Lab 1: Orientation and Macroscopic Variation

Introduction
Welcome to BioSci 110! Throughout the semester we will be investigating questions in biology that focus on areas of the scientific process, variation, genetics, evolution and ecology.

Each week, you will find the lab activity posted to our lab website (https://www.msu.edu/course/bs/110/lab/index.html). Please note: depending on your browser, you may need to type in the url. The website serves as your syllabus for the lab portion of this course; spend some time today looking over the website. On the website, you will find the course schedule, attendance policies, and details about how you will be assessed. You are accountable for the information on this website.

Prior to each lab, you will be expected to visit the website, print a copy of the lab and complete the pre-lab entry pertaining to the lab. After each lab meeting, you will have a post-lab particular to each lab, to be completed before you come to lab the following week. Your TA will overview the specifics of the assessments for this lab during the first week of lab.

Science is a collaborative enterprise, and as a part of this course you will have the opportunity to work with cooperative groups. In lab today, you will establish cooperative groups and work with them to learn about laboratory safety and begin exploring natural variation. Dress warmly... you will be going outside!

Variation
Trees, grasses, ducks, and guppies all have genetic differences which lead to slightly different and distinct phenotypes or traits, within a species. It is this inherent variation that drives much of scientific inquiry at all levels. Today we begin a two week look at variation across different scales. This week, we focus on variation at a macroscale, that is, variation that can be observed with the un-aided eye. Next week, we will focus on variation at a microscale, or variation we can see under a microscope.

Understanding the nature of variation is critical for understanding biology. Over the course of the semester in BioSci110, you will explore the role of variation in the study of genetics, evolution, and ecology through your investigations about: (1) the origin of variation, (2) how variation is passed on from parent to offspring, and (3) consequences of variation on individuals, interactions among organisms, and whole systems.

What you will do
Today, you will begin applying the scientific process to help build your understanding of natural variation. First, you will observe natural variation on the MSU campus. After observing and generating field notes on your observations, your base group will collaborate to develop a method you could use to research a testable question about variation. Although you will not actually conduct the method your group derives, this thinking task will help you contribute to a broader discussion about observing and measuring biological variation – something you will do for the remainder of the semester!
Objectives:
As a result of participating in this laboratory activity, you will:
1. Get to know your peers in lab
2. Establish base groups and build teamwork skills
3. Observe variation in the natural environment
4. Propose a testable question
5. Develop a method to test your question
6. Reflect on variation, and methods of studying variation

Observing and Measuring Variation Part 1:
Spend roughly 30 minutes outside at the location of your choosing:

1. Observe the ecological variation at your chosen location.
   a. Make sketches of the variation you observe
   b. Write descriptions (include color/texture/other descriptive factors)

2. Individually, pose a question you would like to investigate about variation. This question may or may not be prompted by the observational field notes you completed for number 1 above.

3. As a group, select one question of interest, and determine how you would measure this variation. Create a simple method for how you would measure this variation. Record this method as your first post-lab assessment (see details below), along with a statement of how this method will allow you to answer the question you are investigating.

Post Lab: Orientation Lab
Organize the following as your post-lab for Lab 1: Orientation Lab.

1) Include your sketches and descriptions. Label all sketches with titles and short descriptions of what you sketched, where you were, and the time of day. (2 pts)
2) What question(s) do you personally have about investigating variation? (1 pt)
3) Record the question about variation selected by your group. (1 pt)
4) Describe the method your group developed for investigating your question. This method should be detailed enough that another person could follow it. (5 pts)
   a. Include in your method:
      i. Variables; both independent and dependent
      ii. Description of your experimental design
5) In one sentence or less, describe how the method your group developed would generate the data necessary to answer the question you proposed (in #3). (1 pt)

Note: Each member in your group must complete their own post-lab (e.g., do not copy your group’s method verbatim from your peers).