Cave of the Winds Activity Five: Dissolving Limestone

Lesson for Grades 3-8

One lab of about 45 minutes.

Satisfies Colorado Model Content Standard for Science:

Standard 2, Benchmark #2 for grades 3-5. Measurable physical properties can be compared before and after effecting a change has occurred and used to predict its outcome in similar circumstances.

Standard 1, Benchmark #1 for grades 6-8. Ask questions and state hypotheses that lead to different types of scientific investigations (for example: experimentation, collecting specimens, constructing models, researching scientific literature).

Standard 1, Benchmark #3 for grades 6-8. Interpret and evaluate data in order to formulate logical conclusions.

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CAVE OF THE WINDS

Dissolving Limestone with Acid

Objective

Students will apply the trial and error method to test which rock/shell samples react with hydrochloric acid.

Method

In pairs, students place drops of cold, diluted hydrochloric acid on rock/shell samples, and then record the results. Students formulate and write their conclusions on the worksheet provided.

Vocabulary

Mineral
Carbonic acid
Limestone
Calcite
Chemical reaction
Hydrochloric acid.

Materials

Each Student: copy of chart, pencil, safety glasses or goggles
Each Pair of Students: bottle of hydrochloric acid, jar or beaker, dropper, student worksheet
The Class: rock samples of limestone, granite, sandstone and seashells; paper towels

Background

Limestone is the most common cave-forming rock, composed of a mineral called calcite. When carbonic acid in water comes in contact with calcite, the calcite begins to dissolve. A similar and faster chemical reaction occurs with a stronger acid, such as hydrochloric acid. Cold, diluted, hydrochloric acid will produce a bubbling reaction upon contact when calcite is present in an object.

Suggested Procedure

1. Explain safety procedure to be followed. Because the acid will burn skin and clothing, young students should observe a teacher perform the demonstration.
2. Distribute a chart to each pair of students.
3. Mix a solution of HCL and water in a ratio of 10 parts water to 1 part HCL.
4. Label rock samples A, B and C.
5. Using the dropper, place one drop of hydrochloric acid on each rock sample.
6. Observe what happens and record observations in the proper column.
7. Wipe acid droplets off samples with paper towels, being careful not to allow the acid to touch skin.
8. Test a seashell with the acid. Observe and record observations. Write conclusions on the chart.
9. Use the data in this activity to make generalizations correlating it to geology of Cave of the Winds.

Dissolving Limestone with Acid Worksheet

ROCK SAMPLES	ACID REACTION	NO REACTION
A		
B		
C		
Seashell		

CONCLUSIONS:

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