

Reading the River 2006

"How Does Our Water Measure Up?"

8<sup>th</sup> Grade

Science

Mary Beth Armstrong  
Rowan County Middle School  
Rowan County  
9/15/2006

## **Title of Curriculum: How Does Our Water Measure Up?**

### **Objectives:**

- Students will be introduced to the pH scale. Students will learn that the scale is logarithmic and measures the acidity and alkalinity of a solution.
- Students will test a variety of water samples to gain practice in using a LaMotte pH kit. (To prepare for actual stream study).
- Students will determine the usefulness of narrow range indicators in the testing of a variety of solutions.
- Students will use a TI-73 calculator to calculate the mean, median, mode and range of one of their samples.
- Students will apply what they have learned about the pH scale in order to answer data analysis questions.

### **Program of Studies**

S-8-AC-3 - Students will recognize how science is used to understand changes in populations, issues related to resources, and changes in the environment.

### **Core Content**

SC-08-4.6.5 - Explain the effect of change to any component of the ecosystem.

**Materials:** Cups or beakers to hold water/test samples  
Pool water  
Tap water  
Rain water  
Distilled water  
Creek water  
Vinegar  
Milk  
Soft Drink

Healthy Water/Healthy People Teacher's Guide  
H<sup>+</sup> and OH<sup>-</sup> cards (10 of each)  
LaMotte pH kits  
Data Sheets for students  
Overhead of class data sheet  
Transparency marker

**Activity Procedure:**

1. Complete introduction to acids and bases in the Healthy Water/Healthy People Book, "H to OH on p. 15-17. Students will demonstrate acid, base, and neutral concentrations by holding H<sup>+</sup> and OH<sup>-</sup> cards and moving into appropriate groups after teacher directions.
2. After discussing the pH scale, students will make predictions about the 8 substances they will test in the lab. Students will record their predictions of pH on their data table.
3. Students will test the 8 samples using the LaMotte pH kit directions.
4. Students will record their results on their table.
5. One student from each group will record individual group data on to the "class data" overhead.

Day 2

6. Review how to calculate mean, median, mode and range with the students by completing an example. I use the TI-73 graphing calculators.
7. Each group will be assigned one of the test substances to calculate mean, median, mode and range from the class data.
8. Students will then report out in groups the mean of each substance which will be put on the class overhead for all students to copy.
9. Students will then apply what they have learned by completing "data analysis" questions.

**Accompanying Handouts/Materials:**

Data Chart for students, "How Does Our Water Measure Up?"

**Definition/Explanation of concept/skills**

Normally, for this activity, students use Vernier pH sensors and graphing calculators for the pH testing. I chose to use LaMotte kits just to

give them practice using the testing procedure they would be using in the field. The LaMotte kit tests such a narrow range of pH that you might want to offer another means for testing substances like the soft drink and milk.

**Method to assess stated objectives:**

1. Students will demonstrate understanding of H to OH introductory activity by forming correct acid/base/neutral groups with their H<sup>+</sup> and OH<sup>-</sup> cards after teacher prompting.
2. Student should be able to follow LaMotte kit directions to come up with the correct pH of each substance.
3. Students should be able to answer pH and pH scale questions correctly on the section exam.

**References:**

"How Does Our Water Measure Up" was adapted from a lesson presented at a Middle School Science Summer Workshop.

"Healthy Water Health People Educators Guide"

"Issues, Evidence and You (Water Unit) pH scale p. a-61