

## TEACHER'S GUIDE

# WATER WIZARDS

## ACID RAIN

### Review

Remind students of what they learned in the last activity.

### Purpose

The purpose of this exercise is to show the student that gases dissolved in water can turn that water into an acid. Also, the student will learn that this acid is harmful to our environment.

### Preparation

Review "Why Is This Important?" with students. Explain to the students that acid rain is a very real problem in east Tennessee. Gaseous pollutants (such as nitrogen oxide and sulfur oxide from auto and factory emissions) in the air, dissolve in rain as it falls. The resulting acid rain affects not only the plant life on earth but raises the acid level in lakes and in streams where it can be damaging to water life.

### Materials

Small paper cups (enough for each child or divide into small groups)  
Water  
Red, blue, or green food coloring  
Celery sticks (same number as cups, each stick 4-5 inches long).  
Old white sock

### Experiment for "Do This..."

#### **Experiment #1**

1. Give each student or small group a cup and fill with about two inches of water.
2. Add enough food coloring to produce a distinct color (explain this is acid water).
3. Make a fresh cut on each celery slice and put into water to represent plants and animals.
4. Let stand a couple of hours and then talk about the effects of acid rain on plants.

#### **Experiment #2**

1. Take class outside to see acid rain causing pollution at work. Place sock on the exhaust pipe of a car.
2. Explain that the sock will "catch" acid rain causing pollution from the car which enters the air as gas.
3. Turn on car and let run for one minute.
4. Carefully remove sock from pipe.
5. Turn sock inside out to see pollutants. If your exhaust system is working well, you won't see much on the sock. (That's good!) Encourage students to imagine this pollution going into our air from all the cars in your county, state, country, and our world!

### Reinforcement in Can You Tell Me..."

Have students answer questions individually or as a group. Let students complete Water Wizard Workout as time allows.

**Extension**

1. Review "Water Wizards Home Brew" for students. Encourage students to share with their parents and incorporate activities into their daily life. Let students share results in class.
2. Invite a forester or a wildlife officer to your class to talk more about the effects of acid rain on plants and animals.
3. Demonstrate the effects of acid rain (long-term) on limestone rocks and our buildings made from limestone products. For better illustration, shake enough gravel for each student in a bag containing half a box of baking soda. Give each student a rock and then let them use an eyedropper to sprinkle acid rain (half diluted vinegar) on their rock. Wow! Explain that this is what is happening to the Acropolis in Greece. Show students a picture of the Acropolis and point out where it is on the globe.