

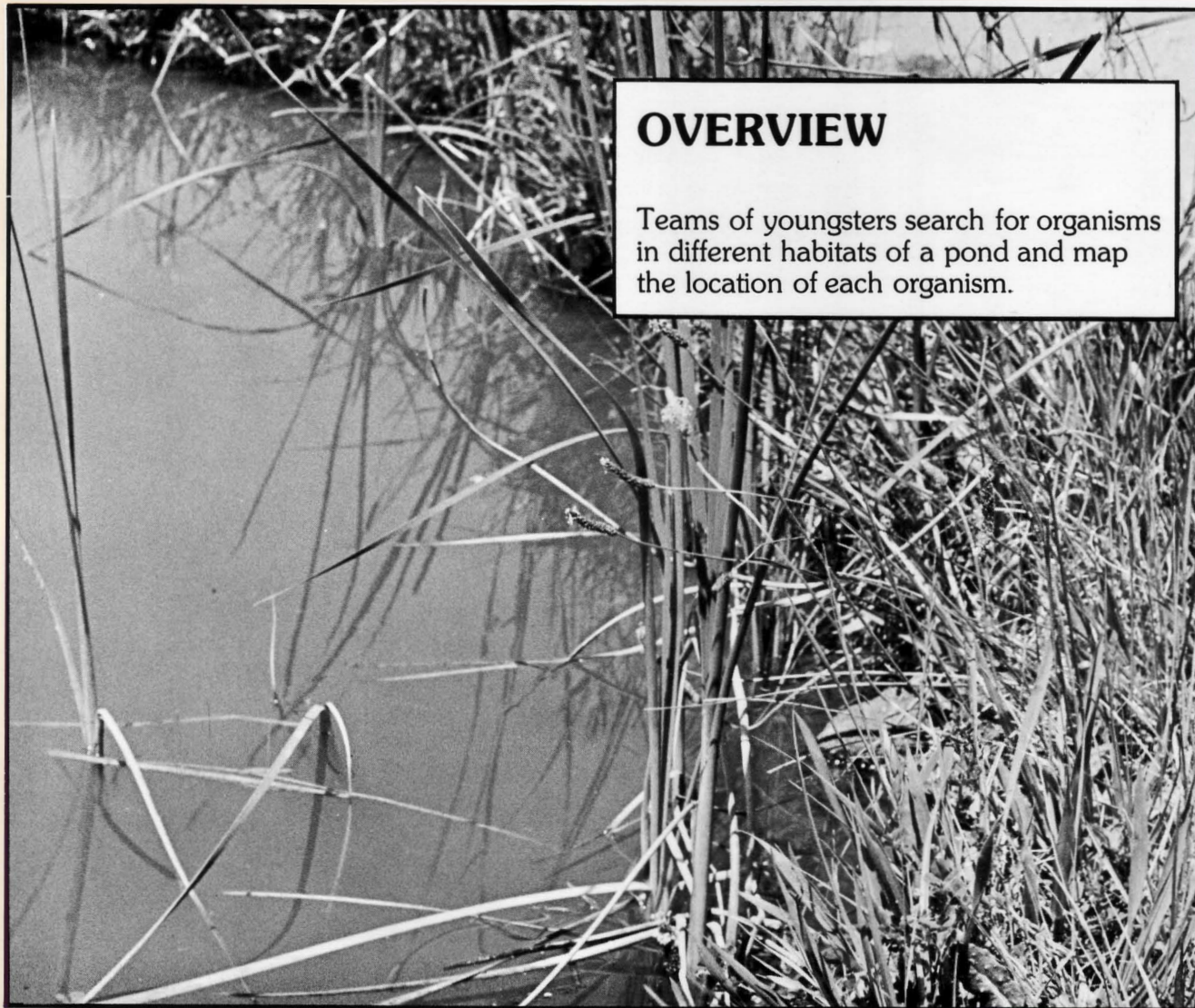
HABITATS OF THE POND

BIO
KEY

Aquatic Organism Search
Observation
Habitat

OVERVIEW

Teams of youngsters search for organisms in different habitats of a pond and map the location of each organism.



BACKGROUND



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. In and around both lakes and ponds, you can easily recognize five distinct areas: the water's edge, the surface layer, the open water, the bottom, and the air above the pond. These five distinct areas are called habitats. A **habitat** is the place where an organism lives and where you would ordinarily go to find it.

The water's edge is where water meets the land. For the purposes of this activity, this area is defined as approximately 15 centimeters into the water and 15 centimeters onto the land encircling a pond or lake. Both aquatic organisms and terrestrial organisms may be found in this habitat.

