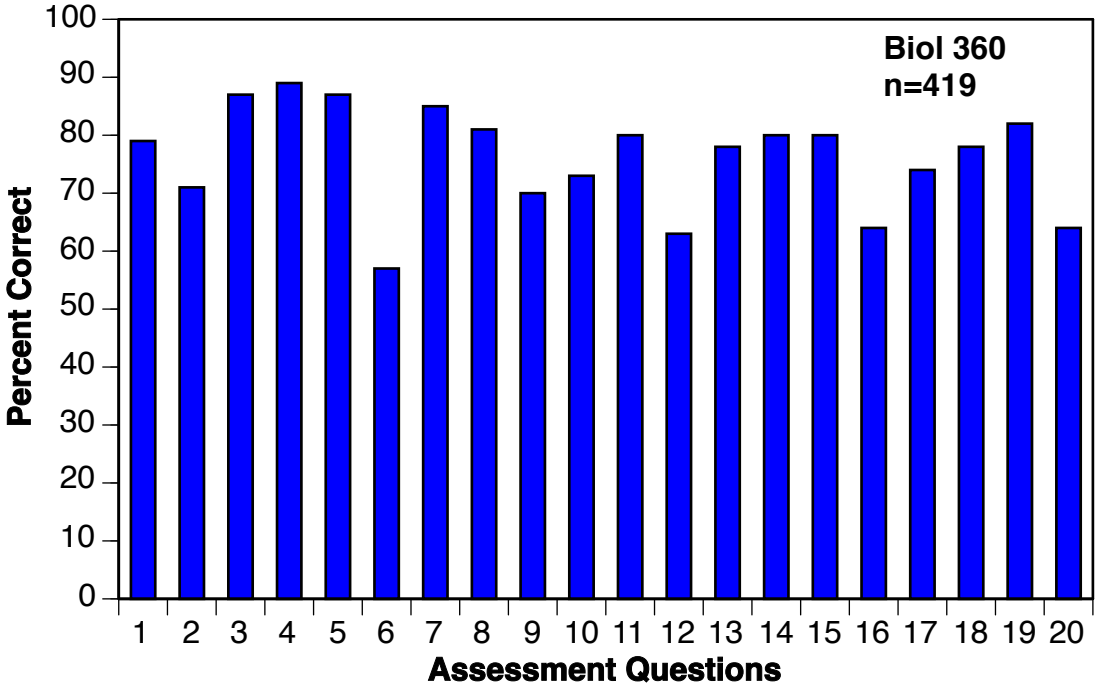

Figure 4. Assessment of SLOs 1, 2, and 3 in Biol 360. Twenty assessment questions were given to students in four sections of Biol 360 during the 2014-2015 school year. The percentage of students that answered each assessment question correctly is shown.

