

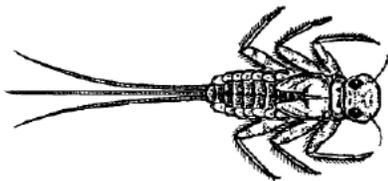
Project WET: Macroinvertebrate Mayhem



Caddisfly Larva

Caddisflies build heavy cases of pebbles, sticks or leaves to protect themselves. They absorb oxygen through their exoskeleton and are filter feeders- they eat mainly algae or small plant particles.

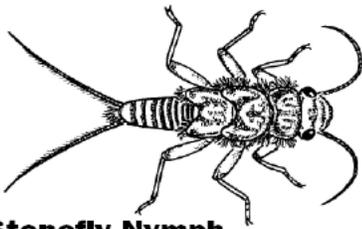
Intolerant to pollution: * You must hop with both feet across the field! *



Mayfly Nymph

Mayflies require high to medium oxygen levels and have gills along the side of their abdomen to 'breathe.' The mayfly nymph eats algae and small plant particles or other material. Mayflies can have 2 or 3 tails.

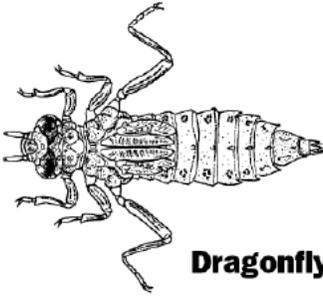
Intolerant to pollution: * You must flap your arms & spin in circles when crossing the field! *



Stonefly Nymph

Stonefly nymphs only tolerate water with high oxygen levels. They absorb oxygen through their body surface and small gills that 'look like hairy arm pits' and do 'push-ups' to increase oxygen flow over their bodies when stressed. Stonefly nymphs are designed to crawl over rocks in rapids to eat algae or small insects.

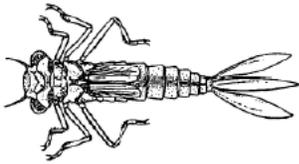
Intolerant to pollution: * You must do a push up every (10) steps!*



Dragonfly Nymph

A dragonfly nymph 'breathes' by pulling water into an abdominal chamber where gills remove dissolved oxygen from the water. The water in this chamber can also be expelled like an underwater jet to help the nymph catch its prey. The dragonfly nymph is an active predator with a special jaw for grasping prey, which includes macroinvertebrates to small fish!

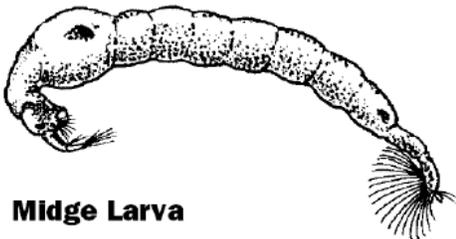
Facultative: Capable of existing under varying environmental conditions or by assuming various behaviors.



Damselfly Nymph

A damselfly nymph moves through water by moving its abdomen and "tails"(called lamellae) from side to side. The lamellae also include gills for gathering dissolved oxygen from the surrounding water allowing the damselfly to 'breathe.' The damselfly is an active predator that clings to vegetation or hides in clumps of dead leaves or sediment waiting to ambush prey.

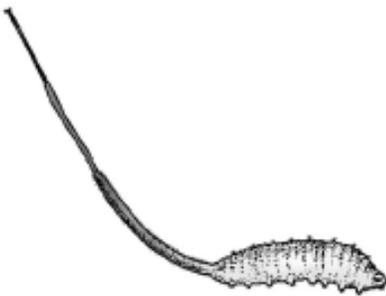
Facultative: Capable of existing under varying environmental conditions or by assuming various behaviors.



Midge Larva

Midge larva eat particles of plants and animals found on the bottom of lakes, streams and ponds. Midge larvae absorb oxygen through their body surface, but their blood is adapted to hold more oxygen in oxygen-poor environments.

Tolerant: Able to endure/withstand a broad range of conditions.



Rat-tailed Maggot

The drone or hover fly aquatic larval stage. These creatures are known to be tolerant of polluted water and their presence in large numbers over that of less tolerant creatures may indicate poor water quality.

Tolerant: Able to endure/withstand a broad range of conditions.

What do humans need to survive? Water, Food, Shelter, Oxygen, and Space

- o Animals and insects also need those things to survive. If they do not have them or if the items are too dirty/polluted, they cannot live.
- o Some animals/insects need very clean conditions to survive. However, some are more tolerant to “dirtier” conditions. They may not need as much oxygen or they may be able to tolerate food sources that are more tainted (polluted/contaminated).
- o Today, we are going to talk about **Macroinvertebrates** (often called Macros).
 - o Macro means big (enough to see without a microscope or magnifying glass)
 - o Invertebrate means an animal without a backbone
 - o These macroinvertebrates live under the water. They need clean water to survive. From the water, they get their oxygen, food/water, shelter and space.
- o Macroinvertebrates can tell us how clean the water is. If there are no macros in the water, we can assume that the water must not be suitable for them to live in. On the other hand, if there are a lot of macros of many different kinds, we can say that the water is healthy and likely relatively clean.
- o Let’s learn about the types of macros in the water and how to tell them apart and how to tell from our collection if the water is clean or not.
- o Hand out Macroinvertebrates (one to each student, make sure that students that are in a group have different samples). Have them look at their insect and compare it with other students in their group. Think of a couple things that make their bug unique from the other ones in their group. Have each student briefly tell the class what makes their macro different.
- o Another important factor is diversity. Diversity means how many different kinds of macros there are in the water. If there are 20 of the same type, the water might not be clean/healthy. If there are 20 different/unique macros, the water is likely very healthy.