LABORATORY INVESTIGATION

13 A SURVEY OF PLANKTON COMMUNITIES

Problem: *How diverse are plankton communities in bodies of water with varying levels of pollution?*

INTRODUCTION

Background Plankton are any of a large variety of organisms that drift on or near the surface of water. Most plankton organisms are protists. Plankton that are able to undergo photosynthesis and other plantlike functions are called *phytoplankton*. Many kinds of phytoplankton are algae. Plankton that do not undergo photosynthesis and act as consumers in the ecosystem are called *zooplankton*. Many ocean zooplankton are small larval animals.

Goals In this investigation, you will use a microscope to **observe** plankton in three samples of pond water that differ in their levels of pollution. You will **read a diagram** to identify the kinds of plankton in the samples. Based on the degree of diversity, you will **infer** the relationship between plankton diversity and pollution.

LAB WARMUP

Concepts The health of an ecological community is often reflected in the diversity of the community, or the number of different species it contains. When certain kinds of stresses affect an ecosystem, some organisms sensitive to those stresses may not survive. Community diversity is thereby reduced. This reduction in diversity, in turn, may reduce the stability of the community. This further diminishes its ability to survive and adapt to future stresses.

Review Section 10.2, Standing-Water Ecosystems, should be completed before beginning this investigation. You should also understand the following terms before you perform this investigation.

plankton phytoplankton zooplankton community ecosystem

Make a **prediction** about the outcome of this experiment and write it in the Lab Notebook.

MATERIALS (PER GROUP)

- samples taken from each of three dropper bottles of pond water labeled *unpolluted*, *slightly polluted*, and *moderately polluted*
- 3 glass slides
- 3 coverslips
- compound microscope

PROCEDURE

1. **CAUTION: Be careful when handling glass objects and microscopes.** Prepare a wet mount by placing several drops of the unpolluted pond water onto a microscope slide. Put a coverslip over the drop.
2. Observe the wet mount under low to moderate magnification through a compound microscope. Identify in the sample as many of the kinds of plankton as you can. Use the illustration of plankton on page 58 as a guide. Count the number of individuals of each kind. Record this information in the table in the Lab Notebook.
3. Repeat steps 1 and 2, observing samples of the slightly polluted and moderately polluted pond water. In the case of plankton that were previously listed in step 2, simply fill in the numbers of individuals of each kind now observed. Record a zero if a kind of plankton observed earlier is not present. Add the names of any plankton not observed in previous samples.

Figure 13.1 Various types of plankton

Name: _____ Class: _____ Date: _____

LAB NOTEBOOK: INVESTIGATION 13

PREDICTION

_____

_____

OBSERVATIONS

PLANKTON DIVERSITY IN DROPS OF POND WATER FROM THREE SOURCES

Kind of plankton	Number of individuals in source that is:		
	Unpolluted	Slightly polluted	Moderately polluted

DATA ANALYSIS

1. Which samples of pond water would you say had the greatest community diversity? The least? Explain your answer.

2. Compare the numbers of individuals of each kind of plankton in the three samples of pond water. Did all kinds of plankton differ in number in the same way from one sample to another?

3. Which sample contained the largest total number of individuals? The smallest number?

CONCLUSION

1. **Infer** Based upon your observations, what would you expect to see if you examined highly polluted water?

2. **Generalize** Make a general statement relating community diversity and pollution. How do you account for this relationship?

3. **Infer** Based upon your observations, how could a study of plankton help identify the kinds of pollutants that are present in a body of water?

EXTENSION

Observe Monitor changes in communities in a local pond by collecting samples every few weeks over a period of several months. Try to account for the changes on the basis of variations in conditions, including the degree of pollution, the season, depth of water in the pond, and temperature.