



Wyoming Game & Fish Department

Build A Bug

Materials:

- Water noodles w/ pipe cleaner “hairs” along them & “hooks” on the end = legs
- Garland or rope = tails
- Sunglasses w/ googly eyes glued on = compound eyes
- Wig or furry hat = hairs on head or body
- Antennae
- Feather Boa = gills
- Beach ball or balloon = air bubble
- Straw = breathing tube
- Vampire Teeth = specialized mouth parts
- Bug net = specialized food-catching device

Activity:

Introduction

- Start by asking if students have heard of a macroinvertebrate before. Break down the name into “macro,” meaning we can see it with our naked eyes (without a microscope), and “invertebrate,” meaning it doesn’t have an internal backbone- instead it has an exoskeleton.
- Aquatic macroinvertebrates include many types of insects as well as worms, mollusks, and crustaceans that all live in aquatic habitats.
- These macroinvertebrates can be found in pretty much any aquatic habitat, and the diversity of them can indicate ecosystem health.

- Most aquatic macroinvertebrates make their homes in rocks, leaves, and streambed sediment. These creatures have lots of adaptations to help them live in a challenging environment.
 - Macroinvertebrates that live in riffles and fast moving water may have features that help them to hang on to rocks such as hooked feet or suction cups, as well as flat, streamlined bodies.
 - Macroinvertebrates that live in mud may have different adaptations for the low oxygen levels, including air tubes or air sacs.
- Ask if students can define an “adaptation.” Adaptations can be either physical or behavioral. Adaptations are ways an animal looks (physical) or acts (behavioral) that help it to more successfully survive in its habitat.
- Ask students “what adaptations do you think aquatic macroinvertebrates might have to help them survive in an aquatic ecosystem?”
- Show them examples of invertebrates with physical adaptations (at end of this lesson plan)

Building the Bug

- Select one student volunteer to become the “bug” aka aquatic macroinvertebrate, and explain that you’ll be transforming them into a macroinvertebrate with tons of great adaptations to live in the water.
- Introduce/review these following adaptations as you dress up the student.
- Discuss the adaptations as you go along. Why would a macroinvertebrate need them? How do they help the macroinvertebrate survive?
- Don’t forget to conclude with a photo! You can also review the adaptations once more as you remove them from the volunteer.

Adaptation	Use	Item to dress up with
Legs with claws, hooked feet, suction cups, or hairs on legs	Holding on to rocks and hard substrate, scraping algae off rocks, attacking prey	Water noodle with pipe-cleaner hooks on the end
Tails	Swimming and maneuvering	Garland or rope
Compound Eyes	Helps to detect motion	Sunglasses with googly eyes attached
Hairs on head and body	Help detect movement or chemical changes in the water	Wig or furry hat
Antennae	Sensing food, water, & surroundings	Homemade or store-bought antennae on a headband
Gills	Breathing dissolved oxygen from the water	Feather boa
Air bubble	Breathing oxygen from the surface air	Beach ball or balloon
Breathing tube	Breathing oxygen from the surface air	straws
Specialized mouth parts	Scaping, piercing, shredding etc. (the mouth parts reflect the food eaten by the insect)	Vampire teeth
Device for catching food (either part of their body or made by the invertebrate)	Catching food in the current	Butterfly net

Modified from a lesson by the Utah State University Water Quality Extension



Wyoming Game & Fish Department
 5400 Bishop Blvd.
 Cheyenne, WY, 82006
 (307) 777-4600

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The **Blackfly larva** has a net on its head for collecting food.



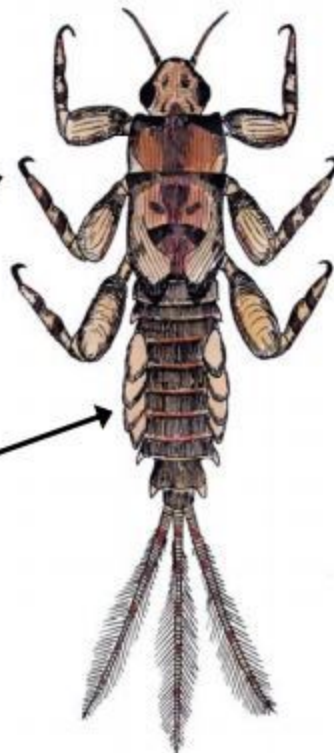
The **Crane fly larva** has tiny hairs and suction cups along its body so it can hold on to rocks and hard substrates in fast flowing water.



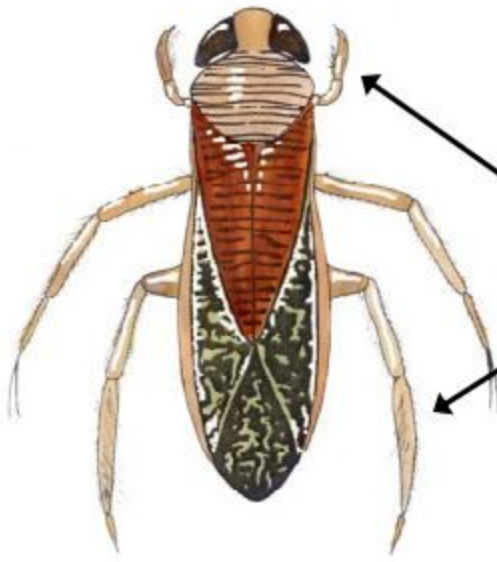
The **Stonefly** nymph has claws for capturing prey and holding on tight to rocky substrates.

The **Stonefly** nymph has gills in its “armpits” for breathing dissolved oxygen in fast flowing streams.

The **Mayfly** nymph has hooks for holding on tight to rocky substrates.



The **Mayfly** nymph has gills on its abdomen for breathing dissolved oxygen in fast flowing streams.



The **Water boatman** has paddle-like legs for swimming in slow moving water.

The **Dragonfly nymph** has claws on its legs for capturing prey and for climbing emergent vegetation.

