

Reading the River, Summer 2006

Assessing Macroinvertebrates and the Habitat They Live In

8th Grade Science

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Context of Curriculum Product

This lesson was designed for 8th grade science students at Belfry Middle School. The unit that this lesson is part of will be described below.

First, I will cover ecosystems and habitats. Discussions on what ecosystems are, the relationships that are formed within an ecosystem, and the habitats that ecosystems can be found in. I will refer students to Chapter 13 from their Glencoe Science Blue Level book.

Next students will be taught how to identify/classification of the macroinvertebrates. I will use information that has previously been learned about classification. Students will be given a key of macroinvertebrates to look for. The key will be the one that was used during Reading the River 2006. Students will learn about different macroinvertebrates and in what habitats these organisms can be found. Students will be taken to the creek bank to see what macroinvertebrates they can find. I will show student how to complete the classification/identification process. Once students become familiar with the identification/classification process they will complete the process within their assigned groups. While learning about identifying these organisms, we will also use our knowledge on habitats and ecosystems to assess the habitat that these organisms can be found. Students will be referred to Glencoe Earth Science book Chapter 19 section 2; this section discusses relationships within an ecosystem in the ocean and discusses different habitats of organisms from the ocean. Students will complete activities from the lesson, Assessing Macroinvertebrates and the Habitat They Live In.

Lastly, students will be taught about the Clean Water Act of 1987 and how pollution (point and nonpoint) are causing harm to aquatic organisms and the quality of water. Discussion will be held on how water pollution in eastern Kentucky is very high and the quality of water is very poor. We will discuss what is causing this low quality of water and how we can help improve the quality of water for our future and for the aquatic organisms. Students will be referred to Glencoe Earth Science book Chapter 21 section 1; Water Pollution and to Glencoe Science Blue Level Chapter 14 section 2 Pollution. At the end of this lesson student will be prepared and asked to write a persuasive letter to the public on water pollution.

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Objectives:

Students will be able to

1. identify macroinvertebrates that can be found at local creek (located across the road from the school).
2. analyze how nonpoint and point pollution effect macroinvertebrates and their habitat
3. students will learn how to use the water monitoring kits to analyze water quality

Program of Studies

Scientific Inquiry:

- give questions to students that can be solved through scientific investigations
- use different lab equipment, techniques, and tools (the water monitoring kits, taking measurements, using calculators to compute density, flow rate, etc.)
- share results with classmates and discuss possible explanations for differences in results
- use data and evidence to see if behavioral responses are innate or learned

Core Content

SC- 08-3.4.3 Students will form or justify conclusions as to whether a response is innate or learned using data/evidence on behavioral responses to internal and external stimuli.

SC-08-3.4.4 Students will describe and explain patterns found within groups of organisms in order to make biological classifications of those organisms.

SC-08-3.5.1 Students will draw conclusions and make inferences about the consequences of change over time that can account for the similarities among diverse species.

SC-08-4.6.5 Students will

- describe that relationship between organisms and energy flow in ecosystems
- explain the effects of change to any component of the ecosystem

Materials

1. Handouts with an identification key of the macroinvertebrates. Similar to the ones we used during Reading the River 2006. Students will be grouped four to a group and can help one another with the identification.
2. Habitat assessment (similar to the one used at Reading the River 2006).
3. Water monitoring kits (DO probes/kits, temperature probes, pH kits, calculators, tape measure)
4. Information/Resources on different macroinvertebrates and their habitats.

Activity Procedure

1. Discuss with students the different types of macroinvertebrates that can be found in local streams/creeks and characteristics of their habitats.
2. Discuss with students how water current, water temperature, clarity of water, stream width and depth, canopy shade, how the surrounding land is used. Also discuss if human involvement has changed or interfered with the natural course of stream/creek.
3. Discuss what students will be completing in the classroom and when in the field. While in the classroom students will become familiar with the different macroinvertebrates and the habitats that support these organisms. I will take the students across the road from the school to the stream/creek; there they will become familiar with how to identify the macroinvertebrates and how to assess the habitat.
4. Students will use information/research gathered from the classroom to share information about different macroinvertebrates.
5. Once students have gained knowledge on the macroinvertebrates and learn how to complete all water monitoring testing they will go into the field. While in the field students will be asked to complete a handout. The handout will have students record all information taken while in the field.
6. Once all assignments are completed each group will present their findings to the class and discuss possible reasons for their findings.

Accompanying handouts/materials

1. I will give students a handout for them to record the data taken while out in the field. Information will include water temperature, air temperature, pH, DO (dissolved oxygen), time, date, conductivity, Bio index, habitat assessment.

Definition/Explanation of Concepts/Skills Taught in lesson

1. Water monitoring testing will be taught to all students. Students will learn how to use all the equipment and will be able to find water/air temperature, pH, DO, conductivity, bio index, habitat assessment.
2. Students will know how all organisms (biotic and abiotic) work together in one ecosystem to survive. Students will recognize that organisms have an interdependence relationship between one another. Students will also learn that if one organism is harmed, all of the organisms will suffer because of that one organism (individual or population) has been harmed.
3. Discussions on how pollution from humans has harmed water conditions and survival to organisms. In eastern Kentucky the quality of water is very poor (actually bad). Many homes have straight pipes that run straight into creeks/streams, it is important for students to realize what harm this is causing to the water quality and life of these macroinvertebrates that were are studying. If students realize the importance of clean water and improving the life of aquatic ecosystems, they will realize that it's the responsibility of humans to stop polluting the water and harming these aquatic ecosystems.

Assessment

1. During the stream/creek study, I will assess the students' handout that is to be completed during the water monitoring. I will be assessing this to make sure all students understand how to complete all the water monitoring testing.
2. Each group will be graded on the information that they will share with the class. Information shared will consist of macroinvertebrates found and results from the water monitoring testing.
3. Each student will receive a grade for completing research/ gaining information on macroinvertebrates before the students go into the field to complete water testing.
4. Students will be asked to write a persuasive letter to the public on how human pollution is harming our water supply and environment. Included in this letter students need to identify why the pollution is harming our water supply, what can be done to stop this pollution, and why stopping the pollution is important.

References

Glencoe Earth Science (2002). Columbus, OH: Glencoe/McGraw-Hill.

Glencoe Science, Level Blue (2002). Columbus, OH: Glencoe/McGraw-Hill.

Prentice Hall Biology (2002). Upper Saddle River, NJ: Pearson Education, Inc.

Reading the River, A Watershed Study of Nonpoint Source Pollution Notebook. Reading the River, Summer 2006. Provided by Morehead State University and Northern Kentucky University.