### Group Projects Student Guide

**Introduction**

Students will work together in groups throughout the semester to carry out scientific investigation of selected topics and labs, and be able to present your research and collected/analyzed numerical data to the class. In addition, in order to evaluate a written component of the project, students will be required to submit an individual written assignment of their projects, to be composed of a reflection essay. These group projects are part of the evaluation grade for the semester worth 20% of the overall lab grade for the course.

2. Instructors will have the Student Guides, Assessment Rubrics A-C, and the Student Self Evaluation Rubric available for the students by the first day of class either by posting them on a course management system (PearsonMastering, Blackboard) or having copies ready to pass out on Day 1. Discuss the Assessments with your instructor as a class on the first day by going over the documents with him/her!

2. Groups will be assigned by the instructor at the beginning of the semester. Also students will schedule group presentations for the semester with their instructors as scheduled dates are provided in the syllabus.

3. Each group will be assigned a different project by their instructors in the course at the beginning of the semester. Project topics are to be selected from the following labs found below:

**Selected Projects for Each Course**

BIOL 1106 BIOL 1107

pH Lab Plant Growth Experiments

Osmosis and Diffusion Population Studies on Euglena

Enzymes and Spectrophotometry Theory of Evolution and Population Genetics

Statistics Lab Environmental Plates and Population Studies on

 Bacteria

 Moldy Jello©

BIOL 1108 BIOL 1109

Element X Lab Exercise Physiology/Homeostasis Lab

Hamburger Meat Lab Reaction Time Lab

Kefir Lab Respiratory System and Lung Capacity Lab

Jalapeno Lab

4. At the time all labs are conducted throughout the semester, instructors and students must ensure that groups properly follow scientific methodology to be prepared for the assessment. Therefore, students should have had practice using the following skills:

a) develop a question and generate a testable hypothesis from observation, background information in the form of student research using a minimum of 3 valid sources (a combination of primary and secondary sources) of information, and prior knowledge.

b) collect numerical/quantitative data from your experiments following the lab protocol.

c) analyze your data using descriptive statistics, such as mean and standard deviation.

d) visually display your data by providing accurately labeled graphs and tables.

e) provide a conclusion based on your experiment findings.

f) be able to communicate your research in visual, written, and oral format.

5. Be sure to schedule the group presentations for the semester with your instructor. **Remember that written reflection essays will be due at the time of the presentation and is an individual assignment.**

6. Upon completion of the class projects and presentations, individual students (not groups) will evaluate each other utilizing the student evaluation surveys found in the lab manual. For those campuses not utilizing a lab manual, the student evaluation surveys will be available through your instructor.

7. In conducting the assessment of the class projects, the instructor will evaluate each individual student in the group utilizing assessment rubrics a-c. Part of the assessment will be conducted during the group presentation (rubrics a-b), and part of the assessment will be conducted after the presentations, and after reviewing the reflection essays (rubric c). They are ranked on a 0 to 4 scale, with 0 (unsatisfactory) being the lowest score a student can receive and 4 (excellent) being the highest in each category. The total score each student can earn is 40 points. The rubrics will include the Biology core assessment rubrics a-c and the student group evaluation rubric.

**The Assessment Rubrics**

The Biology core assessment rubrics a-c are for **instructor use only**, and should not be used by students to evaluate fellow classmates. The rubrics can be used to help structure your project. The rubric is subdivided into Rubric A, Rubric B, and Rubric C. Both Rubric A and Rubric B are to be used **during** the student presentations. Rubric A will be used to evaluate **groups** in the areas of presentation, visual communication, inclusion and interpretation, and innovation. Rubric B will be used to evaluate **individuals** in oral communication. Rubric C is to be used **after** the student presentations, and the student individual written assignments have been evaluated by the instructor. Rubric C will be used to evaluate **individuals** in the areas of teamwork (student group self-evaluation scores are recorded here), written communication, conceptual thinking, and synthesis and design.

The Student group evaluation rubric is for **student use only**, and will not be used by the instructor to evaluate students. This rubric will be made available to every student to evaluate every member of their group, including themselves. The rubric allows the student to assess their team mates in the areas of participation, communication, attitude, and contribution.

**Oral Presentations**

Groups will be evaluated on their ability to communicate their research projects visually, and individuals in the group will be evaluated on their ability to communicate their research orally. During the group presentations, **all** members of the group must speak about their projects and be able to answer questions from the audience. Therefore, all members of the group must be well prepared and organized, and not “read words off the screen.” Groups will utilize technologies such as PowerPoint or Prezi as visual displays of their research projects during the presentation. Presentations should be 10-12 minutes in length, followed by 3 minutes of questions. Groups should structure the format of the presentation as follows:

1. Title slide – to include project title as given in the written abstract, and names of the presenters

2. Overview slide – gives an outline of the presentation

3. Background research (3-4 slides) – group must provide background information that frames the topic and provides the purpose of the project

4. Question and Hypothesis (1 slide) – group should clearly define the research question and hypothesis

5. Methods (2-3 slides) – provide step by step instructions for how the experiment was conducted; be sure to include dependent and independent variables

6. Results (2-3 slides) – slides must contain visual displays of data in the form of accurately labeled graphs and tables; students should present results from the graphs and tables and not “read words off the screen”.

7. Conclusion (1 slide) – summarizes the findings of group projects

8. Broader Impacts (1 slide) – summarize how you would improve your project and what the benefits to society are

9. References (1 slide) – group projects should have a minimum of 3 valid sources cited (a combination of primary and secondary sources) of information in APA format

**Written Presentations**

Students will be evaluated on their ability to communicate their research projects in written format in the form of an individual reflection essay, **due** at the time of the presentation. Students will utilize technologies such as Microsoft Word to prepare their written assignments. The written assignment is an individual assignment and should be structured in the following format:

1. Title page – should be a descriptive title of the project (10-15 words in length; please ensure that students do not title their project as “pH Lab” or “Plant Experiment”), and author name

A. Reflection Essay – should be 3 paragraphs in length and should be structured as follows:

 i. 1 paragraph highlighting important results and findings, and discussing the main overall conclusions of the experiment

ii. 1 paragraph discussing the broader impacts and applications of the experiment

iii. 1 paragraph discussing the student’s personal contribution to the group project

B. References – should include a minimum of 3 valid sources (a combination of primary and secondary sources) of information in APA format