Title: Life In A Pond

Grade Level: Kind.-1st grade

II. Concepts:
1. There are tiny animals and plants that live in ponds and lakes.
2. People need to protect and care for the environment.
3. A habitat is the place where tiny plants and animals normally live and where you go to find them.

III. Materials Needed

1. "Pond Life" Kit
2. Tape recorder and blank cassette
3. Art paper and crayons
4. Magnifying glasses (optional)

IV. Pre-planning
1. Draw a map of the cross-section of a typical pond on a piece of poster board.
2. Be sure to send home notes to parents reminding students to bring towels and extra clothing for the field trip.

V. Estimated Time for Activity
2 hours

VI Procedures
1. Display picture of the pond and discuss habitats in a pond.
2. Tell the students that today they are going to be "Pond Detectives" and will search for clues of life in the pond.
3. Demonstrate how to use each piece of equipment and divide students into teams.
4. Each group is given a laminaterd card from the "Pond Kit" to check for signs of a healthy pond and life in the pond.
5. One group at a time will go into the shallow end of pond and seine for animals and plants.
6. After seining have students to sit on the bank of pond and close their eyes and listen to the sounds of the pond. Ask what did you hear and record the sounds of the tape recorder. Make a list of their comments. Use magnifying glasses to look at pond life.
7. At the pavillon, have students draw the pond and color the pictures. While they draw, discuss the importance of taking care of the pond and the environment.

VI. Follow-Up Activity

1. Have students take different topics relating to pond life and read about them with their parents. Each student, for homework, can bring in information about pond life.
2. Have students write letters to government officials asking for laws to protect our environment.

by Wanda Henry Buhl Elem.

Title: Pond Succession

I. Grade Levels: 4-9

II. Concepts:

1. Recognize that natural environments are involved in a process of continual change.
2. Discuss the concept of succession.
3. Describe succession as an example of the process of change in natural environments.
4. Apply understanding of the concept of succession by drawing a series of pictures showing stages of pond succession.

III. Materials & Supplies:

Gathered by the teacher- long pieces of drawing paper for murals, tape for securing to wall, crayons

IV. Pre-Planning:

Students must know that succession is a term used to describe the ever-changing environment and the gradual process by which one habitat is replaced by another. Many habitats that appear to be stable are changing before us-perhaps at a slow rate in human eyes, but evolving rather quickly according to the earth's clock. For example, a shallow pond may be transformed into a marshy , then forested, area in only a thousand years or so. Wind-blown or water-borne spores of algae are first inhabitants. Eggs of flying insects are deposited, small fish and amphibian arrive through the inlet. Surrounding sediments begin to fill the pond, some borne on wash-out from rainfall, some entering through the pond's inlet. Marshy plants growing along the shoreline spread inward as sediments fill the pond. Land plants also spread inward and replace the marsh plants and the ground is consolidated. As more plants and animals enter the system, more opportunities for habitat become available to others. Changes from ponds to forest are only one example of succession.

V. Estimated Time for Activity:

one to two thirty minute durations or longer

VI. Procedures:

(See attached)

VII. Follow-Up Activity:

Do a research paper on pond succession.

Submitted by: Tammy Harper

Taken from: **Project Wild, The Western Regional Environmental Education Council, copyright 1983, 1985, 1986.**

School: Walker Elementary School

Procedures:

1. Review the idea of succession with students.
2. Talk about the characteristics of a pond. Ask students to imagine what a pond would look like from a side view if you could see under the water. Draw a sample cross section.
3. Tell students they will be drawing three views of a pond and what it would like over a time period of about 800 years. The drawings will represent (first) what it would look like today; (second) what it would look like in 500 years after natural changes; and, (finally) what it would look like in 800 years.
4. Discuss all characteristics of the pond and what would be affected over time. Include in your discussion plants, animals, landforms, etc.
5. Divide the class into groups and give each a large piece of paper that has been divided into three equal sections. Tell the groups to draw in the first section what the pond would look like today. Assign a set time limit (about 10-15 minutes).
6. Bring class together and discuss changes they feel would take place over 500 years. Consider:
   - environmental changes
   - plant and animal life
   - life on top of the water, in the water, surrounding areas

