



NYSDEC Environmental Education

Pond Ecology

For Students in Grades 4 through 6

April through October is the best time for this lesson

A 60-minute program designed to help students learn about the diverse life found in local ponds. This program involves the students working cooperatively in discovery groups, and allows them to investigate living organisms at their desks as a scientific team.

Goal

Many students are familiar with the larger animals that live in ponds and streams, such as fish, turtles, geese and frogs; but often are unfamiliar with the smaller life forms. By bringing pond organisms into the class, you can introduce your students to these small animals, scientific methods, and cooperative learning. Students will better understand the interdependence of their local ecosystem.

NYS Intermediate Level Science Core Curriculum

Standard 1: Scientific Inquiry

Key Idea 1: The central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing, creative process.

Standard 4: The Living Environment

Key Idea 4: The continuity of life is sustained through reproduction and development.

Key Idea 5: Organisms maintain a dynamic equilibrium that sustains life.

Key Idea 6: Plants and animals depend on each other and their physical environment.

Process Skills:

General Skills 6: Use a dichotomous key

Living Environment Skills 7: Interpret and/or illustrate the energy flow in a food chain, energy pyramid, or food web.

Key Terms

Metamorphosis

Amphibian

Wetlands

Researcher

Food Chain

Larva

Predator

Camouflage

Food Web

Nymph

Insect

Water Quality

Life Cycle

Invertebrate

Adaptation

Materials Needed

Dip nets, Petri dishes, plastic spoons, hand lenses, plastic pipettes, pond invertebrate guides, worksheets, pond water, live pond invertebrates, low flat basin, pencils (colored pencils optional), chalkboard or whiteboard

Introduction

What makes a pond a pond? Discuss the places that wetlands occur, asking the students if they have ever visited a pond, and what they saw there. Introduce the topics of life cycles and metamorphosis, comparing the life cycle of a frog to the life cycle of a dragonfly or mosquito.

Explain the roles each student will take in the science investigation.

Divide students into teams of three. Each of the students has a vital role in the exploration:

Reader: This student scientist will read each question to the group, and any guides or scientific keys used.

Recorder: This student scientist will write down the answers that the group comes up with for each question.

Artist: This student scientist will sketch the organism.

(Note: If the students are already divided into teams of three, and each student understands their role before the visiting educator arrives, it can improve our program).

Procedure

- 1) Introduce students to the equipment that they will be using. This will consist of a Petri dish lid or base (to hold the organism being studied), a plastic spoon (to collect organism from water), a pipette (to collect really small organism from water), and a hand lens. Each team of “researchers” will have one of each item.
- 2) Select one student from each group to collect the organism from the pond water basin. Demonstrate the proper technique to catch and not hurt the animals. Explain that though the organisms are small, they are still living specimens and should be respected. There are many species of invertebrates possible, and the point right now is to observe, not identify. Once an animal is caught in the Petri dish basin, the students can now do their research. The collector can carefully carry the Petri dish with the organism back to the other students in the study area.
- 3) The recorder and the reader should sit adjacent to one another. The animal in the basin should be available for all of the students to make observations, and the hand lens can be shared. If the desks are dark, placing white paper under the dish can help the students to see small details. The reader should read each question to the group, the group can then discuss and observe, and the recorder write down the answer the group decides on.
- 4) When all of the questions are answered, a student should render a sketch of the organism. The picture should be much larger than the organism. All of the students can suggest details to the artist. The style of the sketch is entirely up to the artist.
- 5) The final observation is to identify the organism. Older students can use a scientific key to “key out” the animal, younger students (or if pressed for time) can match their artist’s drawing to scientific illustrations.
- 6) Once the identification is confirmed by the visiting educator or the teacher, the animals can be returned to the carrying bin, and the equipment can be put back in the containers.

Extensions:

Students can use the library or internet to research other organisms or larger animals that live in or around ponds. The research team can create a food web or food chain that includes the organism they studied; tying in foods that it eats, and predators that feed on it. For example, if the students studied a damselfly nymph, a food chain might include: pond plankton, water fleas, **damselfly nymph**, bluegill sunfish, painted turtle, raccoon.

Students can tell or write a story, *A Day in the Life of a Pond Critter*, describing what they imagine living in a pond might be like from the perspective of a near microscopic organism.

Students can identify ponds and streams near their homes or school.

Activity Extensions:

Project WET *Macroinvertebrate Mayhem*- lesson about the effects of environmental stresses on pond life
Project WILD *Quick Frozen Critters*- lesson illustrating the importance of adaptations in predator/prey relationships.

Sample Pond Food Web

