

Objective 2.1: Knowledge of the Liberal Arts

Course: Biol 180L

Students will possess a broad understanding of how to think about the world, having studied the modes of inquiry characteristic of humanities, mathematics, natural sciences, and social and behavioral sciences.

Outcomes 2.1-D: Natural Scientific Mode of Inquiry (lab course)

By graduation students will:	Not Proficient 1 Point	Developing Proficiency 2 Points	Proficient 3 Points	Exceeding Proficiency 4 Points
D3: Apply scientific methodology to a natural science question to increase understanding, make an informed decision, and/or solve a problem.	Student earns 0-60% of the total points available on the first and second draft of their laboratory report (see rubrics below). Student is unable to construct a lab report using scientific methodology.	Student earns 61-75% of the total points available on the first and second draft of their laboratory report (see rubrics below). Student has incorporated scientific methodology, but the report lacks clarity, lacks connections between the hypothesis and objectives, and may contain misinformation.	Student earns 76-90% of the total points available on the first and second draft of their laboratory report (see rubrics below). Student has incorporated scientific methodology. Hypotheses are clear and linked to the objectives but may not be testable. Connections between hypothesis and data analysis may be weak or non-existent.	Student earns more than 90% of the total points available on the first and second draft of their laboratory report (see rubrics below). Student has incorporated scientific methodology. Hypotheses are clear, linked to the objectives and testable. Data analysis is connected to the hypothesis.

Assignment meeting Outcome 1:

Students will be assigned a multi-week project using the scientific method to address a question. For this project, they will have to form a hypothesis and conduct an experiment to test it. Following their experiments, they will have to analyze their data and formulate conclusions from it. Projects in the past have included students growing fast plants under different situations or growing bacteria collected from different locations. This project will require the students do the following:

1. Develop and execute experiments to answer a scientific hypothesis.
2. Analyze data generated by experiments and interpret results.
3. Write a report (paper) to communicate their project and their conclusions pertaining to it.

Students will be evaluated on two drafts of a report. The criteria for grading these reports will be based on the rubrics below.

First-Draft Criteria	Points Available	Points Earned

1. Includes title and introduction. Introduction describes what was done and why.	10	
2. Methods section provides a clear, easily understood, and accurate overview of the identification strategy. Purpose and principles of each test and culture used are clearly, completely, and accurately described. Procedures are appropriately referenced and suitable details provided to allow an independent party to repeat the experiment. All tests and cultures were correctly carried out and included appropriate controls.	10	
3. Results (data) from experimental samples and controls are clearly, completely, and accurately presented and analyzed in the results and conclusions section.	10	
4. Figures, diagrams, and tables are used where appropriate, contain information that is readable, labeled correctly, referred to in text, and enhance presentation and interpretation of the data.	10	
5. Conclusion includes a summary of the overall experiment and hypothesis, the data and results, any potential issues that arouse or caveats of the experiment, and future directions	10	
6. References are cited in the body of the text and a complete list of references is given at the end of the report.	10	
7. Terminology, tone, and style of writing are formal and appropriate for a scientific lab report (3 rd person, past tense, passive voice). Rules of grammar, spelling, punctuation, proper sentence structure, etc., have been observed. The overall presentation of ideas is clear, concise (i.e., the report does not contain unnecessary information), well organized, and logical. The report is typed.	10	
Total:	70 Points	

Second-Draft Criteria	Points Available	Points Earned
<p>Points will be earned by responding to the comments on the first draft in the below two overarching categories. If a student received no comments in one of the categories on their first-draft report, they will earn full points.</p>		
<p>1. All corrections with the organization/formatting of the paper have been made. This includes correct grammatical language and reference formatting as well all figures are clear.</p>	<p>15</p>	
<p>2. All correction with the content of the paper have been made and are clear and accurate. All sections (Introduction, Methods, Results, Conclusion) are present and contain the correct information and ideas.</p>	<p>15</p>	
<p>Total:</p>	<p>30 Points</p>	