Along with a strong emphasis on the disciplinary fundamentals, the Biology Student Outcomes Assessment Plan emphasizes student learning of basic research methodology, critical thinking skills, and intellectual independence. In addition to Activity and Lab-based classes, these goals are often accomplished through faculty-supervised Independent Study projects (Biol 190), as well as volunteer and paid opportunities for students to engage in research in faculty labs. Approximately 15-20% of Biology majors avail themselves of these research opportunities.

The broad goal of Biology’s assessment project in 2009-10 was to quantify the effectiveness of all the student research activities in meeting those departmental SOAP goals which are most relevant to research projects. Accordingly, we used assessment data to check whether active participation in a research project outside the classroom context as an undergraduate student enhances student learning, particularly in the areas of critical and independent thinking.

The assessment data were drawn from two direct instruments: 1) a version of the Biology post-test; 2) the BIOL 105 term paper, which is a culminating project on an evolutionary topic. The results of this study provide strong confirmation of the notion that research experience is correlated with increased student achievement in biology. Students with any research experience at all scored somewhat higher on the Post-Test than students without such experience. Students with research experience also scored 3 points higher (on a 20-point scale), on average, on term papers than those without such experience. The effect was in fact much stronger for scores on the Evolution term paper than on the Biology Post-Test, but both effects were statistically significant. The conclusion to be drawn is that experience conducting research at the undergraduate level, whether as a volunteer, paid technician, or BIOL 190 student, clearly goes along with improved skills in biology and critical thinking.

The evidence shows considerable improvement following these curriculum changes. Employer surveys of SPED candidates one year out indicated that candidates’ ability to conduct assessments improved from 50% to 84% of respondents stating “well/ adequately prepared.” The faculty’s ongoing formative assessment using rubrics and the employer surveys administered each year both show that these improvements are being maintained. Therefore, the changes fostered lasting success. The SPED program continues to engage in this multi-year assessment loop and is currently in the midst of assessing new changes that were instituted for addressing deficiencies in training candidates to teach mathematics.