The surface layer is the top centimeter or two of water in the pond. This is the habitat for certain air-breathing beetles and water bugs, crustaceans (copepods, daphnia), and free-floating plants that live on the upper side of the layer.

Open water is the area between the surface layer and the bottom of the pond.

Plants, both large and small, are found in this area along with crustaceans (scuds), snails, insect larvae (damselfly, dragonfly, and mayfly nymphs), fish, and turtles.

The bottom area is inhabited by a variety of animals. In the mud and silt are worms including flatworms, tubifex worms, and leeches; crayfish; larvae of a number of insects including dragonfly nymphs, mayfly nymphs, and beetle larvae; and tadpoles.

The air over the water contains flying insects (damselflies, dragonflies, mosquitoes), birds, bats (in the evening), and the windblown seeds of both aquatic and terrestrial plants.

CHALLENGE: LOCATE PLANTS AND ANIMALS IN EACH OF THE HABITATS OF A POND AND RECORD WHERE THEY LIVE.

MATERIALS



For each buddy team:

- 1 plankton net (See the "Preparation" section.)
- 1 long-handled dip net
- 2 observation trays
- 1 magnifying lens or bug box
- 1 clear plastic cup
- 1 copy of the *OBIS Pond Guide* (for freshwater sites)

For the group:

- 1 data board*
- 4 felt-tip marking pens (brown, blue, green, red)
- 1 copy of the "Aquatic Observation Aids" Equipment Card
- 1 copy of the "Plankton Net" Equipment Card
- several large kitchen strainers (for bottom sampling)

several small aquarium dip nets

PREPARATION



Group Size. This activity is suitable for groups of all sizes. For groups larger than twenty, use an assistant to help you conduct the activity.

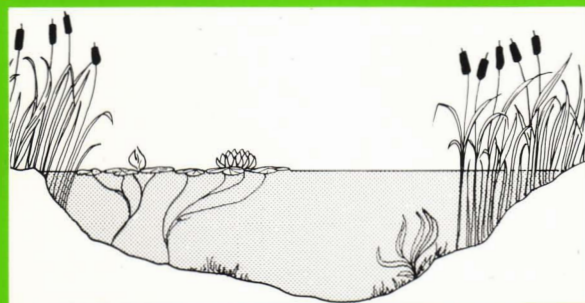
Time. Plan on doing *What Lives Here?* before this activity. For *Habitats of the Pond*, plan on a forty to fifty minute session.

Site. Select a freshwater pond or lake with sides that are not too steep or slippery. Use a dip net to make sure the site contains a variety of aquatic animals and plants. Choose a level area in the site for gathering the kids to record and share observations.

Materials

1. See the "Aquatic Observation Aids" Equipment Card and the "Plankton Net" Equipment Card for instructions on making and using the equipment. Constructing the equipment can be a group activity. Practice using the equipment so you can demonstrate its use.

2. Kitchen strainers may be used to rinse off muddy samples from the bottom habitats. Contents of the dip net may be transferred to the strainer for this purpose.



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3. On the data board, draw a cross-sectional map like the one illustrated. Use blue for the surface and brown for the bottom.

Safety. When working around the water, use the buddy system. (See the "Safety" section of the *Leader's Survival Kit* folio.)

Conservation. Establish some rules of procedure to promote respect for the activity-site environment. Refer to the "Conservation—Take 'Em Back Alive" section of the *Leader's Survival Kit* folio.

ACTION

1. Tell the kids that they will find out *where* organisms live in the pond. Discuss the proper handling of organisms in the environment.

2. Display the cross-sectional map on the data board and point out the areas that represent the:

- water's edge
- surface layer (blue)
- open water
- bottom (brown)
- air over the water.

3. Point out boundaries for the activity site. Explain the importance of the buddy system, and divide the group into buddy teams.

4. Review and demonstrate the use of each piece of equipment. (See the equipment cards.)

- The plankton net is used for sampling the surface layer and open water.
- The long-handled dip net is used for sampling open water and the bottom habitats.
- The aquarium net is used for sampling the edge habitat.

- The strainers are used for sampling and straining the bottom material. Emphasize techniques for sampling the edge and bottom by demonstrating the dipping and transferring techniques described on the equipment card.

5. Challenge half the teams to search the edge area for as many different plants and animals as they can find, and challenge the other half to search the surface layer for organisms. Tell each team to collect *only one* of each *different kind* of organism found in that particular area of the pond. For plants, only a small leaf sample is needed. Tell the kids that in ten minutes you will call them back to the map to share and record their finds. Then the teams will search two other areas of the pond—the open water and the bottom.

