Lesson 6

Biological Properties

Introduction

Physical and chemical properties reveal insights into the health of our watersheds. Biological properties are equally important and complete the picture when assessing the health of the creek. What lives in the water - the biological properties - will be different depending on different ecosystems and the impacts on them. Primarily, we look at macroinvertebrates, organisms that lack a spine/backbone and are large enough to be seen with the naked eye. Different species of macroinvertebrates have different levels of tolerance for things like temperature, acidity (pH) and water clarity (turbidity), so their presence or absence is a good indication of water quality.

In this lesson, we will learn about collection and identification of macroinvertebrates, also known as aquatic invertebrates, and how their presence or absence tells us how clean the water is.

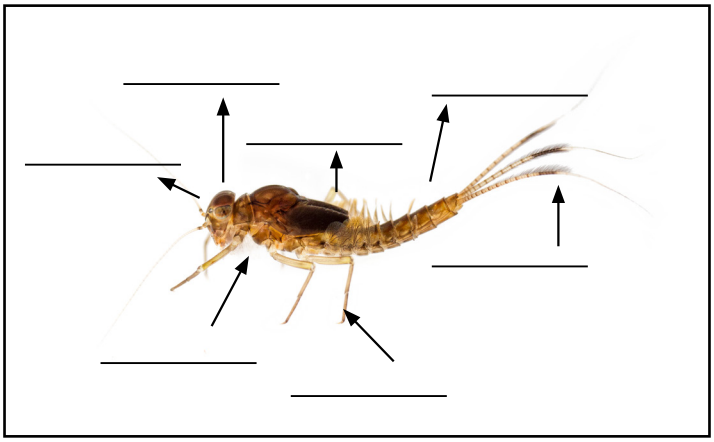
Time: 30 minutes

Materials:

Macroinvertebrate identification key

Notebook and/or worksheet below

Pencil



Instructions

Print the questions below or copy into your notebook, and record your answers.

Label the parts of the insect above (head, thorax, abdomen, legs, wings, tails, gills)

How do you know this is an insect? _____

_____

_____

_____

_____

_____

Biological Properties continued

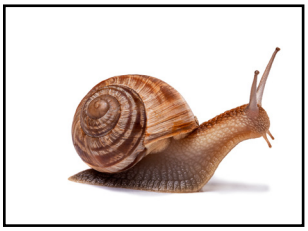
Use the identification key to identify each of the following macroinvertebrates.

1. _____

2. _____

3. _____

4. _____



5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

Answer key: 1. Mayfly (larva); 2. Giant Water Bug; 3. Stonefly (larva); 4. Caddisfly (larva); 5. Snail; 6. Dragonfly (larva); 7. Leech; 8. Mosquito (larva); 9. Water Mite; 10. Scud.

Biological Properties continued

3. Imagine you are assessing the health of Bluebird Creek and its tributary Wolf Creek. After completing your collection of macroinvertebrates, you discover the following biological properties. Using the Biological Test chart below, determine which water body is cleaner.

Bluebird Creek:

5 Shrimp
3 Leeches
5 Midge fly (larva)
3 Dragonfly (larva)
2 Snails

Wolf Creek:

10 Stonefly (larva)
20 Mayfly (larva)
9 Caddisfly (larva)
1 Water Beetle

Biological Test	**Column A: Bluebird Creek** ☐ Checkmark if group is found Record how many _____	**Column B: Wolf Creek** ☐ Checkmark if group is found Record how many _____
Type A * Sensitive to Pollution * Need good water quality	☐ Mayflies _____ ☐ Stoneflies _____ ☐ Dobsonflies _____ ☐ Caddisflies _____	☐ Mayflies _____ ☐ Stoneflies _____ ☐ Dobsonflies _____ ☐ Caddisflies _____
Type B * Less Sensitive to Pollution * Can exist in a wide range of water quality	☐ Dragonflies _____ ☐ Damselflies _____ ☐ Beetles _____ ☐ Crane Flies _____ ☐ Planarians _____ ☐ Sowbugs _____ ☐ Scuds _____	☐ Dragonflies _____ ☐ Damselflies _____ ☐ Beetles _____ ☐ Crane Flies _____ ☐ Planarians _____ ☐ Sowbugs _____ ☐ Scuds _____
Type C * Tolerant to Pollution * Can exist in poor water quality	☐ Midges _____ ☐ Black Flies _____ ☐ Leeches _____	☐ Midges _____ ☐ Black Flies _____ ☐ Leeches _____
Type D * Tolerant to Pollution * Can exist is poor water quality	☐ Worms _____ ☐ Snails _____	☐ Worms _____ ☐ Snails _____

Biological Properties continued

Summary

Now that you know how to identify and interpret the presence of macroinvertebrates in a waterway, you can combine that information with the physical and chemical properties to get a complete picture of the health of the river, stream or pond section you are analyzing. Next, head over to lesson 7 to learn some of the ways our Basin communities ensure citizens have access to safe, clean drinking water.

Extensions

With the images provided draw a macroinvertebrate or create a new species with unique characteristics and adaptations.

- https://www.macroinvertebrates.org
- https://www.youtube.com/watch?time_continue=84&v=9gp03sxR1Nw&feature=emb_logo
- https://environment.arlingtonva.us/streams/macroinvertebrates/

Resources

Macroinvertebrate Identification Key