



# Aquatic Insects Study

## ◆ Description of Activity

Students will use nets, buckets, and handlenses to investigate life along the bank of the river.

## ◆ Objectives

- 1) Students will be able to describe at least three different forms of aquatic life.
- 2) Students will learn how the life they find in the river fits into various food chains and webs.

## ◆ Materials

- nets and buckets
- aquatic insects study field trip kit including: aquariums, droppers, plastic dishes, field guides
- towels
- two-way scopes
- handlenses

## ◆ Background

Energy flows through an ecosystem along a complex pathway, being partly used and dissipated as it passes from one living thing to the next. Green plants are called *primary producers* because they are *autotrophs* (*—trophs is pronounced with a long "o"*), capable of manufacturing organic nutrients from inorganic substances. Algae, other green plants, and some autotrophic bacteria, fill the primary niche of *producers*.

Animals or plants that eat other plants or animals are called *consumers*. Consumers are *heterotrophs*, getting their energy for *secondary production* from living or dead organic matter that has been produced primarily by green plants.

There are *herbivores* that eat plants and

Grade: all; 3 and up recommended

Subjects: food chains, food webs,  
diversity of life

Time: 45 minutes, 30 min minimum

Group size: 1 - 10 is ideal  
15 maximum

*carnivores* that eat flesh of animals (the Spanish word for meat is "carne"). *Omnivores* are those that eat several kinds of food, possibly including both plants and animals, and they may eat dead organic remains, or *detritus*, as well. Crayfish are omnivorous, eating small fish, insects, and detritus. Scavengers are the omnivores--such as insects, scuds and mollusks--that act as garbage collectors, consuming dead plants and animals in the bottom sediments. Fungi and plants that consume dead plants and animals are called *saprophytes*.

Herbivores are eaten by *first-order* carnivores, those that eat the plant eaters, and the *second-order* feeders, which eat other carnivores.

A *food chain* can be constructed that shows the various organisms that energy passes through. The second-order and third-order carnivores, such as the trout and the kingfisher, have progressively less energy available to them, so fewer of these can be supported by the available energy in an ecosystem. A *food pyramid* can be used to represent this energy loss.

However, the food chain and pyramid are oversimplified. Trout eat more than just mayflies, and osprey eat many kinds of fish. A *food web* shows the myriad of possibilities for energy flow through an ecosystem.

Ecosystems with many consumers in the food web tend to be more stable in the face of environmental disruption. For instance, if one type of herbivore, such as the mayfly, was wiped out by pollution, a stream with large numbers of other herbivores would be less affected than one where mayflies were the most abundant plant eaters.

### ◆ Procedure

1. Define and discuss with the students the meaning of a food chain. Ask the students for examples of food chains. For older students, define and discuss food webs.
2. Explain that what we will collect from the river is at or near the bottom of the food chain.
3. **IMPORTANT!** Before collecting from the water, discuss with the students that we are only collecting to learn about the wildlife and we will put them back in the same place as they were collected. This returns the critters to familiar surroundings, ensures more uniform distribution for acquiring food and takes into account that some critters may be territorial. We need to respect the wildlife and take care of the critters and plants while we have them in captivity. Keep the buckets, aquariums, petri dishes, etc. out of the sun. Temperatures can reach fatal levels fast. Don't let the critters dry out. Most need water to breathe. Make sure they have an adequate water supply at all times. Handle the critters as little as possible, especially with your hands. Our hands are not only hot to the critters but we have oil and bacteria on them. This can be harmful to critters including those that breathe through their skin such as frogs.

Collecting should be done by the leader for the younger children, i.e. first and second graders. Nevertheless, it should be explained

that the wildlife will be returned to the same place as they were found.

4. It's time to collect! Distribute the nets and the buckets so that the children are paired up ("a bucket person with a net person"). Consider having the children take turns using the equipment. Most of the critters you are looking for are in the plants and marshy areas along the shore because they are seeking shelter (an element of habitat) from currents, big hungry critters, students with big nets, etc. You might open the brief discussion regarding this by asking the students, "If something much bigger than you was chasing you to eat you, what would you do?" That will help the children know where to look and why they should look there.

First, instruct the students with buckets to fill them approximately half full with river water. Using the net, scrape along the plant life along the banks of the river. Be careful not to stir up the mud. Then invert the net over the bucket and tap it gently and few times on the edge of the bucket. Repeat the scraping and tapping into the bucket a few times. Don't worry if you don't see anything! When you look with the two-way scopes and handlenses, you will most likely find something.

5. When you get back to the tables, have the students gently pour the contents of the buckets into the aquariums, being careful not to leave a critter out of the water. As the contents of the aquariums are settling and making the water a little clearer, explain how to use the equipment.

