

The Wonders of Water Testing

An Interdisciplinary Unit by Jenny Hewitt

Pomfret Grades 3/4

<p>S3-4:35 (DOK 3) Students demonstrate their understanding of Food Webs in an Ecosystem by...</p> <ul style="list-style-type: none">Recognizing that, in a simple food chain, all animals' food begins with plants. ANDResearching and designing a habitat and explaining how it meets the needs of the organisms that live there.	<p>Science Concept:</p> <ul style="list-style-type: none">Food for animals can be traced back to plants.Organisms can survive best only in habitats in which their needs are met.
<p>S3-4:36 (DOK 2) Students demonstrate their understanding of Equilibrium in an Ecosystem by...</p> <ul style="list-style-type: none">Explaining how one organism depends upon another organism to survive.	<p>Science Concept:</p> <ul style="list-style-type: none">Organisms interact with one another in various ways besides providing food (e.g., Many plants depend on animals for carrying their pollen to other plants for fertilizing their flowers).
<p>S3-4:47 (DOK 3) Students demonstrate their understanding of Processes and Change over Time within Earth Systems by...</p> <ul style="list-style-type: none">Investigating how local landforms are affected by wind, water or ice, and using results from the investigation to draw conclusions about how water interacts with earth materials. ANDBuilding models that simulate deposits of sediments (e.g., a stream table). ANDComparing local landforms with models created in the classroom	<p>Science Concepts:</p> <ul style="list-style-type: none">Waves, wind, water and ice shape and reshape the earth's land surface by eroding rock and soil in some areas and depositing them in other areas.

Essential Questions –

- What conditions constitute a healthy brook?
- How can you determine if a body of water is healthy or not?
- How is aquatic life affected by water quality?

- How are macroinvertebrates indicators of water quality?
- How do you measure the velocity of a brook?
- How do you measure the pH of a brook?
- How do you measure the embeddedness of a brook?
- How do you measure the dissolved oxygen level of a brook?

Assessments of Learning

- Water Quality Data Collection sheets
- PowerPoint presentations
- BMI Field Guide
- 3D reference stream bulletin board

Overview of Daily Instruction

Day 1 – Essential Question - What conditions constitute a healthy brook?

Discuss the idea of a reference stream. Brainstorm the elements of a healthy brook – adequate oxygen levels, debris for bottom feeders, current to keep water clean, riffle zones to bring in oxygen, cobbled bottom for macroinvertebrate and fish egg habitat, etc. Use this information to make a 3D bulletin board display of a healthy brook.

Days 2-4 – Essential Question – How can you determine if a body of water is healthy or not? Discuss ways in which we can test the quality of water. Go over the protocols for turbidity, embeddedness, temperature, and velocity. Have students act out performing the test to gain practice in using the equipment and collecting the data.

Day 5 – Essential Question – How can the chemical tests, pH and dissolved oxygen (DO) provide information about the health of our brook? Introduce students to the idea of chemical testing and emphasize that these tests provide information about water quality that we can not see. Go over background information for tests to learn how pH and DO affect water quality and therefore aquatic life. Discuss the procedure for testing pH and DO.

Day 6 – Essential Question – How are macroinvertebrates indicators of water quality? Ask students what it means to be an “indicator”. Provide examples such as black clouds are indicators of a storm approaching, a yellow traffic signal is an indicator that a red light is next, etc. Explain that

macroinvertebrates are organisms without a backbone that are small enough to be seen with the naked eye. They can be used as indicators of water quality both by their presence and absence. Examine the “Benthic Macroinvertebrate Assessment Sensitivity Groups Field Sheet”. Point out the different colors as well as the idea of quantity using an “abundance code”. Go over the protocol and materials for collecting

Supporting Resources

Jenna Guarino, Verdana Ventures, Educational Consultant jguarino556@gmail.com

Videos:

“Bugs of the Underworld” by Ralph and Lisa Cutter

Instructional Resources:

Guide to Common Freshwater Invertebrates of North America by J. Reese Voshell

Freshwater Macroinvertebrates of Northeastern North America by Barbara Pekarsky et al.

Bug Water by Arlen Thomason

Literature Connections:

Ryan and Jimmy and the Well in Africa That Brought Them Together by Herb Shoveller