

# Don't Take Rocks for Granite

<b>Standard 3240-05</b>	Students will investigate changes in the Earth's crust and climate.	<i>Topic: Earth Changes Course: # 3240</i>
<b>Objective 3240-0503</b>	Analyze the processes involved in rock formation.	
<b>ILO's</b>	<b>1a</b> Make observations <b>1b</b> Develop and use categories <b>6a</b> Use the language and concepts of science	

## Description of Activity

*Title:* "Don't Take Rocks for Granite"

*Activity Overview:* Students will examine characteristics of rock that provide clues as to its' formation.

*Duration:* 40-50 minutes

*Materials, Facilities, and Resources:* 2-5 identical rock samples per pair of students. (e.g. 4 quartz samples) Local mountains are the ideal source for rock samples, students, local monument companies, and rock shops may be helpful in providing them. Hand lens, weak hydrochloric acid, baby food jar.

## Background Information

Rocks are identified by a variety of means. Color is an easy one for students but not all that helpful. The size and shape of the particles that make up rock or the lack of them, are more meaningful. The following is a summary of characteristics of each type of rock.

Igneous rocks all were once molten rock. Their location in the earth's crust controlled the rate at which they cooled. The two types of igneous rock look quite different from one another as a result. Intrusive rocks cooled slowly under the earth's surface. Extrusive rocks cooled quickly, on the surface.

Intrusive igneous rocks are composed of sharp edged crystals which can be clearly seen. The crystals are shiny.  
ex. granite

Extrusive igneous rocks have small (basalt) or no crystals (obsidian). They may be porous enough to float (pumice)

Sedimentary rocks form on the earth's surface as eroded materials, mineral deposits or living things die and form layers of sediments. Characteristics include having rounded fragments of a variety of sizes, occurring in thick layers and in the case of evaporates (water deposited minerals) a very smooth texture. The sediments are held together by mineral cements which have testable properties. If calcite is the cement it will fizz with acid. Not all sedimentary rocks fizz, but most limestones, some sandstones and some conglomerates will.

Metamorphic rocks have undergone heat and pressure but not enough to melt them. These rocks may have been buried under the earth's surface or been near a heat source such as a volcano. They form from igneous, sedimentary or other metamorphic rocks. They are recognized by the occurrence of thin bands or layers which form as the minerals as the rock rearrange themselves. They are harder and shinier than the rocks that form them.

Safety suggestions: Hydrochloric acid should be used in a controlled manner. The students should be advised as to its' use, you should require goggles.

### **Teaching and Learning Strategies**

A discussion of how to observe rocks, what the hand lens is for and how to use the acid would be appropriate. Do not discuss the names of the rocks, what type they are or how they are formed beforehand.

### **Invitation to Learn**

Problem-Ask the students how they could find out if a set of polished rock bookends is made of the stone the dealer says it is. Ask them if color alone is enough to assure them to spend a lot of money for the bookends.

Have the students work in groups of 2 and bring two or more samples of the same rock to their desk.

Give the students fifteen minutes to carefully examine their samples and use the hand lens or acid. During this time they should write up a description of their rock that could be used in a mineral and rock identification book. They should write their names on their paper.

Collect the descriptions and hand out a different one to each pair. Have them go around the room and try to find the sample described by relying on the student description they were given. After they find the correct sample, have them refine the description that is written by discussion and consulting with the original authors.

The papers should be returned to the authors for a final rewrite. You may discuss with students the correct name for each rock at this time. The discussion should include a summary of the three main types of rock and how they can be recognized. The students should then identify their rock by type.

Now that the students have correctly identified their rocks, ask if they will now take the rock dealers' offer.

### **Summary of Learning**

*Multiple Choice.*

1. Which type of rock was once molten?

- a. igneous
- b. metamorphic
- c. sedimentary
- d. sandstone

answer: a

2. Which rocks can be recognized by their rounded fragments?

- a. granite
- b. igneous
- c. metamorphic
- d. sedimentary

answer: d

### Strategies to Share Findings:

Students from another school or class could be given the samples and the descriptions to test the rock. This new group of students could give suggestions to change the descriptions given.

A writing assignment could be given requiring students to write the life story of their rock.