Ecology is a science that takes place at many levels of inquiry: organismal, population, community and ecosystem. A population is comprised of all the individuals of a given species in a particular time and place. A community includes several interacting species at a particular time and place. An ecosystem includes both the biotic (plants, animals, fungi, microbes) and abiotic components (minerals, water, energy). At all levels, we need to start with some observations and a question of interest. We then propose an explanation of an observed phenomenon that will answer the question. Then we design a study (either experimental or observational) that makes measurements which can address this question and test the proposed explanation.

What makes a good question at each level of ecological inquiry? First it should address an issue of general interest that is currently unresolved. To do this requires some background knowledge of the field. At this point in your studies, you may not have this background so today we will be more lenient and let you pick anything that stimulates your imagination from what you see around you. Second, we need to be able to make measurements that can answer the question. Here we may be technologically constrained. But today, we let you imagine that such technological issues have been resolved and encourage you to imagine taking whatever measurements you need to address your question.

Materials and Methods

In this lab there are two main activities: thinking about questions at each level of inquiry based on observations you make in the Microbiome and discussing the relative merits of the questions posed by the class.

First, we will visit the Microbiome and each student will spend some time on her/his own making observations and looking for interesting things that are going on.

Then the class will divide into teams of two while we are still outside. Each team will choose 4 questions (one for each level of inquiry) and figure out what they would measure to answer those questions.

Then we return into the lab to discuss and debate the merits of the proposed studies. For each level of inquiry, 5 teams will be selected to present their proposed study.

References

Study questions

1. What are the levels of inquiry in the science of ecology?

2. What makes a good question?

3. List the 4 questions you posed and explain why they were interesting and what measurements you would take to answer them.

4. What was the best question posed by your lab section for each level of inquiry? Why was it selected?