

## Looking for River Critters

**Age: Elementary School**

### Objective

To determine water quality by identifying the micro and macro-invertebrates that live in streams and riverbeds.

### Background Lesson

Healthy streams and rivers are interesting ecosystems that are full of life. Invertebrates such as insect larvae, worms, crustaceans and copepods not only provide food for larger animals such as fish, frogs and birds, but can also indicate the overall health of the river. Scientists often look at the number and types of micro and macro-invertebrates in these areas, as they are easy and inexpensive to study and changes can indicate pollution or poor water quality.

### The Activity

#### **Suggested Materials**

Identification guide, hip waders, wire brush, white trays, white buckets, tweezers, spoons, a kicknet with a flat side and fine mesh, magnifying glasses, jars, pencils, waterproof paper, clipboards, Petri dishes (optional), microscopes (optional), jars (optional)

#### **Preparation**

Find a safe area that is suitable for sampling. The areas most likely to have lots of organisms are usually riffles; areas of shallow, fast-moving water where it will be easy to dip the net, but do not be afraid to try areas with still or stagnant water. It is often best to go in the fall or spring on a day when the river level is low; check the weather and try to go after a few days without rainfall. If the area is located on private land, be sure to get permission first. If possible, prepare to take samples at different times and under different conditions. Try to organize students into groups that can rotate for various tasks such as recording information, sorting samples and picking out insects.

#### **Procedure**

1. Set up the buckets and lay out the trays with some river water inside. Encourage students to note the date, time, water temperature, air temperature and weather conditions before sampling, as well as anything else of interest (i.e. a sewer pipe nearby, large groups of frogs in shallow areas or birds catching fish). Take photographs if possible.

2. Get into the river with the kick net facing downstream, so that the current flows into the net and keeps it open. Make sure the flat side of the net opening lies on the river bottom.
3. Kick the rocks and gravel in front of the net to stir up the bottom and catch it into the net. Scrape the undersides of rocks with the wire brush into the net to dislodge any invertebrates that are clinging to them.
4. Empty the sample from the net into a bucket and mix it for a few seconds, then wait for a few minutes to let the pebbles and sand settle to the bottom and lighter organic matter to float to the top. Repeat as desired.
5. Have students pick out any organisms that they can see with the tweezers and spoons. Have them group similar looking organisms into the same trays.
6. Using their identification keys, ask students to try and identify organisms, as least down to major group or family depending on age. For example, students in Grade 3 and below should be able to identify if an organism is an insect or crustacean, while students above Grade 3 should be able to identify the general type of organism, such as crayfish, worms, dragonfly nymphs and mosquito larvae.
7. If enough equipment and time is available, older students can take water samples and store the organic matter from samples into jars for later inspection under the microscope. Squirt material from the samples into Petri dishes and look for micro-organisms and test the water for properties such as acidity.
8. After identification, record the number and types of organisms found before returning them to the water.
9. Repeated sampling over time at different locations in various conditions over time can be compared with other information such climate to assess water quality.

### Post Activity Discussion

Ask students to discuss what creatures were found and why.

Here are some possible sample questions:

- What sorts of features were found on different organisms that help them adapt to their habitat in a riverbed, under rocks with fast moving water?
- What did the organisms which were found tell us about the water quality?
- What might happen to the ecology of the area if the numbers and types of organisms were to change? How would predators such as fish and frogs be affected?

If you sampled different areas:

- Did you see any differences in sites that could explain differences in the organisms you found in each sample?

- Did you see any differences in the number and types of organisms from samples collected at different times and under different conditions? If so, what do you think causes them?

### Possible Assignments

- Students can research/report on related topics such as:
- How pollution can enter rivers and streams and how it can affect organisms that live there.
- The life history of a selected organism that was found; what it eats, how it moves, how it reproduces and avoids predators.
- Possible sources of pollution such as a nearby road or storm drain and the steps that their local community is taking to prevent and clean up pollution.

One Fish at a Time