6. Distribute the observation tools and the appropriate sampling tools to each team:

- Give edge teams the aquarium nets.
- Give surface-layer teams plankton nets and dip nets.

Remind the youngsters to focus on the edge or surface area of the pond and to stay with their buddies all the time. Let the search begin.

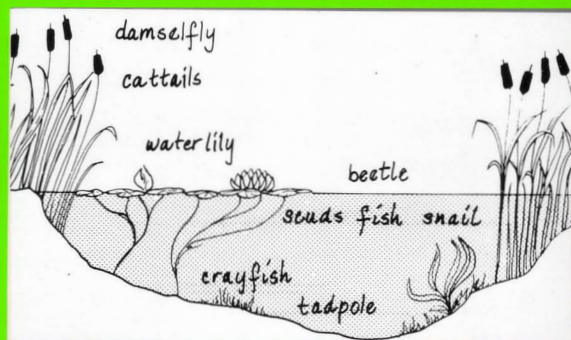
7. As the teams search, encourage them to use the *OBIS Pond Guide* to identify organisms. Circulate among the teams offering assistance and encouragement where needed.





8. After ten minutes, gather the group around the map and have the teams share their discoveries. You or one of the youngsters should record on the appropriate section of the map the names of the organisms found. If the kids don't know the name of a certain organism, and cannot locate it in the *OBIS Pond Guide*, have the group decide on a descriptive name or substitute a drawing for the name.

9. Challenge the teams who searched in the edge habitat to now search the open-water habitat with the plankton nets and dip nets, and challenge the surface-area teams to search the bottom habitat with dip nets and strainers. Remind the kids that they will find more organisms in the open water if they sweep their nets through the water and across vegetation instead of just trying to net organisms that they can see. The bottom group should sweep along the bottom, scrape over rocks and, towards the end of the sampling period, try to scoop up some sediment. Mud may be strained out by repeatedly dipping the nets or strainers in and out of the water. The youngsters can then carefully examine the contents by transferring them to an observation tray filled with water.



10. Allow ten to fifteen minutes for the search. Then call the teams back to the map to share what they found and where they found it. Record on the map as before, using a green pen for open-water organisms and a brown pen for bottom organisms.

11. After it becomes apparent that different organisms tend to live in different areas of the pond, tell the kids that each area represents a particular **habitat**. Explain that a habitat for any organism (plant or animal) is the place where an organism lives and where you would ordinarily go to find it.

PONDERING OUTCOMES



1. Are there any plants or animals found in only one habitat?
2. Which plants and animals live in more than one habitat? Why do you think they are able to survive in more than one habitat?
3. Were there organisms you saw in the water, on the ground, or in the air that you were not able to collect? Add these to your map.
4. Which organisms seemed to be most abundant in each of the different habitats?

Note: Have the teams return their organisms to the water where they found them. Rinse out all nets and containers.

BRANCHING OUT



1. Collect water and bottom-mud samples and examine them with microscopes or bioscopes.
2. Ask the teams to chart the number of different kinds of organisms in each of the five habitats to see which habitat supports the most diverse life.
3. Have each youngster or team investigate a different habitat, using the appropriate piece of equipment, to find a plant and an animal not represented on the map.

PLANKTON NET

Habitats of the Pond

Equipment Card



A **plankton net** is a device for concentrating minute aquatic organisms for close observation. These organisms are easily overlooked in water samples and pass through standard dip nets. The plankton net is funnel-shaped and acts as a fine cloth filter that retains small organisms. The small organisms collected in the funnel are washed down into the clear plastic vial at the bottom of the funnel.

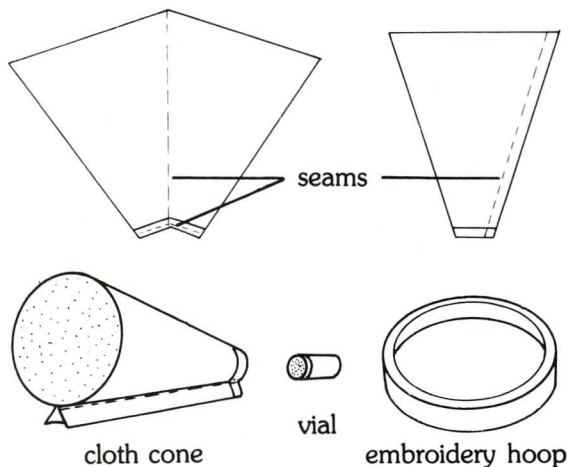
MATERIALS FOR ONE NET:

- 1 metal or plastic embroidery hoop (about 15 cm in diameter)
- 1 piece of old bedsheet
- 1 7-dram vial* (old pill vials are fine)
- 2 pieces of #22 wire*, each 10 cm longer than the diameter of the hoop
- 6 meters of nylon fish line*
- 1 rubber band

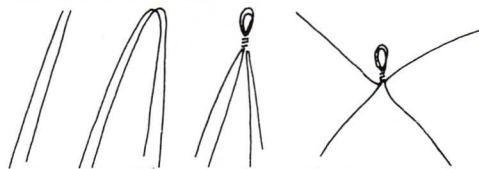
* Available from Delta Education.