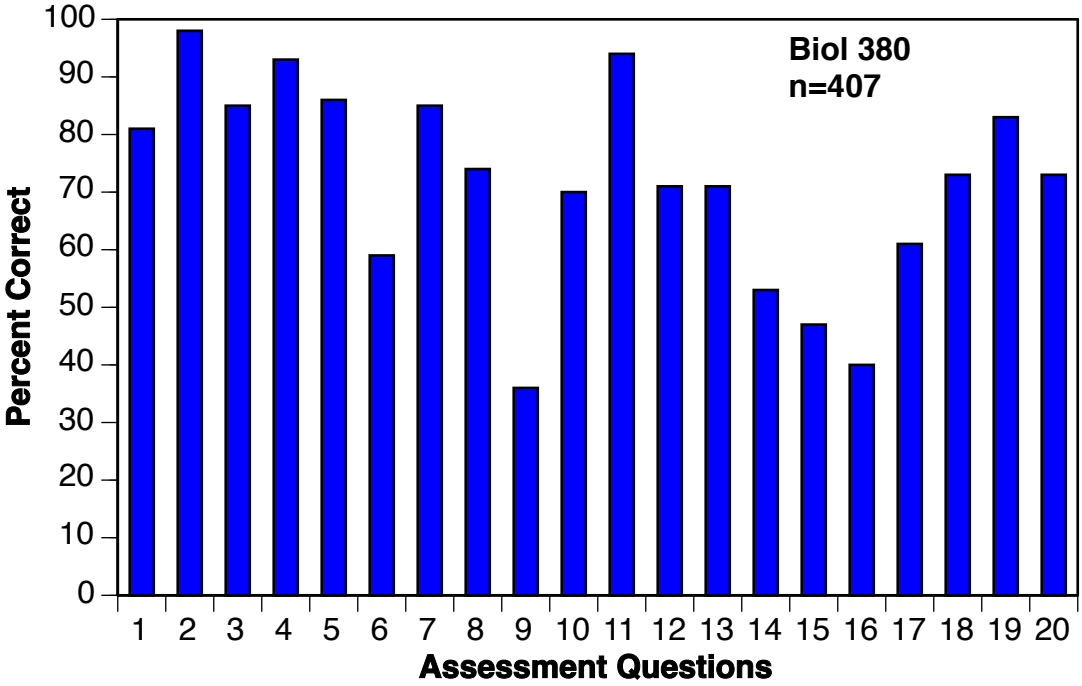

Figure 5. Assessment of SLOs 1, 3, and 4 in Biol 380. Twenty assessment questions were given to students in five sections of Biol 380 during the 2014-2015 school year. The percentage of students that answered each assessment question correctly is shown.

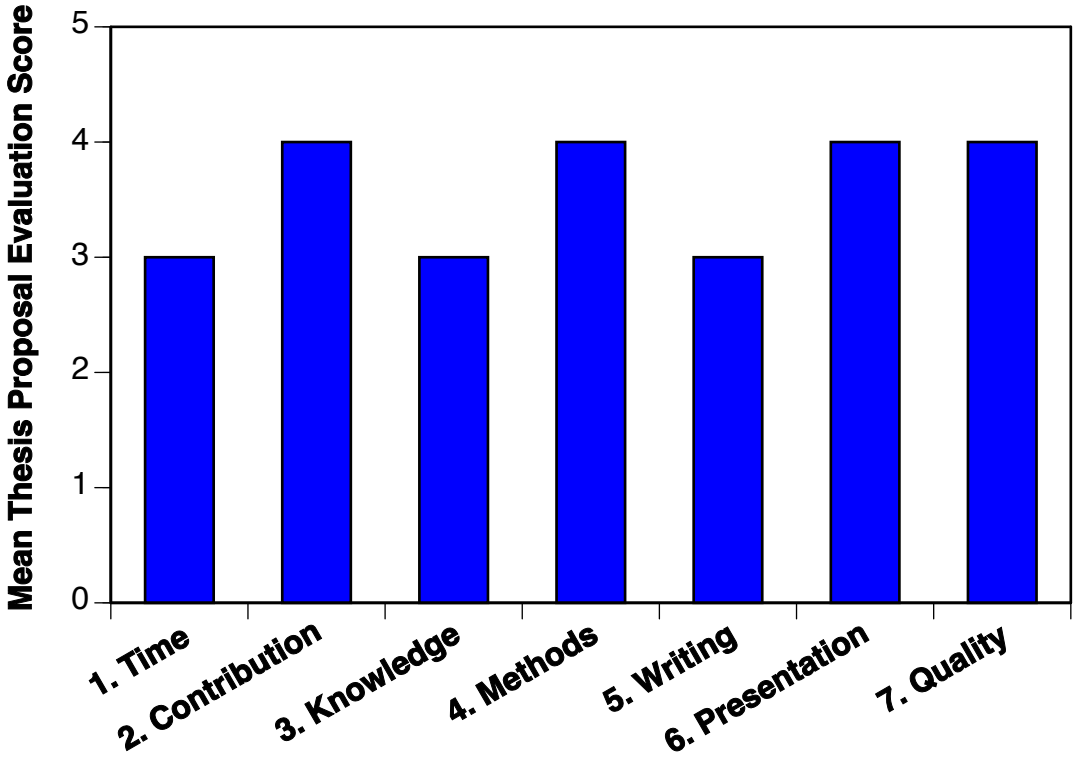

Figure 6. Assessment of the graduate program SLOs 1, 2, 3, and 4. Students were evaluated in seven areas on a scale of 1 to 5 with “1” being the lowest and “5” being the highest. N=62 students.