

## **Why Do We Measure the pH and Alkalinity of the Streams Near the Capital Area Greenbelt Trail?**

**Contributed by Mary Pat Evans**

**Overview:** Students investigate human impact on water quality in their area through the use of GIS and ground-truthing.

**Suggested Grade Level:** 7<sup>th</sup> and 8<sup>th</sup>

**Class Length:** Day-long field trip

### **Connection with Curriculum Standards and Skills:**

**Standard 8:** The Characteristics and Spatial Distribution of Ecosystems on Earth's Surface

**Standard 14:** How Human Actions Modify the Physical Environment

**Standard 15:** How Physical Systems Affect Human Systems

### **Inquiry Question:**

Why do we measure the pH and alkalinity of the streams near the Capital Area Greenbelt Trail?

**Materials Needed:** GIS software  
Digital cameras  
Litmus paper

### **Procedure:**

Begin with the students at the computers using the GIS software to query the maps of North America, the Chesapeake Bay Watershed, Pennsylvania, Central Pennsylvania and ask the following questions:

- Where is Pennsylvania?
- Where is Ohio?
- In which direction does most of the wind come from in Pennsylvania? (From the West)
- What are the three major watersheds in Pennsylvania? (Erie, Mississippi, Delaware and the Susquehanna River)
- Drill into Pennsylvania- which major watershed ends in the Chesapeake Bay? (Susquehanna River, which is their watershed)
- Why is the Bay so important to this region? (Provides food and recreation to people, habitats for fish and crabs)
- Drill into the Capital Region of Pennsylvania, the three-county area of Perry, Cumberland, and Dauphin Counties- point to Dauphin County [their county], what are the smaller watersheds in this county? (Swatara Creek, Paxton Creek, and Spring Creek)

Developing the Lesson: Students will identify some of the locations of their water quality monitoring sites along the local watershed. Senior citizen volunteers from the Pennsylvania Senior Environmental Corps (PASEC) will assist students at the computers. The seniors will work with the students in using the GIS maps to query the databases they themselves have created. Local maps will be generated for use in the field for the ground-truthing.

Students, along with PASEC members, will visit some of the water quality monitoring sites to ground truth the area for Geology and land use.

Students will record land use with digital cameras as a visual record of sources of the high pH values. A GIS scientist from a local engineering firm, an environmental scientist from ALLARM (a statewide water quality monitoring protocol), and local watershed association members will join them in the field to assist in ground truthing the GIS maps.

**Additional Questions to Answer:**

1. How do the details of maps change as GIS software allows for “drilling down” into a map?
2. Where are local watersheds on the GIS map?
3. How does contemporary water-quality data compare to historical water-quality data and what are the implications of these differences?
4. What are the pH values of water in this area and what are the implications of these differences?