

Name _____ Class _____ Date _____

Aquatic Ecosystem Lab

Background: In this lab we will identify the invertebrates you collected from the pond or stream and use the class data to develop a food web and explore the relative abundance of the organisms found in this ecological community. The diversity of a community depends on its **richness**, the number of different kinds of organisms, and its **dominance**, the number of individuals of each type. Very diverse communities like tropical rain forests have many different kinds of organisms but relatively few individuals of each type. Less diverse communities, such as those found in the arctic, may have relatively few types, but large numbers of the few types that are present. Sampling macroinvertebrates can also tell us about the health of the aquatic system, because some organisms are more tolerant to pollution than others. Finding out what kinds of organisms are in your ecosystem can tell you whether it is healthy or not.

Before you begin: Based on your observations during the field experience, what can you say about the aquatic ecosystem? Do you think you will find that it is a healthy, diverse ecosystem? Why or why not? _____

Procedure

1. Obtain the samples that you collected previously from your teacher. The 'type' of organism refers to the groups of organisms that you decided on when you were at the stream. You may find that you have to separate out the samples once you have more time to identify them.
2. Carefully get a dissection microscope, carrying it with two hands.
3. Take an organism out of its collecting jar and place it (with as little water as possible) in a petri dish.
4. Direct the light beam on your specimen. Adjust the eyepieces so they fit your eyes. Starting with the magnification on its lowest power, use the focusing knob on the side of the microscope and lower the microscope to its lowest position. Slowly adjust the focus upward until the specimen is clear.
5. Use either the dichotomous key or the picture key provided by your teacher to identify the invertebrates.
6. Complete the data table, being sure everyone in your group has a copy, and assign each organism to a trophic level using the information in the **Invertebrate Biology Briefs**. Note that some organisms may occupy more than one trophic level.
7. Pool your data with the rest of the class and be sure to copy down the class data.
8. Clean up your area as instructed.

Class Macroinvertebrate Data

Organism	Class Total	Trophic Level	Relative Abundance
Total Number Collected			XXXX

Relative abundance: the percentage of all organisms present in that community that is represented by that organism

Relative abundance of each organism = $\frac{\text{number of individuals of an organism}}{\text{Total Number Collected}} \times 100$

total number collected

1. Attach and hand in both data sheets.
2. Using the class data on macroinvertebrates and your notes from the field trip, draw a food web for the pond ecosystem. You will need to include organisms that you did not collect during the field trip, such as fish or birds. Be sure to include all the organisms that the class found in your food web and to correctly identify the flow of energy.
3. On a separate piece of paper, use the class macroinvertebrate data and create a data table showing the types of organism and their relative abundance. List the types of organisms from most abundance to least abundant along with the relative abundance of each.
4. On a separate sheet of graph paper, create a bar graph showing the relative abundance of the organisms that the class collected. Put the name of each organism on the x-axis listing the most abundant first and the least abundant last going from left to right. Put percent relative abundance on the y-axis.

5. From what part of the trophic level pyramid did you obtain the largest number of organisms? Why do you think this happened?

6. Based on what you learned in lecture about the numbers of producers, consumers and detritivores in an ecological community, do you think the class did a good job of sampling the macroinvertebrates in the aquatic ecosystem? Explain your answer in terms of pyramids of energy, biomass and numbers.

7. Summarize in words what the class data says about the species diversity in the aquatic ecosystem.

8.
 - a. Based on the types of organisms that you found, what can you conclude about the health of the ecosystem?

 - b. Do you have enough information to decide if the ecosystem is healthy or not? Why or why not?

 - c. What else would you need to know to make this decision?

9. If you were going to do this activity again, what would you do differently? Why?