2018 Annual Assessment Report- Biochemistry and Molecular Biology

I. Annual Assessment Meetings

March 22, 2018 (1 hour)- The NMS faculty met to appoint point people for assessing each of the majors in the division; Professors Burwell and Elliott agreed to assess the BMB major.

May 10, 2018 (1.5 hours)- Professors Burwell and Elliott met to familiarize Elliott with the previous year's Assessment Plan and Report (as she in new to the faculty this year) and assessment in general.

May 14, 2018 (1.5 hours) - Professor Elliott attended the workshop on Assessment led by members of EPC.

May 23, 2018 (2 hours) - Professors Burwell and Elliott met to write this Assessment Report and discuss how to change measures of learning outcomes as BIOL226L and BIOL312L change in the coming year.

II. Closing the loop

This year the BMB program has focused on goal 1, objective B, outcome 2 (organize and utilize a lab notebook to record findings, analyze data, and become an independent researcher). This outcome is has been assessed using an open lab notebook quiz at the end of the Fall and Spring semester for the 2016-2017 academic year (without the lab notebook checklist) and the 2017-2018 academic year (with the checklist).

III. Examination of data collected for this year's targeted learning outcomes

During the 2016-2017 academic year ~20% of students in the Organic Chemistry I course received than <70% on the quiz. The success criteria for the outcome that year (100% of students will receive a passing grade on the open lab notebook quiz) was not met during the Fall semester (Figure 1). Therefore, to help students with this learning outcome a checklist was developed (archived in the faculty files) that students could use to help them include all the pertinent information and experimental details into their notebooks. Incorporation of the checklist did appear to improve students' grades on the open lab notebook exam in the Fall semester (Figure 1A). The percentage of students scoring less than 70% decreased from ~20% to ~10%. It was also noted, the number of students scoring between 81-90% increased. Everyone in the Fall semester passed their lab notebook quiz by receiving a 70 or higher.

In the Spring semester, the number of students scoring <70% was minimal both years but, there was a dramatic increase in the number of students scoring between 71-80% (Figure 1B). This was attributed to the decrease in students scoring between 81-100%. One explanation for this drop was that students were not reminded of the checklist throughout the semester. Once again everyone passed their lab notebook quiz.

In addition to the success criteria improving, the incorporation of the checklist also improved the student's usage of the lab notebook. They asked fewer questions when repeating a technique or data analysis procedure. The usage of their notebook was especially noticeable while they set up and carried out their independent projects during the Spring semester. Compared to previous years, students were able to write up the methods and conduct their experiments more independently.

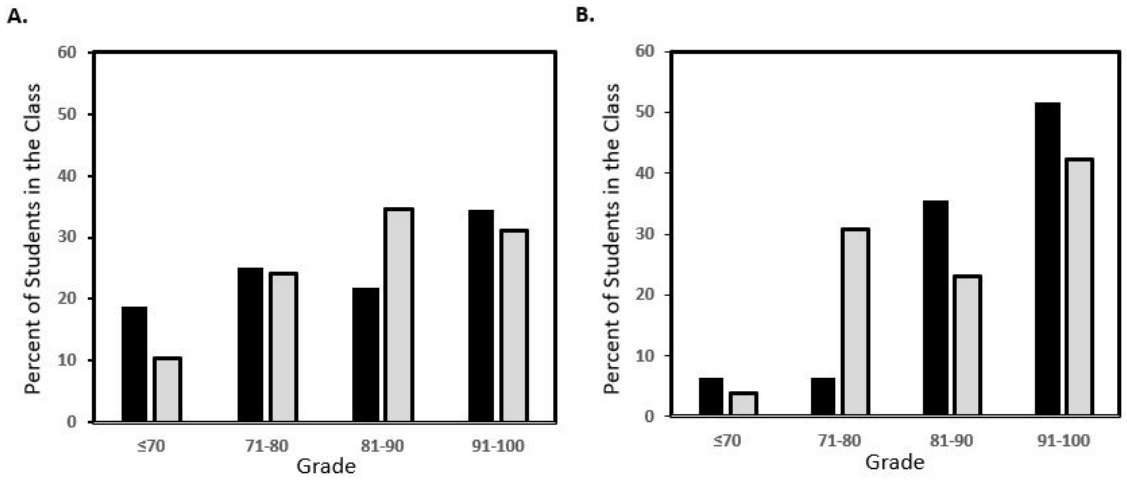

Figure 1. End of the Semester Grade Distribution for the Organic Chemistry Open Notebook Lab Exam. Both bar graphs represent the percentage of students within each class receiving <70, 71-80, 81-90, and 91-100. Black bars denote the students who did not have the lab notebook checklist (academic year 2016-2017). Grey bars denote students who had a checklist at the beginning of the Fall semester (academic year 2017-2018). **A.** Distribution of grades during the Fall semester. **B.** Distribution of grades during the Spring semester.

IV. Program Changes for the Upcoming Year.

Because so many of our BMB graduates go on to graduate school for jobs that require a suite of technical skills, we feel that it is important to coordinate techniques across the required courses and then assess how well our students retain knowledge and understanding of techniques between those courses. The introduction of Professor Elliott to the program provides an opportunity to ensure that techniques offered in Genetics and Molecular Biology integrate with those already offered. Additionally, measured outcomes for these two courses need to be reexamined and updated.

V. Action Plan for the Upcoming Year

In the 2018-2019 academic year we will continue to assess objective 1B (Students will have a foundation in the technological skills used in Biochemistry and Molecular Biology). Our focus will shift to assess how well students meet outcome 1 (utilize lab equipment and software needed to collect and analyze data). Professor Elliott will gather data from BIOL 226L (Genetics) in the spring semester and Professor Burwell will gather data from CHEM 323L (Biochemistry) in the fall semester.

Measure	***Measurement Tool***	***Success Criteria***
Post-lab Assignments (CHEM 323L, BIOL 226L)	Answer Keys to post-lab Assignments	overall student proficiency will be considered met if 70% of the students demonstrate a passing grade on the assessed activity

VI. Appendix I

The following documents used for this assessment are in the Faculty Files.

1. Fall Semester 2016 Organic Chemistry 213L Open Notebook Lab Quiz
2. Spring Semester 2017 Organic Chemistry 214L Open Notebook Lab Quiz
3. Fall Semester 2017 Organic Chemistry 213L Open Notebook Lab Quiz
4. Spring Semester 2018 Organic Chemistry 214L Open Notebook Lab Quiz
5. Fall 2017 Lab Notebook Checklist