   Have the groups draw in the middle section of their papers what they think the pond would look like 500 years later (be sure they label the section, '500 Years Later').
7. Once again bring the class together and discuss the changes to the pond in 800 years. By now the pond is almost totally filled with sediment. There may be large marshy areas and perhaps a small stream. Have the groups draw their final sections.
8. After the murals are complete, they should be displayed and students may discuss similarities and differences.
9. Ask students to summarize what they have learned about succession in writing. How does succession relate to the overall scheme of our ever-changing natural environment?

Sharing a Habitat

I. Grade Levels: 3-6

II. Concepts:

1. An ecosystem is a physical environment and all the living things (organisms) in it.
2. A habitat is a place in which an organism lives.
3. A niche is the organism's job.

III. Materials & Supplies

A. Gathered by the teacher

1. Worksheet "Sharing a Habitat" (Be sure to duplicate one for each student.)
2. Clipboard and a pencil for each student.

B. Included in "Pond Life" Kit

dip nets, pond field guide, bug boxes, hand lenses

IV. Pre-Planning

Teach vocabulary: **ecosystem organism habitat niche**

V. Estimated Time for Activity: 45 to 60 minutes

VI. Procedures:

1. Gather the materials from the pond kit and go to the area by the pond. Find an ecosystem that you can get to easily. You might look at the edge of the water, under a piece of old wood, around a tree trunk, in a bush or on a branch or leaf.
2. Find two different animals that are in the same spot, for example a salamander and a slug, a spider and a fly, or a water bug and a beetle. (Use dip nets to scoop water bugs and beetles from the pond's surface.)
3. Study the animals closely. Use the hand lenses and bug boxes for closer observation. Discuss the questions below and then have the students write the answers on their worksheets.
   a. Which animals did you choose? Draw their pictures.
   b. Describe the habitat. Draw pictures of the habitat.

c. Where was each animal when you first found it?
d. What was each animal doing?
e. Do the two animals interact?
f. What is each animal's niche?
g. How are the two animals and their niches related?

VII. Follow-up Activity

1. The students can shade in the pictures they drew with colored pencils and share their answers to the questions with the group.
2. Find books to help them identify the animals and learn more about the habitats, animals, and their niches.

Submitted by: Carol McBrayer
School: Maxwell Elementary

Sharing a Habitat

Questions

a. Which animals did you choose?
Draw their pictures.

b. Describe the habitat.

Draw pictures of the habitat.

c. Where was each animal when you first found it?

d. What was each animal doing?

e. Do the two animals interact?

f. What is each animal's niche?

g. How are the two animals and their niches related?

TUSCALOOSA COUNTY SCHOOL SYSTEM
BLACK WARRIOR COUNCIL, B.S.A.
ENVIRONMENTAL LEARNING CENTER

Pond Habitats

I. Grade Levels: 4-7

II. Concepts:

1. A pond is a body of standing water so shallow that rooted plants grow over the entire bottom. A lake is usually larger than a pond, and the water is too deep for plants to grow, except around the shore.
2. In and around both lakes and ponds, you can easily recognize five distinct areas: the surface, the open water, the bottom, the water's edge, and the air above the pond. These five distinct areas are called habitats.
3. A **habitat** is the place where an organism normally lives and where you would go to find it.
4. The *surface* is the habitat for certain beetles, water bugs, and free-floating plants that live on the upper side of the surface.
5. *Open water* is the area in the center of a pond where rooted plants do not extend to the surface of the water. Some of the organisms that live in open water are fish, turtles, birds, and large and small plants.
6. The *bottom* is inhabited by a variety of animals including snails, flatworms, earthworms, sponges, crayfish, and the nymphs of mayflies, dragonflies and damselflies.
7. The *water's edge* is where water meets the land.
8. The *air over the water* contains flying insects, birds, bats, wind-blown seeds, weeds, and reeds.

