

Life in a Mini World

Summary

Observations of pond water help students to form classifications of microorganisms.

Time Frame

1 class periods of 45 minutes each

Group Size

Small Groups

Materials

Each group of 2-4 students will need:

- Protozoa Cultures

- Microscope

- Microscope Slides and Cover Slips

- Medicine Dropper or Pipette

- 3x5 Index Cards

Background for Teachers

The purpose of this activity is to observe, describe, and classify microorganisms found in water sources (such as ponds, puddles, or lakes).

Protozoa cultures can be ordered from a biological supply house, collected from local water sources, or you can make your own.

- Powell Laboratories; 1-800-547-1733 have a complete supply of protozoa.

- You can collect water from a local pond or other water source; however, the collected water must be stagnant in order to find live protozoa to observe.

- To culture protozoa, get pond or aquarium water. (Do not use tap or distilled water!) Add wheat, rice, hay, grass, or unwashed lettuce to inoculate the water. Cover loosely and store in a lighted area, but NOT in direct sunlight. The culture will be ready to use in two to three weeks.

The **protozoans** are excellent microorganisms for students to observe. Protozoans were one of the first forms of animal-like life. They are found in lakes, seas, oceans, rivers, and ponds. They are animal-like in that they must find outside sources of food and can move around freely, but they are so small (single-celled) they are placed in their own kingdom.

Amoeba are very simple and look much like a blob of jelly. Some amoebas can be seen without a microscope, but most are microorganisms. Amoebas have no cell wall, but, with their cell membrane, they can extend themselves. Their extension is called a pseudopod. The amoeba uses its pseudopod to pull itself along and also to catch food.

Ciliates are a group of protozoans that have hair-like projections on the outside of their cells called cilia. Cilia help these protozoans move and collect food particles. Paramecia are the most well known of the ciliates.

Flagellates have a whip-like structure to help them move. There are two kinds. One contains chlorophyll and can make its own food. The other does not contain chlorophyll and must find its food. Euglena and Volvox are protozoans that move with flagella. Euglena are unusual protozoans in that they have chloroplasts, a lot like those found in plants, that allow them to carry out photosynthesis. But unlike plants, their flagella allow them to move from one sunny spot to another.

Sporozoans are protozoans that cannot move on their own. They are parasites and feed off the cells and body fluids of other organisms. Sporozoans form spores which contain their hereditary materials;

by releasing these spores into the environment, new sporozoans are formed. For example, the disease malaria is caused by a sporozoan that is carried by the mosquito. You should not expect to see sporozoans in your protozoa cultures, because they are parasitic and do not reside in water.

Intended Learning Outcomes

- Observe simple objects and report observations.
- Use classification systems.
- Describe observations with pictures.

Instructional Procedures

- Give each group of students a Protozoa culture in a small container such as a cup.
- Explain and demonstrate the procedure for making a wet-mount slide.
 - Collect a water sample from the bottom of the Protozoa culture in the pipette.
 - Place one drop of water in the center of a clean slide.
 - Place a coverslip over the drop of water by laying the edge of the coverslip on the left side of the sample and holding up the right side with your finger. Slowly lower the right side to cover the sample.
- Have students use their samples to make their own slides. (You may also choose to complete this step in advance and have the slides already prepared for students.)
- Demonstrate how to use the microscope to observe the Protozoa.
- Give students time to use their microscopes and observe as many Protozoa as are visible in their sample.
- Students should record their observations by drawing as many different kinds of microorganisms as they see. Each microorganism should be draw on a separate 3x5 card.
- Once all observations are complete, have the students clean up their equipment and bring the cards they used to record observations to their desks.
- Students should work with the members of their group to classify the organisms they observed. Students should be able to give reasoning for the groups they have chosen as well as defend their method of classification.
- (Information they have learned about different microorganisms such as that contained in the Background portion of this lesson plan may assist their efforts. However, this lesson may also be used as an introduction to microorganisms with more direct instruction to be given later.)
- Groups should share their classifications with one another.
- REMEMBER: Well-justified student classifications are as "correct" as the ones used by scientists, though they may not be as useful.

Extensions

This lesson may also be repeated in other variations. One such variation would be to use 3-5 different samples of Protozoa cultures from different sources. Students can then observe each sample and compare the number and types of Protozoa found in different areas.

Assessment Plan

Evaluate student classification systems to check for logical reasoning, and their ability to defend their method of classification.

Authors

[Teresa Hislop](#)
[KIRSTIN REED](#)