

Pond Water Ecology and Habitat Change

Summary

Students will understand how abiotic (physical) factors alter the biotic elements of an ecosystem through an examination of microbial life in water. Students will observe water from three aquatic habitats that differ in their physical characteristics. Students will also experimentally alter the physical factors of an aquatic habitat. By observing and experimentally changing different aquatic habitats, students will understand that the abiotic components of an environment shape the type of life living there.

Time Frame

2 class periods of 45 minutes each

Group Size

Pairs

Materials

At least 3 types of pond water (could have students bring in one)
Dissecting microscopes (40X magnification or higher)
Disposable pipettes
Petri dishes
Notebook or datasheet

Student Prior Knowledge

How to use a microscope
Microbe identification

Intended Learning Outcomes

1. Use Science Process and Thinking Skills
 - a. Observe simple objects, patterns, and events, and report their observations.
 - f. Plan and conduct simple experiments.
 - g. Formulate simple research questions.
 - i. Use data to construct a reasonable conclusion.
3. Understand Science Concepts and Principles
 - c. Solve problems appropriate to grade level by applying science principles and procedures.
4. Communicate Effectively Using Science Language and Reasoning
 - a. Record data accurately when given the appropriate form (e.g., table, graph, chart).

Instructional Procedures

The first day of this experiment will be pretty scripted as students will observe and compare water from three different habitats. The second day of this lesson will be much more inquiry based. At the end of the first class session, students will set up an experiment to manipulate the aquatic environment and then observe any changes on the second day. Prior to starting the lesson, the teacher will need to collect water from three different habitats. For example City Creek, Jordan River and a pond. These three waters should vary in the type of habitat and the level of pollution in the water. The teacher will need to measure a few abiotic parameters at each water collection site (temperature, pH, conductivity and turbidity). If the teacher does not have access to this equipment, a simple description of each site will suffice.

Day 1:

Obtain water sample and observe in a petri dish

Start with 40X lens and work up to higher magnification

Count the number of microorganisms in a single field of view. Try to describe or identify the microorganisms you see and write down all observations in a notebook.

Repeat #3 in with a new field of view.

Repeat #3 & 4 with a new sample from a different water source.

After all water sources have been sampled, the teacher will lead a discussion to understand differences in types and numbers of microorganisms in each habitat.

Which had more number of microbes?

Did they have the same microbes?

Pick your favorite sample for an experiment.

Pick a possible variable you would like to test:

Temperature

Salinity

Light

Other

How could you alter this variable? (e.g. place one in cupboard and in window or one in classroom and one in fridge)

a) Apply the treatment for the remainder of the class period

b) Or, apply treatment for 1 day (if you have time)

Count the number of microbes after the end of the class period or after the day

Record observations for each treatment separately

Compare the results for the two treatments

Discuss how a change in the physical environment will change the things that live there.

Assessment Plan

Students will record observations in their lab book. Students can create a line graph showing the number of microorganisms in a given sample. The line will delineate the number of microbes over time after the treatment.

Authors

[Seth Arens](#)

[Ryan Bixenmann](#)

[Holly Godsey](#)