

Program Name(s)	EETF Faculty Rep	Department Chair
B.S. & B.A. Biological Sciences		Brian Perry

SUMMARY OF ASSESSMENT

A. Program Learning Outcomes (PLO)

Students graduating with a B.S. or B.A. in Biological Sciences from Cal State East Bay will be able to:

1. explain core biological concepts, including evolutionary processes, structure-function relationships across all levels of biological organization, homeostasis, information flow, matter and energy transformations, and the interactions and interconnectedness of living systems (ILO 6);
2. apply quantitative reasoning to explain biological phenomena and to address biological problems (ILO 1);
3. clearly communicate biological information in a variety of formats (written, oral, visual) using a style appropriate for the intended audience (ILO 1,2,6);
4. apply methods of scientific inquiry by formulating testable hypotheses, collecting and analyzing data, and reporting conclusions (ILO 1,6);
5. gather, interpret, and evaluate published scientific information (ILO 1,6).

B. Program Learning Outcome(s) Assessed

We assessed PLO4: Apply methods of scientific inquiry by formulating testable hypotheses, collecting and analyzing data, and reporting conclusions. This is the first time the department assessed PLO4. During AY2015-16 the department assessed PLO 2 using the Biology Science Quantitative Reasoning Exam ([BioSQuaRE](#)).

C. Summary of Assessment Process

Instrument(s): Maria Gallegos modified the “Inquiry and Analysis Value Rubric” for ease of use (See the original and the one used by the department in the Appendix). The VALUE rubrics were developed by teams of faculty experts representing colleges and universities across the United States. The Value Rubric Development Project was sponsored by the Association of American Colleges and Universities.

Sampling Procedure: The modified “Inquiry and Analysis” rubric was applied to a signature assignment completed by all 17 students in partial fulfillment of Population Biology (BIOL 4175).

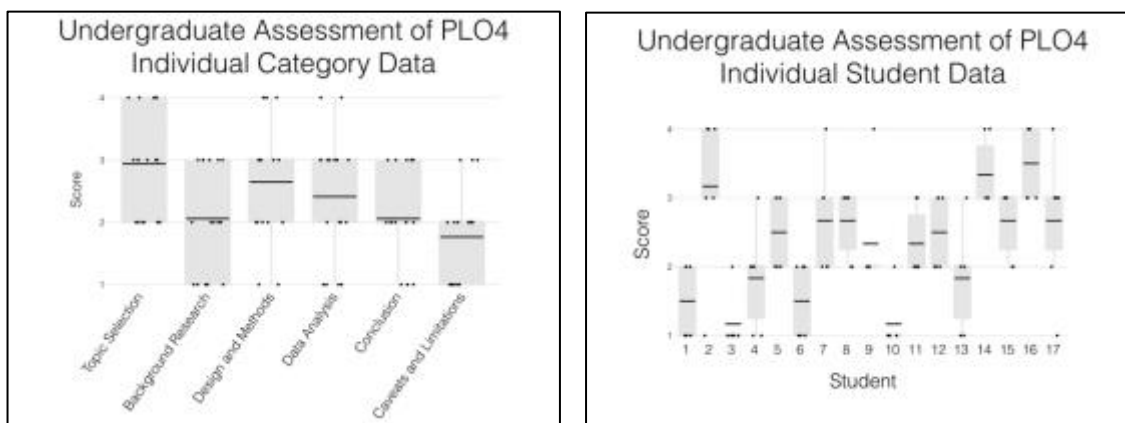
Sample Characteristics: Students of BIOL 4175 are typically juniors and seniors that have chosen the Ecology and Conservation Biology option. It is designated as a capstone course in the Department of Biology as students are expected to have mastered all 5 PLOs by the end of the course.

Data Collection: Dr. Brian Perry was given the Inquiry and Analysis Rubric in Excel format. He applied this rubric to a course research project turned in by students near the end of the course (BIOL 4175) in Spring 2017.

Data Analysis: The results shown in D (Summary of Assessment Results) include all individual data points (filled black circles). The black horizontal line represents the average. The gray boxes represent the first and third quartile and the vertical lines represent the minimum and maximum.

D. Summary of Assessment Results

Main Findings:



We find that the majority of our students performed below “proficient” (a score of 3) for all categories examined except “Topic Selection.” This is very disappointing.

Recommendations for Program Improvement: The overarching goal the department is to help students develop and master all of the abilities listed in our program learning outcomes, but is apparent from the results of this assessment that we are not achieving this goal with regards to PLO 4. The faculty have long been aware of these shortcomings, and results such as these continue to inform our departmental discussions and assist us with planning for improvement. With regards to PLO 4, the faculty are in agreement that the low performance of our students is the result of two factors: 1.) not enough experience in their coursework with hypothesis development, data analysis and interpretation and formulation of supported conclusions; 2.) a lack of writing development throughout their high school and undergraduate experience. As part of the department’s transformed undergraduate curriculum, we have taken some steps to alleviate both of these issues through the addition of a weekly activity section to our first-year, general biology series (BIOL 140A/B). The activity section will provide the additional time necessary to specifically work with our students on developing and mastering PLO 2, 3 and 4. The department is also currently discussing the addition of a writing within the discipline course to our curriculum as we move to semesters.

Next Step(s) for Closing the Loop: In addition to the changes to our curriculum mentioned above, the department will continue to assess our students for additional PLOs from a

broader range of courses and instructors. The 17 students we assessed during AY 2016-17 reflects the performance of a single class by a single instructor, and as such does not necessarily represent all our graduating students in all major options. We are already working to collect a larger, more meaningful dataset from a broader range of courses and instructors during AY 2017-18. The assessment of each PLO will involve a data collection, analyses, description of assessment results and reporting, and the use of assessment results to inform programmatic improvements. Such improvements will include, if decided by the department to be necessary, (a) revision of the given PLO assessed, (b) refinement and implementation of assessment tools, (c) revision and implementation of curriculum and/or teaching practices to support student achievement of the given PLO, and (d) refinement and integration of course-specific learning outcomes that are aligned with the given programmatic PLO.

Each of the transformed options in our semester curricula includes a capstone experience course that will allow the students to fully develop and demonstrate their mastery of the PLOs. The transformed semester curricula is designed to begin working on these skills with our freshmen students and continue their development through our shared core curricula and options, with each course building upon the skillset and knowledge of the prerequisite courses. The opportunity to transform our entire curricula has allowed the biology faculty an opportunity to determine what skills our students are currently lacking as they enter our foundational courses (e.g., genetics, evolution, many upper division electives), and redesign our core curricula to ensure the students have multiple opportunities to master specific skills and knowledge before moving forward in the program.

Other Reflections: As indicated in the AY2015-16 annual report, the department also plans to administer the Biology Science Quantitative Reasoning Exam to both freshmen and seniors so that we can distinguish any significant shifts/improvements in the quantitative reasoning skills of our students upon completing the biology major.

E. Assessment Plans for Next Year

We will assess PLO5: gather, interpret, and evaluate published scientific information. We will again, develop a rubric, identify classes / signature assignments that can be assessed.