TO MAKE THE PLANKTON NET:

1. Sew the cloth cone. The net is a cone of old bed sheet material as big around at the top as your embroidery hoop, and as narrow at the bottom as your vial. A couple of measurements and a trial or two should be sufficient to give a suitable pattern from which any number of nets can be made. Hem the edge at the vial end to keep the material from unraveling. Sew a seam up the side to make a cone.

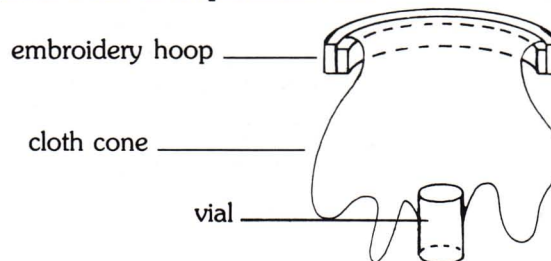


2. Prepare the wire yoke. Using a pair of pliers, if necessary, twist the two wires together as shown. Be sure to leave an eye at the center to attach your tow line.

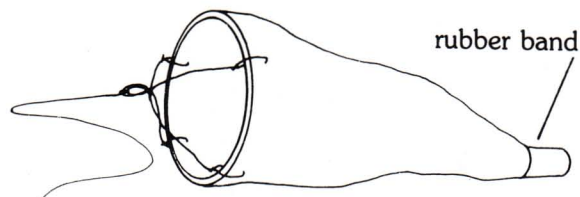


3. Assemble your net. Fix the net in the embroidery hoop. Any way that will work is good, but this way is the best:

Cross-section of plankton net



Attach the wire yoke to the hoop-net combination by pushing the wire through the cloth and twisting each wire around the hoop.



Drop the vial in from the open end and secure it with a rubber band. Attach a tow line to the eye of the yoke, and your net is ready.

4. To use a plankton net, toss it underhand into the water and pull it in hand-over-hand. Throw the net out and tow it in five or more times to concentrate the organisms before examining the plastic holding vial.

- To sample surface organisms, pull the net in while it is still on the surface of the water.
- To sample open-water organisms, let the net sink below the surface before pulling it in.

AQUATIC OBSERVATION AIDS:

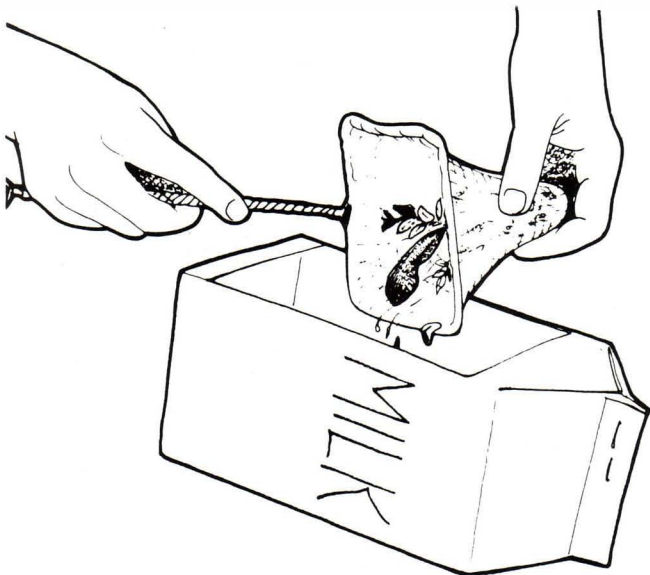
For Aquatic Activities

Equipment Card Side 2

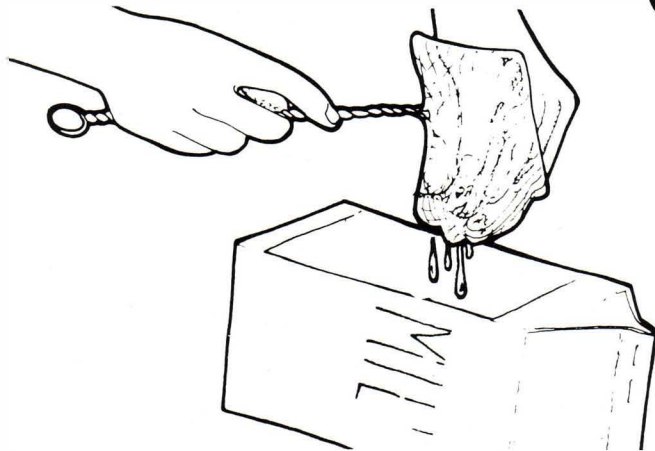


Transferring critters to observation trays.

