

Water Quality

Macroinvertebrates, Where Do They Live?

How might you determine the water quality using living things?

Background

Water quality is critical for life in water ecosystems. In addition, humans use water for many different activities that require clean sources. How can we tell if water quality is excellent in an ecosystem or clean for human use? Scientists can test the chemical contents of water by using test kits. These kits can be specific for many chemicals: chlorine, benzene, etc. or test for nutrients (i.e. nitrates and phosphates) in water that could increase the growth of algae in the water that may negatively impact other living things. However, the levels of these nutrients can change depending on the temperature, weather conditions (rain or drought) and life in the water source.

Macroinvertebrates are primarily insect larvae that live a portion of their life spans in water. They are large enough to see (macro), and have no backbone (invertebrate). Living things in the water are a much better indication of what water quality exists in a water source. If there are fluctuations daily, the nutrient tests will only show the levels at that moment in time. Over the course of time, if a water source is clean and healthy, certain macroinvertebrates will be found there. If the water is not, different macroinvertebrates will be found there.

The purpose of this activity is to determine what type of water quality would be indicated by macroinvertebrates living in the water.

Materials

3 plastic shoebox containers
rocks/gravel/sand
plastic aquarium plants
paper plates/cups
macroinvertebrate models (helgrammites, worms, mayflies, stoneflies, crayfish, dragonfly larva, caddis fly larva)

Preparation

1. Create a stream by adding rocks and sand in the bottom of a clear container.
2. Create a different stream by adding sand only to the bottom of a clear container. Anchor a few plants in the bottom of the container.
3. Create a third stream by adding soil to the bottom of a clear container.
4. Add clean water to the rock and sand filled container.
5. Add clean water to the sand filled container.
6. Add clean water to the container with soil to create a muddy water environment.

Procedure

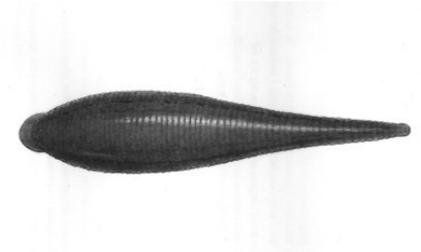
7. Provide them with information cards about the macroinvertebrates (or share the information on the cards with participants). Include how they “breathe,” what they eat, how they live (attached to rocks or free-floating), etc.
8. Ask participants to place the organisms they think would live in each water environment in front of the containers.
9. Ask them why they placed each critter where they did.

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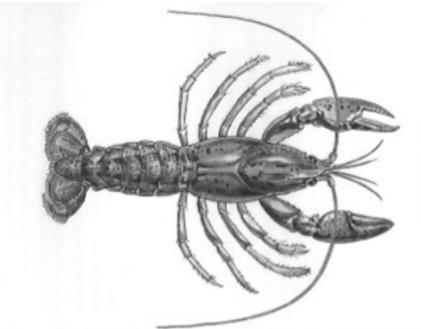
Water Quality

Macroinvertebrates

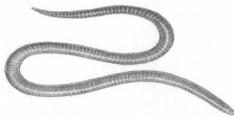
Leech – commonly found in standing or slow-moving water; exchange oxygen through skin; clingers/use suckers to hold onto rocks; predators of small invertebrates



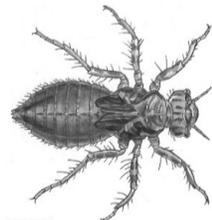
Crayfish – commonly found in running and standing water; hide in spaces among rocks, woody debris, plants; exchange oxygen through gills; eat decaying aquatic plants and decomposing small invertebrates



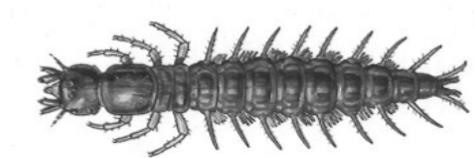
Aquatic worms – commonly found in standing or slow moving water; burrow into silt and mud; exchange oxygen through skin



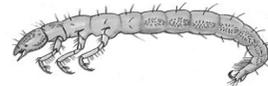
Dragonfly larvae – commonly found in standing or slowly moving water; climbers or crawlers on live plants; exchange oxygen through gills; live on plants and detritus



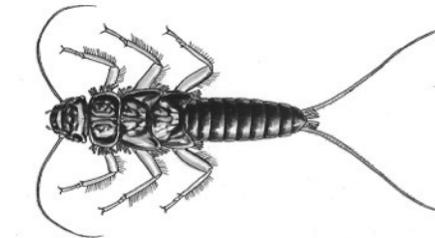
Dobsonfly larvae (hellgrammites) – swift water with rocky bottoms; exchange oxygen through filaments located on the sides of the body; crawl; eat aquatic insects or small fish



Caddisfly larvae – commonly found in fast moving water encased in small pebbles or silk attached to a rock in the stream; predators on small insects and larvae



Stonefly larvae – commonly found in running water; hide in areas with current among rocks or decaying leaves; eat algae or decaying leaves



Mayfly larvae – commonly found in lakes and fast moving streams; exchange oxygen through gills; eat algae and detritus by using scrapers

