WATER–HARD AS A ROCK?

CONCEPT

Crystal systems and other physical properties and characteristics are crucial in the identification and classification of mineral resources.

LEARNING OUTCOME

The students will discover the approximate hardness of the water in their area.

CURRICULUM FOCUS:
Science

SKILLS/PROCESSES:
observe, experiment, research, chart

KEY VOCABULARY:
magnesium, manganese, calcium, iron

MATERIALS:
green soap tincture (from pharmacies), eyedropper and glass jar with lid for each group of students, samples of water from different locations

Background

Hard water is found in eighty-five percent of the United States. Calcium and magnesium, and sometimes iron and manganese, are the minerals that make water hard. The degree of water hardness is usually expressed in grains per gallon. Generally, water with 0-3 grains of hardness is considered soft, and water with more than 10 grains, very hard. Water with over 19 grains of hardness is extremely hard. Hard water leads to a buildup of minerals called lime scale in pipes and leaves a film of sticky soap residue on skin and clothes.

Preparation

Obtain water from various sources. You may want to have students bring in water. Obtain and set out the other materials.

Learning Activity

Ask the students the following questions to assess their knowledge of the subject or to stimulate interest in the activity:

Do you have a water softener at your home? What is the difference between hard and soft water?

1. Explain to the class what hard water is and what minerals make it hard.

2. Divide the class into groups and give each group a water sample to test.

3. Instruct the students to fill the glass jars with water.

4. Have them drop one drop of green soap tincture in the water, put the lid on the jar, and shake it. If the water soap mixture bubbles, then the water is soft; if the water turns cloudy, repeat the procedure using one drop at a time until the mixture bubbles, counting the number of drops of soap needed.