Stream Macro-Invertebrates

Teachers' Guide

Suggested Grades: 6-12

Black Fly Larva

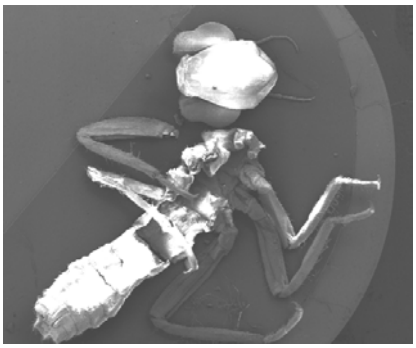
Objectives:

- Compare and/or contrast the diversity of ways in which living things meet their needs (S6-15).
- Trace the flow of energy and/or interrelationships of organisms in an ecosystem (S9-13).
- Describe how organisms accomplish basic life functions at various levels of organization and structures (S9-16).
- Relate structure and function in physical and biological systems (S12-5).

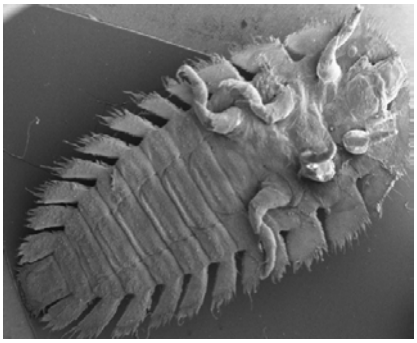
Strategies:

- You do not need to have the SEM to complete this activity. Micrographs of these specimens are on the TECH TREK CD under Stream Invertebrates.
- This activity may be more meaningful to your students if they have actually collected stream invertebrates. You might want to arrange a field trip to a slow-moving river near you and try kick seining with thin mesh nets.
- Research-based information is available to help you identify and count stream invertebrates. You can use your data to estimate the health of a stream. Your students might enjoy submitting their data to one of the organizations that depend on the public to report on the health of streams.
- If you collect your own specimens, follow the procedures for drying arthropods. It may be advantageous to mount the specimens before they are completely dry, because they may become brittle.
- If your specimens are different than the four listed in the Student Activity, you should develop your own student worksheet specific to your specimens and objectives.

Mayfly Nymph

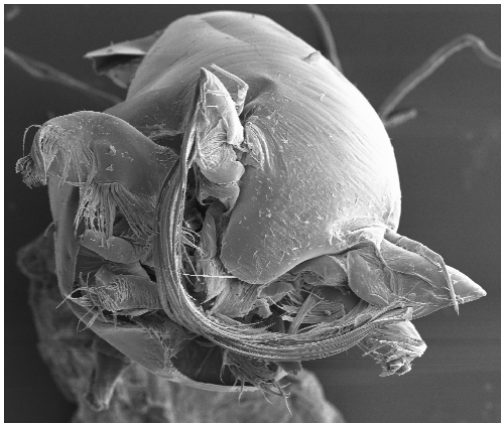


Damselfly Nymph



Water Penny

Stream Macro-Invertebrates
Student Guide



Black Fly Larva

Introduction: During this activity, you will use microscopes and reference guides to examine macro-invertebrates collected in streams, such as the Stillwater River. Each organism has different adaptations for feeding and surviving in flowing water. You should consider the roles of these organisms in their ecosystems, the diversity of ways in which living things meet their needs, and the relationship between structures and function in order to understand how these organisms accomplish basic life functions.

Procedure:

1. Use the SEM or SEM micrographs to examine stream macro-invertebrates.

2. Select Site #1. This is the larva of a Black Fly. The Black Fly larva has two arm-like extensions at its anterior end. Get one of these in focus under high magnification and get a print of what you see. What are the fine, feather-like projections? How do they enable the Black Fly to feed? What term best describes the feeding mechanism of the Black Fly? What is its role in the food chain?

3. Select Site #3. This is a Mayfly nymph. Concentrate on the lower jaw of this organism. Focus it under higher magnification and make a print. Remember that this creature lives under rocks in the stream. How would you describe the shape/design of the lower jaw? With this in mind, how would it feed? What kind of organisms would it probably eat? (algae, plankton, dirt, etc.) What is its role in the food chain?

4. Select Site #6. Find the water penny that is lying on its back. This is a ventral (bottom) view. Focus on the jaws. Since this is a beetle, it has chewing-type mouthparts. Get the lower jaw under high magnification and make a print. With this in mind, how does the water penny feed while crawling along, underneath a rock in the stream? What is its role in the food chain? Look at a claw and at the edges of the shell. How is it uniquely adapted to cling to the rocks in the stream? (How does it keep from being washed away by the current?)

5. Select Site #7. This is a Damselfly nymph. Note the huge lower jaw of this organism. Focus in on the edge of the lower jaw and increase the magnification. Describe the structures you see along the edge of the lower jaw. What do you think is the function of these structures? Are they segmented? (If so, how many segments can you see?) Observe the eyes. What is this organism's niche in the food chain? How does its huge lower jaw make it well suited to this type of feeding behavior?

6. **Bonus**: Determine the insect order of each of these specimens. Make a chart listing the Latin name next to the English equivalent. Include the name of the specimen. (For example, orthoptera="straight wing"=grasshopper)

Summary question: Write a paragraph explaining why different insects have different feeding adaptations.