When using a net to transfer critters, first swish the net through the water without releasing the organisms. (You can use the pond or stream you are investigating.) The rinsing removes any sediment you may have netted. Fill your observation tray about one-half full of water (preferably water from the organism site). Hold the net hoop over the tray,



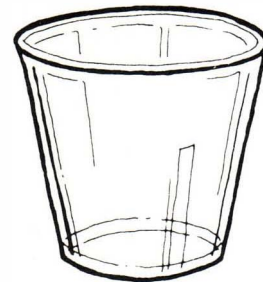
turn the net inside out, and dip the net bag into the water in the tray.



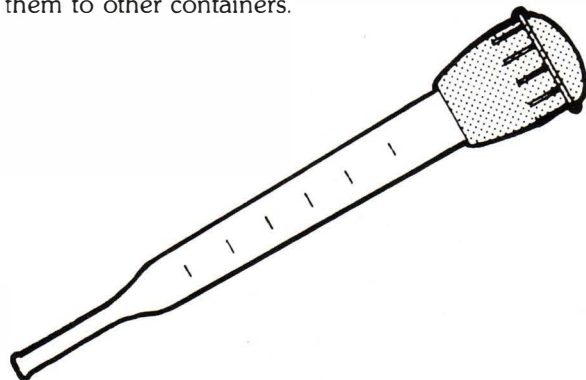
This will release netted organisms into the tray.

Spoons and Clear Plastic Cups

Spoons and cups are useful for transporting tiny organisms and observing them at a close range.



Simply dip up tiny organisms with a spoon or cup and place the organisms in a container partially filled with clear water. Turkey basters are also useful for sucking up tiny organisms and transferring them to other containers.



AQUATIC OBSERVATION AIDS: For Aquatic Activities

Equipment Card Side 1



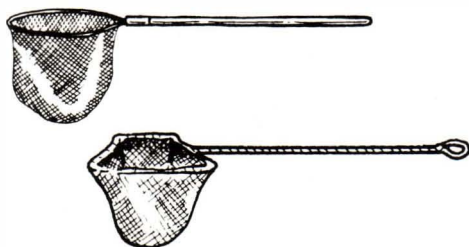
Bug Boxes

A bug box is a small, clear plastic box with a magnifying lens for a lid. To use the bug box, place an object or organism in the box and replace the lid to magnify the contents. When exposed to direct sunlight a closed bug box heats up rapidly, so release organisms promptly after observing them. The lid can also be used separately as a magnifying lens.



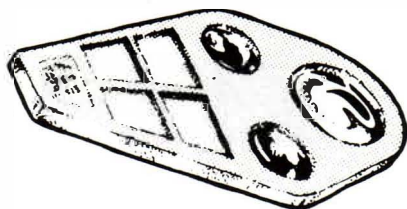
Dip Nets

Nets can either be made or bought. Aquarium nets work fine. You may want to extend the reach of an aquarium net by attaching a dowel, a stick, or a similar extension to the handle. A gradual, gentle scoop of the net is usually more successful and less damaging to organisms than a sudden, violent scooping motion. To prevent eye accidents, ask that the nets never be raised above shoulder level.



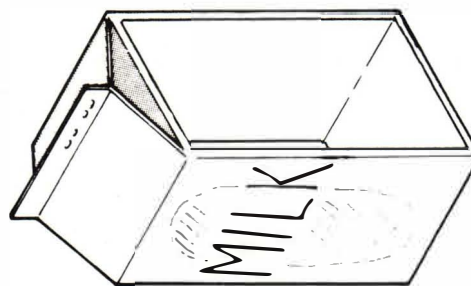
Magnifying Lenses

To use a magnifying lens, hold the lens close to one eye and move either your head or the object back and forth until you can see the object clearly.



Observation Tray

Any container that will hold water can serve as an observation tray. Containers with light-colored bottoms are best for easy viewing of organisms that have been added. Half-gallon milk cartons can be made into deluxe observation trays. To make one, staple the pouring spout closed and cut out the carton wall on the same side as the stapled pouring spout.



To make a hinged-top observation tray, just cut along three sides (two short and one long) of the carton wall on the same side as the stapled spout.