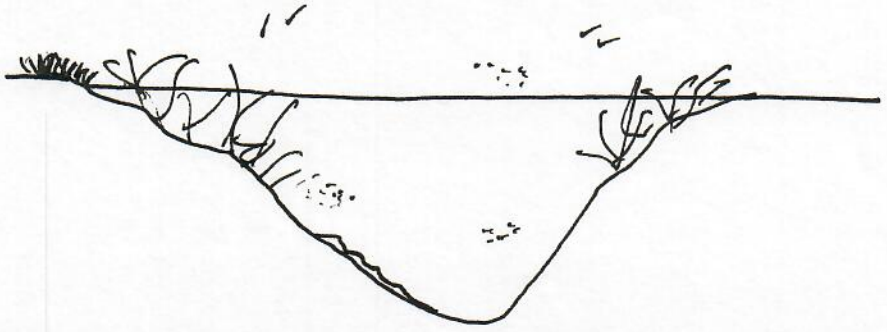
III. Materials & Supplies

A. Gathered by the teacher
large posterboard, felt markers

B. Included in "Pond Life" Kit
plankton net, dip nets, seine, pond field guide, bug boxes, hand lenses

IV. Pre-Planning

Draw a map of the cross-section of a typical pond (example shown below) on a piece of posterboard.



Teach vocabulary: **habitat** **organism**

V. Estimated Time for Activity:
30 - 45 minutes depending on size/level of group.

VI. Procedures:
1. Display the cross section of a typical pond pointing out the five major habitats (edge, bottom, open water, surface, air above pond).
2. Demonstrate the use of each piece of equipment to help locate animals and plants. Divide into teams and hand out equipment; assign a different habitat to each team.
3. Have each team search their habitat of the pond and locate as many different animals or plants that they can. You may want teams to swap areas and equipment after a given time limit.
4. Ask teams to keep notes as to the names of each plant or animal they find and in which habitat it was found.
5. After they are finished, have them return organisms to their respective habitats.
6. As a class discussion, mark what the students found on your map.

VII. Follow-Up Activity
1. Research different organisms and place into categories.
2. Set up a classroom bulletin board as a pond map with actual placement of student's findings.

Who's in the Neighborhood?

I. Grade Levels: 4-7

II. Concepts:

1. Organisms belong to a population.
2. A population is a group of organisms of the same kind that lives and reproduces in a particular area.

III. Materials and Supplies

A. Supplied by the teacher

team census chart (1 per team)
pencils

B. Included in "Pond" kit

pond guide
strainers
magnifying lenses
white bottom tray

IV. Pre-Planning

1. Copy "Census Chart" with this lesson - 1 for every 2 students.
2. Discuss concepts of organisms, habitat, population.
3. Describe activity to students explaining procedures. Divide into teams of 2. Have each team estimate the number of organisms they think there will be in a square that is 25 cm on each side.

V. Estimated Time of Activity

45 to 60 minutes.

VI. Procedures:

1. Use a scraper to scrape one square, 25 cm on a side, of near-shore bottom to a depth of 3 cm.
2. Place the scrapings in a white-bottomed container, taking care not to lose any of the scrapings. Observe immediately, and count the number of organisms. Magnifying lenses will help.
3. Count the plants, and then carefully check for any organisms that might live on the plants. Also check the rocks and sticks carefully. Rinse plants and rocks by placing them in a kitchen strainer and carefully run water over them until they are clean. Count the stranded organisms. Runoff water can be checked for organisms by pouring it through fine mesh before returning the water to the pond.

4. Immerse plants, rocks, logs, or other debris, and the strainer in water after they are checked for organisms. Some organisms (hydra for example) are easily overlooked until the object they are attached to is immersed in water and left undisturbed for a few minutes.

   Each team should make at least one census. If time allows, have them complete more. All organisms should be returned to the pond after they have been counted.

