

Pond 1: Pond Life

Purpose

To investigate familiar and unfamiliar ecosystems using Internet resources; to explore how various organisms satisfy their needs within their environments; to study the kinds of relationships that exist between organisms within an environment.

Context

This lesson is the first in a two-part series on microorganisms. It is designed to be used in conjunction with the second 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](#)⁶, 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

Materials:

- Jars for water samples from a local pond, lake, river, or stream
- Poster board
- Microscopes
- Slides

Motivation

It is important for student exploration of the living environment to begin with direct observation. If possible, have students visit a local pond, river, lake, or stream.

Note: Have students collect water samples. These will be used later in the lesson.

Have students create a field journal documenting the living organisms that they encounter, along with any relationships that appear to exist between them. The American Museum of Natural History offers an [online field journal](#)⁷ with questions that can be used to guide student observation, as well as sample journal pages that can be printed out.

Students could visit [Freshwater Ecosystems](#)⁸ on the MBGnet website for a comprehensive guide to the aquatic plants and animals they might find in and around local bodies of water. Students could use this site as a field guide for identifying the organisms that they discover in their observations, or as a resource for follow-up research activities.

Development

[Freshwater Ecosystems](#)⁸ explores some of the interrelationships between the plants and animals in an environment. Have students read about the ways in which organisms rely on plants for survival in a freshwater ecosystem.

Ask students to reflect on these questions, writing some preliminary ideas in their journals:

- Can you think of additional examples of ways in which plants and animals rely on one another for survival?
- Did you find any evidence of relationships between living things during your observations?

While they are at the Freshwater Ecosystems page, students should explore the three different sections of the site: Rivers & Streams, Ponds & Lakes, and Wetlands. On the left-hand side of each of these sections, there is a list of subsections that students can visit. Have students explore the following:

- [River & Streams Animals](#)⁹
- [Ponds & Lakes Animals](#)¹⁰
- [Wetlands Animals](#)¹¹

As students explore these sections, they should identify some of the plants and animals that can be found in freshwater habitats. Identify those animals that students have seen locally. Divide students into groups and have them research one of the animals further. Students should consult their previous journal entries as they work in teams to investigate.

Have students discuss these questions:

- What are the animal's basic needs? (They are food, water, air, and shelter.)
- What organisms would this animal rely on in order to meet these needs?
- What might happen if some of these organisms were to disappear?
- What organisms rely on this animal for survival?
- How does this animal interact with the non-living things in its environment?
- What might happen to a freshwater ecosystem if this animal were to become extinct?

Have students create a poster that includes words and pictures to show some of the relationships that exist between the animal and other living things in its environment. Using this poster, have groups give at least one example of a change in the environment that might threaten this animal's survival. They should explain some of the ways in which the environment might be affected if this animal were to become extinct.

Have students visit [Waterworld](#)¹² at the Microbe Zoo website. In this activity, students will take a closer look at the living organisms that exist in a freshwater habitat. Have students list some of the living things they encountered in their observations. (Just for fun, have students read to find the relationship between diatoms and toothpaste!)

Distribute the jars containing water samples from a local pond, river, lake, or stream (samples that students collected at the start of this lesson). Ask students to look closely to see if there is any evidence of living organisms. Have students prepare slides with a small drop of the water to observe using a microscope, and sketch and discuss what they observe.

Assessment

Present a hypothetical situation in which a living organism from a freshwater ecosystem suddenly disappears. Have students write a journal entry in which they explain some of the possible causes and/or effects.

Extensions

Follow this lesson with the second lesson in the Pond series: [Pond 2: Life in a Drop of Pond Water](#)⁶.

For an additional Living Environment lesson for grades 3-5, go to [Classification 1: Classification Scheme](#)¹³.

Visit [Biomes of the World](#)¹⁴ on the MBGnet website. At this site, students can research the living organisms that exist in the Rainforest, Tundra, Taiga, Desert, Temperate Forest, and Desert biomes.

Have students work in groups to investigate one of the biomes using both Internet and other resources. Have students research the climate of that biome, as well as where such biomes are located. They can research the plants and animals found in that biome, as well as the interrelationships that exist between them.

Have students identify plants or animals that appear particularly well suited to the physical conditions with which they must cope. What adaptations help them survive?

Visit [Endangered!](#)¹⁵ at the American Museum of Natural History or [Save Our Species](#)¹⁶ at EPA's Explorers' Club to learn more about animals that are currently listed as endangered. Students can conduct research on one of these animals in order to determine the greatest threats to its survival, and some possible protection strategies. Students should also investigate what impact the loss of that species would have on other organisms within its environment.