

Reading the River, Summer 2001  
Macroinvertebrate Study

8<sup>th</sup> Grade  
Science

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## **Macroinvertebrate Simulation Study**

**Grade Level:** 8th

**Macroinvertebrate Model:** Identification of Macroinvertebrates

### **Objectives:**

1. Students will be given simulated samples of water from three different river sources to test their pH.
2. Students will collect samples from three different simulated river sources. They will use an identification chart to determine types of macroinvertebrates.
3. Students will be able to determine the healthiest river sample with the results of data collection.

### **Program of Studies**

#### **Scientific Inquiry**

- Identify and refine questions that can be answered through scientific investigations combined with scientific information.
- Design and conduct different kinds of scientific investigations to answer different kinds of questions.

#### **Life Science**

- Develop an understanding about the structure and function of living systems, regulation and behavior, populations and ecosystems, and the diversity and adaptations of organisms.

#### **Conceptual Understanding**

- Investigate the structure of the Earth system (e.g., rock cycle, water cycle, weather, climate, and rivers).

#### **Applications and Connections**

- Use science to evaluate the risks and benefits to society for common activities.

### **Core Content**

SC-M-3.51 A population consists of all individuals of a species that occur together at a given place and time. All populations living together and the physical factors with which they interact compose an ecosystem.

SC-M-3.54 The number of organisms an ecosystem can support depends on the resources available and abiotic factors (e.g., quantity of light and water, range of temperatures, soil composition). Given adequate biotic and abiotic resources and no diseases or predators, populations (including humans) increase at rapid rates. Lack of resources and other factors, such as predation and climate; limit the growth of populations in specific niches in the ecosystem

### **Materials (Groups of Four)**

- Graphing Calculator and CBL unit with pH probe
- Three beakers containing three simulated river samples labeled A,B,C
- pH range that can support aquatic life chart.
- Three rectangular trays filled with sand labeled A,B,C
- Macroinvertebrate components for trays: multi-colored paper clips, beads, push pins, thumb tacks
- Dip net
- Three trays for emptying contents
- Macroinvertebrate identification chart/key

### **Activity Procedure**

1. Materials will be distributed to students.
2. Students will be instructed to program CBL units with pH probe.
3. Students will find the pH of each river sample to record in data table. (River samples should be made to have three different pH's)
4. Students will use dip net to remove a sample from each simulated river source. (River samples should be made to have different contents of macroinvertebrates)
5. Students will complete macroinvertebrate chart for identification to record health of the simulated river.
6. Data Analysis Report: Comparing pH aquatic life chart and the macroinvertebrate data, students will identify the healthiest river source.

### **Definition/Explanation of Concept or Skill**

Students need to know the different types of aquatic systems and how they are related. The best way to begin is to understand the aquatic world around them and to study a local aquatic site. Students need to learn more about the watersheds and aquatic sites within watersheds. This simulated pH and macroinvertebrate study is part of the basic testing that is performed to relay the health of our rivers, streams, etc. It gives the students the skills necessary to go out into a real field-testing site and perform tests accurately and determine if a sample is healthy.

### **Assessment**

1. Students will complete data chart.
2. Students will explain the correlation of the pH samples and the macroinvertebrate study data analysis.

### **References**

- Ecopath with ecosim <http://www.ecopath.org>
- Fifteen Things You Can Do to Make A Difference in Your Watershed <http://www.epa.gov/owow/watershed/earthday/earthday.html>
- Sea Grant: Education Digital Library <http://nsgd.gso.uri.edu/edu.html>
- Water on the Web: Understanding Lake Ecology <http://wow.nrri.umn.edu/wow/under/primer/index.html>
- Textbook Merrill Earth Science
- Internet Project: Jason Project

### **Lesson Context** Lessons that will be conducted in the unit.

- Current Speed: Using oranges, students will calculate the current speed at a specific aquatic site using the formula:  $Speed = distance / time$ .
- Dissolved Oxygen: Students will measure the amount of dissolved oxygen in the water and learn what that measurement indicates about that aquatic site. They will learn that some invertebrates need high levels of dissolved oxygen while others can handle a wide range of levels.
- Water Temperature: Students will take water temperature measurements and learn what these measurements indicate about the aquatic site. Water temperature affects the ability of oxygen to stay dissolved in water. Changing seasons can affect temperature dramatically.

- Water Clarity: Using a secchi disk, students will measure the aquatic site's water clarity and learn how clarity affects aquatic life. If low, particles can block the sun which organisms need to survive.
- Sediment Analysis: Students will examine the different types of sediments in the aquatic site and soils around the site.
- Weather Conditions: Students will collect weather information including wind speed, air temperature, and sky conditions because of the affect it can have on plant and animal life.