5. When all of the organisms have been recorded, ask which team found the greatest number of organisms, and which found the greatest number of different kinds of organisms. Write the term **population** in large letters at the top of a chart. Explain that a population is a group of organisms of the same kind that lives in a particular area.

   Now compare the different censuses and ask why each team didn't find the same numbers and kind of organisms. If they took more than one census, ask them if they can explain any discrepancies between different censuses. Some possible explanations are:
   - inconsistent counting techniques
   - inadequate equipment
   - uneven distribution of organisms over a habitat
   - differences in area sample

VII. Follow Up Activity

Using all the censuses taken, can the class make an estimation of the number of organisms living throughout the entire pond? How might this be accomplished? Extend math skills into the activity and have students work in small groups. Compare answers.

CENSUS CHART -- WHO'S IN THE NEIGHBORHOOD?

	List the number of organisms found	[T E A M S ---------] 1	2	3	4
ANIMALS					
PLANTS					

The Freshwater Pond

I. Grade Levels: 10-12

II. Concepts:

1. A correlated study of physical and biotic factors is necessary to understand the complexities of a biome such as a pond.
2. The variety of life in a pond community is focused into different zones: the shoreline, littoral, benthic, surface, open water.
3. Heterotrophs fill a diversity of niches that fall into one of three general categories: predation, scavenging, or symbiosis.
4. The most common linkage between living things in a biome is through production and consumption of food. Those complex relationships may be expressed as food chains, food pyramids, or food webs.

III. Materials and Supplies

A. Gathered by the teacher

collecting bags
collecting jars

B. Included in "Pond Life", "Water Test", and "Seine Nets" kit(s)

seine nets	plankton net	shovels
dip nets	water test kit	secchi disk
thermometers		

IV. Pre-Planning

** Teacher must be trained in gathering samples, data, and collection techniques in order to use this activity.

1. Divide class into 6 groups of approximately equal sizes. Each group needs a designated recorder to label jars, bags, etc.
2. Introduce students to the concepts and objectives of field activity and go over the following vocabulary words prior to your trip:

Vocabulary:

autotroph	consumer	habitat
biome	decomposer	heterotroph
biotic	ecology	mutualism
community	food chain	niche
commensalism	food web	parasitism
symbiosis	scavenger	producer
predation	physical environment	

3. Bring jars, buckets, and other containers if you wish to transport live specimens back to the classroom for further study. Any additional collecting equipment your class might have such as dip nets will also be useful.

V. Estimated Time for Activity:
60 minutes (longer, if groups rotate stations)

VI. Activity Procedures:
Groups will be given a sampling assignment and specific instructions in sampling techniques. **The first group** will determine the physical factors of the pond. They should produce a simple map showing approximate depths, elevation in relation to land, area, and shape. They should try to determine the source of the water and outlet, if present. Students directly observing signs of life may include these on the map. **The second group** will be concerned with other physical parameters such as temperature, turbidity, lake bed, pH, etc. They will use a water sampler, secchi disk, thermometer, and a water test kit. **The third group** will use a plankton net to gather microscopic samples from different points on the lake. Each sampling site should be recorded on lake map and samples labeled accordingly. **The fourth group** will use dip nets along shore line and littoral zones. **The fifth group** should examine driftwood and submerged branches for attached organisms along the littoral zone. They will also use a shovel and strainers to locate benthic species. **The sixth group** will use a seine net to catch open water and littoral zone specimens. They are going to get wet, so they may wish to bring a change of clothing.

If time allows, switch activities at least once for all groups. Emphasis should be placed on scientific methods. Careful observation and good record keeping are as important as a large bucket of specimens to carry back to the classroom.

VII. Follow-Up Activity
1. Prepare a freshwater aquarium using specimens collected on field trip. Include representatives from the various life zones encountered in the pond.
2. Construct a bulletin board illustrating the food relationships (food web) and other interactions observed in the pond.
3. Compare the pond community with other biological communities found in our area, eg., forest, field, bog, swamps, etc.