

**Report for Information Literacy in BIOL142L-General Biology II Laboratory,  
Taught Spring 2014.  
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Introduction

I am taking part in the departmental revision of the general biology laboratory curriculum to focus on the five major goals recently implemented in the Biology Curriculum Revision approved in spring 2013. These goals call for graduates of the Biology major to demonstrate: critical evaluation of biological data, mastery of the scientific method, and effective written and oral communication. Students will need to complete these competencies either through classroom experiences, research, or other extra-classroom activities.

The goal of the first year laboratory course is to begin to engage students in these key skills and to challenge them with inquiry-based learning to teach students how to think, rather than simply memorize. Information literacy is key to inquiry-based learning. To become lifelong learners students must have the ability find resources, evaluate them, and summarize the information for their own research (ALA, 2013). I have found that upper class students are often deficient in these skills and so I am excited to focus on them in the freshmen year. This will begin a process that other instructors will foster with each level of class taken by the students as they progress through their coursework. Information literacy is even more important now due to the explosion of information that is now only a keystroke away. Betsey Moylan (Library Coordinator) and Bonnie Oldham (Information Literacy Coordinator) assisted me in planning this information literacy aspect of the curriculum, instructing, and in planning for the future.

This report focuses on the spring semester course - BIOL142L General Biology II Laboratory. This encompassed a large number of students since all sections (13) of BIOL142L were involved and assessed (185 students). I was the key faculty member devising the curriculum for all sections in the spring and prepping all of the graduate teaching assistants. I also directly taught one section myself.

Student Learning Outcomes (SLO) for Information Literacy for BIOL142L  
(adapted from ALA, 2013)

The information literate student will demonstrate the ability to:

1. Determine the extent of the information needed
2. Conduct effective search strategies and identify a variety of potential sources.
3. Evaluate the appropriateness of sources
4. Evaluate information and its sources critically and incorporates selected information into his or her knowledge base.
5. Summarize the main ideas to be extracted from the information gathered.
6. Synthesize main ideas to construct new concepts.

## Methods

We used the small class size (18 maximum) of the laboratory sections for students to engage in experimental design, data collection, data analysis, and communication of their findings, both written and orally. Throughout the semester students needed to locate, evaluate, summarize and incorporate information with their collected experimental data and present this information in oral presentations to the class and in written papers.

The semester began with a visit to each section by either Betsy Moylan or Bonnie Oldham. They spoke to each section for about 15 minutes on the use of library resources, particularly databases specific for science. They had received from me our first assigned topic (photosynthesis) and they were able to give specific instructions pertinent to the topic. They also discussed source reliability and format of citations. This information was followed up in class for the next few weeks by the instructors to follow up the librarians.

## Course Assessment

Three major laboratory reports were part of the student workload throughout the semester and I used these reports to assess the student learning outcomes (SLO) and the students' performance progression through the semester. I was able to obtain 135 laboratory reports from 7 of the 13 sections\*. I randomly selected 45 student names (33% of reports downloaded) and reviewed SLO #2,3,4, and 6 for each of the student's three laboratory reports. This allowed me to find follow individual students progress throughout the semester on each objective.

Before reading the reports I created a ranking system for each SLO (see Table 1) so that as I read the paper I could "grade" for each SLO. I ranked each SLO (see Table 1) to qualitatively rank how each student did for each objective. I ranked each student for each of the three reports they did during the semester, so I was able to show individual student changes over the course of the semester.

Also assessed was the search strategy used by students. Students were instructed to maintain their strategy in their laboratory notebooks. I used only my section (n=16) to assess this process.

\*Some sections were unable to be reviewed due to files that did not download from ANGEL. Unfortunately this summer 's death of ANGEL coincided with my review of the reports and I was unable to download all of them.

## Results

**Table 1** Assessment Rubric for Information Literacy Scores: scores were determined by using the ranking system to “grade” each SLO on the sampled report, then taking an average of all reviewed reports to get a mean ranking (first row) for each laboratory report done. The mean ranking was divided by the top rank of 3 to get a percentage score (second row).

| <b>SLO #2</b><br><b>Conduct effective search strategies and identify a variety of potential sources.</b>    | <b>SLO #3</b><br><b>Evaluate the appropriateness of sources.</b>  | <b>SLO #4</b><br><b>Evaluate information and its sources critically and incorporates selected information into his or her knowledge base.</b>        | <b>SLO #6</b><br><b>Synthesize main ideas to construct new concepts (with use of the primary source).</b>   |
|---|---|--|---|
| <u>Ranking:</u><br>0=no sources<br>1=no variety<br>2=mix of sources<br>3=primary incl. covered area needed. | <u>Ranking:</u><br>0=none appropriate<br>1=scientific<br>2=sci., & primary<br>3= sci., & primary, on – topic, (present date). | <u>Ranking:</u><br>0=none used<br>1=sometimes correct<br>2=info. always used correctly<br>3= uses information correctly, integrates into their text. | <u>Ranking:</u><br>0=none used<br>1=scientific & on-topic<br>2= scientific & on-topic, integrated into text<br>3= scientific & on-topic, integrated into text and adds beyond basic text. |
| <u>Lab Report #:</u><br><b>1      2      3</b>  | <u>Lab Report #:</u><br><b>1      2      3</b>  | <u>Lab Report #:</u><br><b>1      2      3</b>   | <u>Lab Report #:</u><br><b>1      2      3</b>  |
| 1.9    2.5    2.5   | 2.2    2.4    2.4   | 2.0    2.2    2.4  | 1.8    2.0    2.3   |
| 63%   83    83  | 73%   80%   80%   | 67%   73%   80%  | 60%   67%   77%   |

In each SLO a ranking of “3” would signify the best score. Overall you can see (shown by Table 1) that students generally improved their scores on these measures from the first to the last laboratory report in each SLO. The first report rankings percentage for each SLO ranged from 60% to 73% but by the end of the semester the third laboratory report ranking percentages ranged from 77-83 %.

SLO #4 and #6 did show improvement however even after the third lab report their percentage score was slightly lower than SLO #2 & #3. SLO #6 had the lowest starting score (60%) which indicates that using source material to develop new ideas is the toughest concept and even after the third report were only scoring 77%.

Using my section only (16 students) I assessed the student search strategies by what they recorded in their laboratory notebooks. Only 40% of the students had listed their strategies in their notebooks by the end of the semester.

Anecdotally the library staff report that during this spring semester they were less inundated with students searching for resources or questioning what is a primary source compared with past years.

## Discussion

Overall the class visitation by the library staff and the follow-up classroom instruction of all the sections appears to have supported improvement in the laboratory reports in terms of using source material. SLO #2 & #3 generally showed higher scores and indicate students can find primary and useful sources, however the assessment has shown us that more work needs to be done to explain the use of sources in the future. SLO #4 & #6 focus more on how the students are using the sources particularly focusing on integrating and synthesizing new ideas from the material they glean from primary sources. This is naturally the more difficult of the SLOs, and in the future we will work on creating example and short assignments on how best to integrate source material to their discussion.

The low percentage of use of the student laboratory notebooks to journal their source strategy will need to be addressed also. The library staff suggested some potential improvements such as including prompts for students might be helpful. We could ask them to specifically name what database they used, key words used, or the number of search results.

Overall this award has pointed to areas of focus for the future in use of source material and how best to teach students on this matter. While there was improvement over the course of the semester new assignments need to be developed to focus in on specifics of source material use to write better reports.

## Bibliography

ALA. (2013). *Information Literacy Competency Standards for Higher Education*.

Retrieved from ALA.org:

<http://www.ala.org/acrl/standards/informationliteracycompetency>