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Acid Rain: An Air Pollutant

Purpose:

To demonstrate the effect of acid on statues and buildings

Grade Level:

5th grade

Essential Elements:

Environmental Essential Elements Across the Curriculum - 75.25 (2) Acquire data through the senses. The student shall be given opportunities to (B) observe properties and patterns of objects, organisms and events in the environment.

(4) Communicate data and information in appropriate oral and written form. The student shall be given opportunities to (B) describe objects, organisms and events from the environment, (D) describe changes that occur to objects and organisms in the environment.

Objective:

Students will learn how acid rain is an air pollution problem.

Focus:

Show a picture of a defaced statue.

Materials:

chalk, vinegar and glasses for each group

Background:

Acid rain is more acidic than normal rain and forms through a complex process of chemical reactions involving air pollution. The two most important pollutants that contribute to the formation of acid rain are oxides of nitrogen and sulfur dioxide, which react with moisture in the atmosphere to form nitric and sulfuric acid. The sulfur

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and nitrogen compounds that contribute to acid rain primarily come from manmade sources, such as industries and utilities. Emissions also come from automobiles and other forms of transportation and industrial processes, such as smelting.

Acid rain can harm forests and crops, damage bodies of water, and contribute to the damage of statues and buildings. Researchers are considering the possible effects of acid rain on human health. These acidic pollutants can be deposited through rain, snow, fog, dew, or sleet. Large quantities can also be deposited in a dry form through dust.

Pollutants that contribute to acid rain may be carried hundreds of miles before being deposited on the earth. Because of this, it is sometimes difficult to determine the specific sources of these acid rain pollutants.

Procedure:

1. Explain that acids react chemically with limestone.
2. Explain that the vinegar is an acid and chalk is limestone.
3. Fill a glass 1/3 full with vinegar for each group.
4. Add a piece of chalk to the glass.
5. Have the students write what they see happening.
6. Discuss their observations and inferences.
7. Add corrected notes to notebook.

Discuss the slow deterioration of statues and buildings due to the weak acid rain that falls on some statues and buildings. If the stone is limestone or has limestone in it, the deterioration is more rapid.

Extensions:

- See the Acid Rain ["Information, Activities and Data"](#) page for suggested activities using acid rain data collected by the Texas Natural Resource Conservation Commission.
- Gather pictures of examples of acid rain (chemical weathering).
- Research effects of acid rain on great art works.
- Research causes of acid rain.
- Suggest solutions to the problem of acid rain.

Acknowledgment:

Lois Richardson, Stephen F. Austin University Nacogdoches TES Course, 1994

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