2010 Department of Biology Course Assessment

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Biology 395 Assessment

What is the level of the reports?

The reports are generally written at an acceptable level of sophistication. Readers noticed several trends.

(1) As might be expected students that had been performing research for a longer period of time generally wrote better, more informative and comprehensive reports.

(2) Often the introductory materials and figures appear to have been taken from "stock" lab materials or published reviews. Care should be taken to avoid the possibility of plagiarism in these sections. See recommendations #1, 2, 4, and 5.

(3) The best assessment of the student's understanding and critical thinking skills was often obtained through reading the discussion section of the report. See recommendation #2.

Do the students demonstrate the use of critical and creative thinking skills in their approach to mentored undergraduate research?

See recommendation #2.

At what level do the students understand their research?

Generally, the degree of understanding seemed high. The level of understanding is variable, and as might be predicted improves with the number of semesters of research in which they have participated. However, sometimes this was difficult to ascertain, because it was hard to tell if the student had written the words from an original thought process, or had simply paraphrased review articles. See recommendations #1, 2, 4, and 5.

How large is the variation among the students?

A substantial fraction (10%) of the reports was clearly outstanding, written entirely by the student and at or above the level of scientific writing and thought that might be expected of top graduate students. About 80% were acceptable, meaning that they were written at the level expected of advanced undergraduates enrolled in the course. Only about 10% were considered unacceptable, either because of the research project or the quality of the report were low.

Are there differences in the types of research being carried out and the level of student participation between students who work in the department and those who work elsewhere?

In general, students were addressing important research questions and were fully engaged in their work. However, see recommendation #3 below.

Biology 395 Recommendations

(1) The reports are meant to represent the research performed by the undergraduates, and should be written by the undergraduate as a sole author. During the process of writing the reports, undergraduates are encouraged to seek advice regarding writing their reports and undergraduate thesis. However, PIs and graduate student mentors are strongly encouraged not to directly edit the text. These recommendations are meant to encourage an independently written report, while not discouraging effective mentoring during the writing process.

(2) We recommend further development of the discussion in the reports. The discussion should include sections describing future directions, and what problems or hurdles need to be overcome for the research to progress.

(3) We recommend that in the results the student states explicitly what they have actually done in the research project, and what was done by others. This could also be specified in the methods. For example, if a figure is shown, the creator(s) of each portion of that figure should be specified (*i.e.* John Smith ran the gel shown in panel A, Jane Doe acquired the data in panel B).

(4) In general, the literature citations were not up to community standards and could be improved. This includes some cases (rare) in which entire figures were clearly taken from other sources without attribution or citation. A mechanism for providing advice on proper citation and attribution should be specifically provided to students.

(5) Create a common cover sheet for all 3 classes. The current coversheet could simply be modified with a check box that indicates which class was taken. A place to note the location (not just the lab affiliation) of where research was performed should be added to the form.

Biology 295 assessment:

How well do the students understand their projects? What is their level of involvement in the research? Do they show critical thinking skills?

> We found that neither the Bio 295 reports, nor the quality of the research, differed substantially in any respect from the 395 reports. All of the recommendations we make for Biology 395 also apply to Bio295.

For Biology 293:

How appropriate are the internships and the work done? How well do the students understand their projects? What is their level of involvement in the research? Do they show critical thinking skills?

We were impressed with the Bio 293 reports, and found the internship projects to be very interesting, and appropriate for the class. All of the recommendations we make for Biology 395 also apply to Bio295.