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GRAB N' GO ACTIVITY:

Acid Rain Experiment

OVERVIEW:

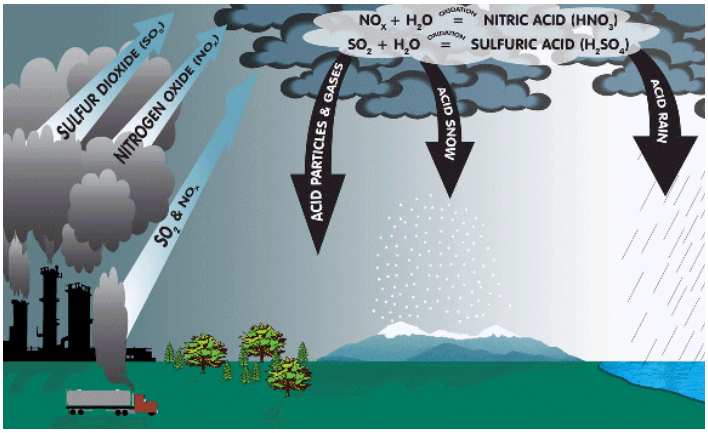
Students will learn the effect acid rain has on buildings, walkways or statues. Be able to discuss what acid rain is, where it comes from and what effect it has.

MATERIALS:

- Vinegar
- Chalk
- Eye dropper or teaspoon
- Bowl
- Image resources of Acid Rain (Before and After?)

OBJECTIVES:

1. See the chemical reaction of acid on limestone through the vinegar and chalk reaction.
2. Describe what they are seeing and how it relates to acid rain falling on limestone buildings, walkways and statues.
3. Discuss what causes acid rain and how it gets here.
4. Think about solutions to acid rain.



Ages: 9 - 13

Time: 30 - 40 minutes

PROCEDURE:

Step 1: Hand out the information sheet on acid rain.

Step 2: Either divide the students into groups, or have them all do the experiment individually.

Step 3: Have the students put a piece of chalk in their bowls infront of them.

Step 4: Using an eyedropper or the teaspoon, dribble vinegar onto the chalk.

Step 5: The chalk will begin to fizz when the vinegar touches it.

Step 6: Watch the chalk until it disintegrates.

Step 7: Have a class discussion about what they saw and how it relates to acid rain falling on limestone buildings, walkways and statues.

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WHAT IS PH?

pH is the measurement of whether something is acidic or alkaline (base). The number scale used to measure pH is from 1 to 14 with 1 being the most acidic and 14 being the most alkaline (base). 7 is considered neutral, neither acid or base. The normal pH of rain water is not 7, the neutral number, as you might think. It is actually about 5.6, which is acidic. This is because the rain combines with carbon dioxide in our air. This makes a very mild form of carbonic acid naturally.

The Adirondacks and throughout the northeastern US and SE Canada however, the pH of falling rain can be as low as 4 or 5. This is much more acid than normal. Each number represents 10 times the acidity of the number before it. So if rain water goes from the normal 5.6 to 4.6 it is 10 times more acid than normal.

WHAT MAKES ACID RAIN?

The burning of coal, oil and gasoline gives off sulfur, nitrogen and carbon that combine with water vapor in the air to make acids, like sulfuric acid, nitric acid and carbonic acid. These mild acids fall to earth as rain or snow. When they land in lakes and streams they can make the water so acid that fish and frog eggs won't hatch. Soon those lakes have no fish or frogs left in them. Acid rain can also cause building and statues to rot away. It can build up in the soil and slow the growth of some trees and kill others.

WHERE DOES ACID RAIN FALLING ON RURAL AND WILD FORESTS COME FROM?

It is carried by the wind. The wind patterns of North America carry pollutants from busy cities, factories and industrial centers in the Midwestern part of the United States and Canada and drops them on the northeast.

WHY DOESN'T THE ENVIRONMENT PROTECT ITSELF FROM THE ACID, LIKE IT DOES WITH THE NATURAL ACIDS IN RAIN?

The soil naturally contains calcium carbonate, a substance that is alkaline, and mixes with the normal acid of rain and as it washes into lakes and stream and cancels the acid effect out. These are called "buffers." As the rain becomes 10 times more acid than normal the buffers aren't strong enough to counteract the acid and it flows freely into our waterways.

IS ACID RAIN ALWAYS MAN-MADE?

Not all air pollutants are man made. A volcanic eruption can push millions of tons of acidic debris into the air and have a similar effect on the rain and snow. Though intense following a volcanic eruption, this effect is not long term in this case.