

## PRELIMINARY ACTIVITY FOR

# The Effect of Acid Deposition on Aquatic Ecosystems

Acid deposition is a topic of much concern in today's world. It can kill fish and other water life by lowering the pH of lakes and rivers. The pH scale is a measure of acidity. A pH value of 7 is neutral, values lower than 7 are increasingly acidic, and values higher than 7 are increasingly basic. Acid deposition is more harmful in some areas than others because some water resists changes in pH better than others. This ability to resist pH change is called buffering capacity. In Part I of the Preliminary Activity, you will use a pH Sensor to monitor pH as dilute sulfuric acid is added drop wise to a water sample.

General water hardness is related to the dissolved minerals in the water. In Part II of the Preliminary Activity, you will use a Conductivity Probe to determine the conductivity of water from the same source.

The following table describes water hardness as determined by conductivity measurements.

Conductivity ( $\mu\text{S}/\text{cm}$ )	Hardness
0–140	Very Soft
140–300	Soft
300–500	Slightly Hard
500–640	Moderately Hard
640–840	Hard
Above 840	Very Hard

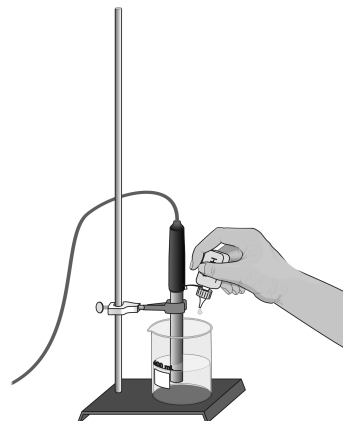
After completing the Preliminary Activity, you will first use reference sources to find out more about acid deposition before you choose and investigate a researchable question dealing with acid deposition. Some topics to consider in your reference search are

- acid precipitation
- pH scale
- acid deposition
- water hardness
- effects of acid deposition

## PROCEDURE

### Part I Effect of Acid Deposition on the pH of a Water Sample

1. Connect the pH Sensor and the data-collection interface.
2. Set up the data-collection software for the Events with Entry mode.
3. Rinse the pH Sensor with distilled water.
4. Get a 50 mL portion of water provided by your instructor. Lower the pH Sensor into the water.
5. Keep a data point for “0” drops of sulfuric acid before any acid is added.
6. Add 1 drop of sulfuric acid to the water. **WARNING:** *Sulfuric acid solution, H<sub>2</sub>SO<sub>4</sub>: Causes skin and serious eye irritation.*
7. Stir thoroughly. When the pH is stable, keep a data point for “1” drop of acid.
8. Repeat Steps 6 and 7, adding 1 drop at a time, until you have added a total of 6 drops of acid.



*Figure 1*

### Part II Conductivity of a Water Sample

9. Connect the Conductivity Sensor and the data-collection interface.
10. Place the tip of the Conductivity Sensor into a new sample of the water provided by your instructor. Be sure to submerge the sensor far enough to cover the hole at the tip of the sensor. Record the displayed conductivity reading (in  $\mu\text{S}/\text{cm}$ ).

## QUESTIONS

1. How hard was the water sample that was tested?
2. How low did the pH drop?
3. Would the pH values of water samples from various sources be equally affected by the addition of diluted sulfuric acid? Why?
4. List at least one researchable question for this investigation.