Water Stories Lesson Four:
"What is the quality of this water?"

Academic Question: What is the quality of water in your watershed?

Objective(s):
- To use multiple methods to determine water quality
- To understand the water quality needs of the inhabitants of an aquatic ecosystem
- To determine the major threats the water quality of the local waterways

Process (Activities):
1. Before you begin, you will need to determine the waterways within your watershed that you will study. At least one water source should be above ground. Before students conduct the water quality experiments, they should read the background information on the Cyberways web site: http://www.cyberwaysandwaterways.com/en/fieldGuide.
2. This activity will require one or more field trips to identify the macro invertebrates found in the water. You will need to obtain a water quality test kit. (Most science equipment providers carry these kits.) Water quality background and testing procedures as well as macro invertebrate background and field study procedures are available on the Cyberways web site: http://www.cyberwaysandwaterways.com/en/fieldGuide/waterquality.xml.
3. Obtain water samples from several water sources within your watershed. Include a sample of the drinking water. You will need at least two liters of each water sample in order to have enough water for all the students. Allow students to measure the different water qualities. Have students create chart of these different water qualities.
4. Have students compare their results with those found on Cyberways in the View Data area: http://www.cyberwaysandwaterways.com/en/viewData/.
5. Using their water quality data, have students predict the results of a rapid bioassessment using macro invertebrate study of the same waterway.
6. Conduct a rapid bioassessment of the macro invertebrates found in a waterway within your watershed. Students should use the information to determine the quality of water. Compare the chemical water quality data with the assessment from the macro invertebrate findings.
7. Analyze the sediment and rocks found within the waterway. Begin by studying a geologic map of the area. Gather samples of the sediment and rock found at the bottom of the waterway. Determine if the rocks are igneous (formed from molten lava), sedimentary (formed from deposits of sediment), or metamorphic (formed when igneous or sedimentary rock are out under extreme heat or pressure). Compare the rocks and sediment found in the water to those found on the edge of the waterway and in the surrounding area. Waterways often cut into bedrock or carry sediment from erosion of the surrounding areas. The rock and sediment in the waterway can impact the water chemistry as well as create different habitat conditions. Discuss with students how they think the geology is affecting the water quality.

Product/Application: Have student post their findings on the Cyberways web site. To do this, the teacher must be a "member" of Cyberways. To join, click Join on the homepage: http://www.cyberwaysandwaterways.com. Then, login and follow the easy steps for enrolling students and setting up field sites and projects in the Teacher's Lounge in "Getting Started" under "Quick Start Web Tips".

Assessment/Evaluation: Ask students to discuss the connections between the chemistry of water and the aquatic life found in water. Ask students to discuss the impact of specific changes in the chemistry of water on the aquatic life. For example, what would happen if the pH of the water changed from 7.5 to 8.5 (only macro invertebrates that can live in polluted water would survive).

Conclusion: Label the water quality of the different water sources on the waterway wall map display. Have students hypothesize the sources of water pollution found in the water and make recommendation on how to protect the water quality in their watershed.

Resources: The Cyberways web site contains many resources to complete the above activities: http://www.cyberwaysandwaterways.com.

Time Frame: Four to five 45 minutes class periods.
Grade Level: 6th- 12th