Macroinvertebrate Observation

Chicago-Calumet River system Field Trip Activity

Summary

Students observe and study macroinvertebrates collected from the Chicago-Calumet River system.

Background

Macroinvertebrates are small (but still visible to the naked eye) invertebrate animals (animals without a backbone). Some macroinvertebrates are the younger life stage (called nymphs or larvae) of insects. Ones you are likely to see are dragonflies, damselflies, mayflies, caddisflies, black flies and midges. Others are crustaceans that live their entire life in the river, these include scuds, sowbugs and crayfish. Aquatic mollusks like snails, clams and mussels are also considered macroinvertebrates, as are aquatic worms such as leeches and planaria.

Depending on the cleanliness of the river and the type of habitat available, you will find different types of macroinvertebrates. Some macroinvertebrates, such as midges, aquatic worms, and sowbugs, are tolerant to pollution and are found in most rivers. Other macroinvertebrates, such as the nymphs of dragonflies, mayflies, damselflies and caddisflies, are somewhat tolerant to pollution and are quite common in the more natural sections of rivers. Still other macroinvertebrates, such as stoneflies, alderflies and dobsonflies, are very intolerant to pollution and are only found in very clean rivers. Due to the fact that different macroinvertebrates are more or less tolerant to pollution, they can be used to calculate a water quality index for a stream.

All macroinvertebrates are an important food source for animals up the food chain, such as fish, reptiles, amphibians and birds (some macroinvertebrates, such as dragonflies, eat other macroinvertebrates). Macroinvertebrates themselves eat a variety of items. Some are detrivores, eating dead plant and animal material. Examples are sowbugs, scuds and mayflies (though mayflies also eat plant material).

Grade Level: K – 4th

Duration: 20-30 minutes

Objectives:

1. Students develop observation skills.
2. Students become familiar with some of the small creatures (macroinvertebrates) that live at the bottom of rivers.

Materials:

- Copies of Macroinvertebrate Observation sheet (one or more per student) (Each sheet has room for students to observe one macroinvertebrate. If you wish students to observe multiple macroinvertebrates, photocopy multiple sheets per student.)
- Fish tank nets (4) and or large D-nets (2-4)
- Hip waders (2-4)
- Shallow, preferably white, trays (3-4)
- Tweezers (4)
- Magnifying lenses or boxes (4)

Standards:

12.A.1a, 12.A.2a, 12.A.1b, 12.B.1a, 12.B.2a

NGSS:

K-LS1-1, 1-LS3-1; 3-LS1-1, K-ESS3-1, 2-LS4-1, 3-LS4-3, 5-LS2-1

Others are predators, like damselflies and dragonflies. Snails are herbivores. Some are omnivores, like caddisflies, crayfish and midges. And leeches are famous for sucking the blood of live animals (usually fish and frogs).

https://stroudcenter.org/macros/key/ has information on identification
https://www.macroinvertebrates.org/ has a great dichotomous key

Detailed information on each of the macroinvertebrates can be found on our website at www.chicagoriver.org/education, click on curricula and then lessons and scroll to the bottom (Macroinvertebrae Fact Sheet PDF). The information is written for teachers and high school students.

Procedure

For information on planning and organizing a field trip and for safety tips, visit our web site at www.chicagoriver.org/education, then click on field trips.

As with all field trips, divide students into small groups, each with an adult chaperone. You can decide to have students collect their own macroinvertebrates from the river or have an adult collect the macroinvertebrates. Be sure to work with Friends staff to identify a safe site for collection. Students (especially young ones) can collect macroinvertebrates by standing at the river's edge and using fish tank nets to scrape the bottom of the river. Nets can then be inverted into trays filled with water to release the macroinvertebrates. Adults can lift out rocks and place them in trays filled with water. Students can then use their fingers or forceps to pick the macroinvertebrates off the rock. This can be a great way to find macroinvertebrates. Older students and adults can don hip waders and wade into the river with large D-nets and scrape the bottom and sides of the river to find macroinvertebrates. Nets can then be inverted into trays of water to release the macroinvertebrates. Nets and hip waders are available for loan from Friends. Friends is available to accompany students and teachers on their field trip to the river.

Once the students and/or adults have collected some macroinvertebrates, let students observe the macroinvertebrates in the trays. Notice how they look, how they move and how they interact. You can use magnifying lenses or boxes to let students take a closer look. Once students have had enough time for observation, draw their attention to their macroinvertebrate observation sheet and have them focus their attention on the macroinvertebrate that particularly interests them.

Always use caution when near the river, and remember to wash or sanitize hands after touching river water. For more safety tips visit our website at www.chicagoriver.org/education.

Use the extensions to continue using the macroinvertebrates they found to expand their science understanding of food chains, life cycles and adaptations.

Extensions

If you are studying animal life cycles, students can compare the life cycles of a couple of the macroinvertebrates they found with other insects. For instance, the scuds and sowbugs the students may find do not go through metamorphosis, while the caddisflies, mayflies and damselflies go through incomplete metamorphosis. Unlike the complete metamorphosis of butterflies and moths in which animals move from egg to larvae to pupae to adult, in incomplete metamorphosis animals go from egg to nymph to adult.

You can also use your students' drawings to make food chains. Have students tape their macroinvertebrate observation sheets on the blackboard. Give the students new information by writing on each sheet something that macroinvertebrate eats (see background information). Older students could research this information when they are back in the classroom. Add a photo of algae, fish (some eat algae, some macroinvertabrates, some other fish, some frog tadpoles), a frog tadpole (eats macroinvertebrates and eaten by dragonfly nymphs, herons and fish), and a heron (eats fish) and have students create food chains on the board. This information could also be used to create a field guide tailored to your students' experience from what they observed.

Take a Closer Look at Those Macroinvertebrates

My name: _____

Draw a picture of one of the animals you see.
Then try to answer a few questions about your animal.

My macroinvertebrate's name is: _____

- **What color is it?**

  _____

- **Does it have legs?** **How many?**

  _____

- **How does it move (or how do you think it moves)?**

  _____

- **What do you think it was doing before you caught it?**

  _____

- **What questions do you have about your macroinvertebrate?**

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