For the youngest students, the small white dishes and handlenses are the best.

For third graders and above, use the the two-way scopes in conjunction with the

handlenses.

To use the two-way scopes:

a. Remove the cone-shaped top to expose the "stage", the area where the specimen will be put for viewing. The stage should not be removed from the blue base. This will allow water, etc. to get on the mirror and the scope will not function properly.

b. The specimen can now be placed on the stage by using a small cup or petri dish. The droppers are not to be used to relocate critters. They are only to be used to provide a water supply to the specimens. Do not scoop with the plastic cone that is attached to the top lens of the scope. This will get water on the lense and it will not work properly. Use the scoops and containers provided for scooping and viewing specimens.

c. Once the specimen is on the stage, replace the top lense piece and view the specimen from the top. Look through the side lense to view the bottom of the specimen.

6. You may ask the students to draw and describe what they observe.

Remember that the objective of this activity is to observe and be able to describe different forms of life. It is not to know the name of everything. If you or the students learn the names, great, but don't be afraid to just observe and appreciate all the forms of life that live in the river. Encouraging curiosity is the best part of this activity.

7. When you are done looking, put all the plants and animals back into the river as close as you can to the place where you collected them. Teach the students stewardship for all life, even the "gross" creatures.

8. Have the students clean and dry all of the scopes and equipment.

### ◆ Discussion Questions

What would life be like living in a river?

What are some adaptations or different strategies that aquatic plants and animals have regarding places to live, shape of their body, etc.?

Who eats whom? Describe some food chains.

How do these animals move around?

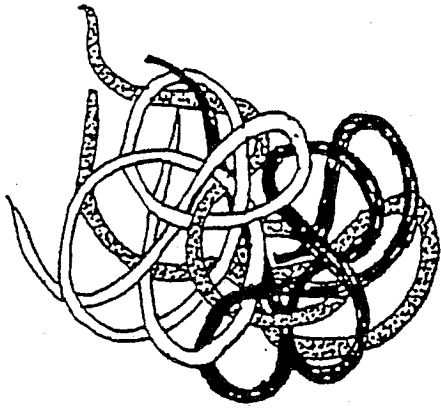
How do these animals protect themselves from predators?

What affects would an acid spill or some other form of pollution have on the ecosystem along the river?

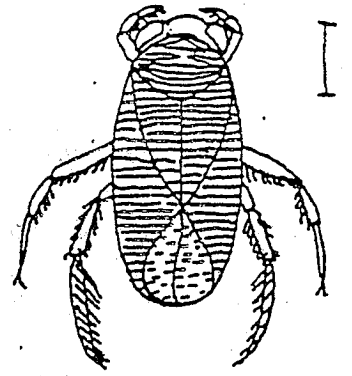
### ◆ Complementary Activities

Webbing, Sharing Nature with Children, Joseph Cornell, Dawn Publications

Horsehair worms



water boatman

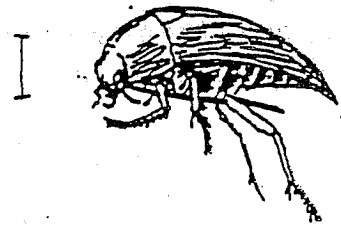
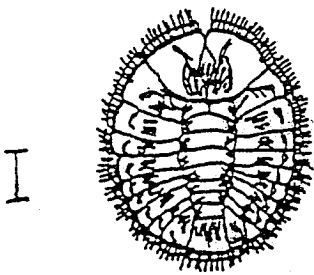


Scud

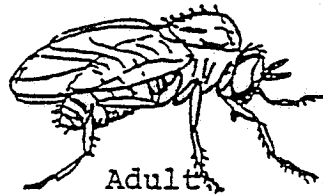


Water penny

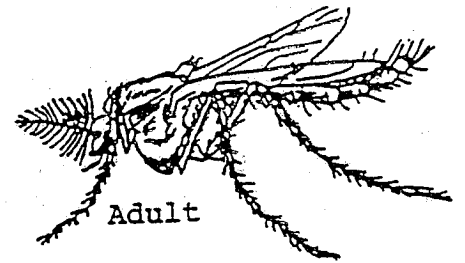
Water scavenger beetle



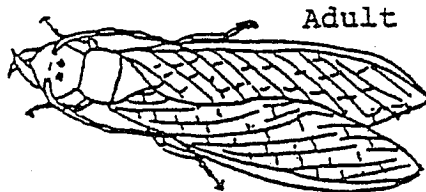
Black fly



Midge



Dobsonfly



Alderfly

