

Pond 2: Life in a Drop of Pond Water

Purpose

To investigate the living creatures in a drop of pond water under magnification.

Context

This lesson is the second in a two-part series on microorganisms. It is designed to follow the first lesson, but it can also stand alone.

In order to learn about the living environment, young children should begin with direct observation of their immediate surroundings, such as a backyard, schoolyard, or local pond. As students observe their environment, they should have many opportunities to record and communicate their findings using words and pictures.

In this grade level, students' experiences with living things should expand to include the observation of microscopic organisms. During this time period, it is a good idea to let children have some experiences with increasing the scale of magnification.

In [Pond 1: Pond Life](#), students explore how various organisms satisfy their needs within their environments and the kinds of relationships that exist between organisms within an environment.

In Pond 2: Life in a Drop of Pond Water, students observe microscopic organisms found in pond water using a hand lens, 30x magnification, and 100x magnification. Observing these organisms should stimulate discussions about how single-celled living things might satisfy their needs for food, water, and air. They can do this by comparing the needs of macroscopic organisms to those of microscopic ones. It is important to remember that while watching microorganisms is informative, it is not always likely that students will be able to observe these tiny cells performing such functions as dividing or taking in food. Thus direct observation should be supplemented with films of living cells or by using prepared materials.

For students at this early level, it would be helpful if they walked away from this lesson with some understanding that all life forms are made up of cells—from single-celled bacteria found in ponds to human beings, who are made up of trillions of cells. Students should be able to grasp that even microscopic, single-celled organisms are alive and they need food, water, and air to survive. (*Science for All Americans*, [pp. 62-63](#).)

While teaching, keep in mind that research indicates that it may be easier for students to understand that the cell is the basic unit of structure (which they can observe) than that the cell is the basic unit of function (which has to be inferred from experiments). (*Benchmarks for Science Literacy*, [p. 342](#).)

Ideas in this lesson are also related to concepts found in the following benchmarks:

- 5C The Living Environment: Cells (3-5) #1
- 3A The Nature of Technology: Technology and Science (3-5) #2

Planning Ahead

This lesson involves a field trip to a local pond for observation and pond water collection.

Materials:

At the pond:

- Fresh pond water
- Clear glass jar(s)

In the lab:

- Slides
- Droppers
- Hand lenses
- 30x microscopes
- 100x microscopes
- [Pond Water - A Closer Look](#) student sheet
- [Virtual Pond Dip](#) student E-Sheet

Motivation

To introduce the activity, take the class on a field trip to a local pond. While at the pond, encourage students to look around and explore the surroundings. Then lead them in a discussion of what living things might live in a pond. Ask questions like these:

- How do you know that something is alive?
- What kinds of creatures or things live in a pond?
- What do you think is the biggest creature to live in a pond like this one? The smallest?
- Can you see any living things in the water? If so, what?
- Do you think that anything could live in just a single drop of pond water? Why or why not?

(Accept all answers. Encourage students to elaborate on their responses.)

Then gather up some of the pond water in a clear glass jar. Allow students to look closely at the contents of the jar and discuss whether they see any evidence of living organisms. (Refer back to the question about what living things do.) Take the jar back to the classroom for further investigation.

Note: If you are doing this lesson after Pond 1: Pond Life, you can use the water samples that you have brought back to conduct this activity.

Development

In this activity, students will take a closer look at the living organisms that exist in a freshwater habitat. Begin by reviewing and listing on the board or on chart paper some of the living things that students encountered in their observations at the pond.

Lab Work

Divide the class into groups of two or three, and distribute the student lab sheet, [Pond Water: A Closer Look](#). Then set up the microscopes and distribute droppers, slides, hand lenses, and pond water samples to each group. Have students follow the step-by-step instructions carefully during their investigation, which will allow them to observe the pond water for living organisms first using a hand lens, and then a

microscope at 30x and 100x magnification. During their investigations, students will be required to think about and answer the questions on the student sheet.

Using their science journals or notebooks, allow students to sketch and discuss what they observe. Tell students to include as many details as they can in their sketches so that they can try to identify the organisms later on.

Observations

After the lab, discuss with students their answers to the questions on the student sheet and let them share their observations and sketches with members of other groups.

Then have students use the [Virtual Pond Dip](#) student E-Sheet to visit [A Virtual Pond Dip](#). As students explore this page, you may want to talk to them about the organisms in the jar. You could also let students click on a couple of organisms to learn more about them. Doing this activity should help students make the correlation between the lab work they've done and the next activity.

Next, students should use the student E-Sheet to visit the [Pond Life Identification Kit](#). Allow students to spend about 10 minutes reading about some of the microorganisms that might be found in a pond. See if they can find any of the actual organisms they saw under the microscope and ask them to go back and label their drawings with the actual names of the organisms. Let students compare their drawings and their observations. Encourage them to take notes about how the organisms function, survive, and other interesting information.

Still using the student E-Sheet, students should visit the [Virtual Pond Dip](#) on the Sparsholt School's Centre for Environmental Education site. Here they can read more about the organisms that they have observed, as well as the contributions that they make within an ecosystem.

To aid and reinforce their understanding of the material, draw a large version of a pond on the board. You can use this drawing to jot down additional information that students retrieve about the roles and functions of organisms that live within the pond.

Assessment

The Pond Report

Take a final tally from each group of the specific organisms they were able to sketch and identify. Depending on the number of organisms identified, have each group represent one key organism.

Tell students to imagine that the classroom is actually the pond they visited earlier (and that they have to pretend to be the organisms they've been assigned). You will pretend to be an underwater reporter and do a live TV interview with each of the moving and squirming organisms to find out what their lives are like. Questions may include:

- Please describe your appearance.
- How do you move? (Demonstrate.)
- What part of the pond do you live in?
- What do you do or need to survive?
- What else can you tell me about yourself?

Before the news report, to help answer these and other questions, students may wish to review their notes about their organism or go back and review the [Pond Life Identification Kit](#) and [Virtual Pond Dip](#) websites for additional information. It might also be helpful to supply the class with a number of books on freshwater organisms that will help them.

Other fun and interesting questions to add during the interviews:

- What's it like living in a pond?
- Do you enjoy being a _____ (organism name)?
- Can you swim faster than a _____ (other organism in the room)?
- Do you ever see any turtles, fish, or ducks? Are they friendly?

Extensions

Have students speculate on aspects of creatures they have found and devise experiments to test such questions as these:

- How many microscopic organisms are in a drop of pond water?
- What do microscopic organisms in ponds eat?
- How do organisms that live in pond water move?

[Pond Water Survey](#) is a lesson in which students prepare a pond water survey. In this activity, students determine the volume of the pond, collect and record data on 10 pond organisms, and conduct population counts of the organisms.

[Nye Labs](#) contains a set of additional investigations that students can do with pond water.

[The Bucket Buddies](#) project offers your class an opportunity to further investigate pond life and the kinds of animals that inhabit ponds. Bucket Buddies collects information from classrooms worldwide to see if the same kinds of macro-invertebrates (visible animals without backbones) live in freshwater areas in different regions. Registration is required, sample classroom results are provided, and detailed lesson plans help to guide students in their investigations and the publishing of their results.