Scrambled Rocks! ACTIVITY

Students visit different stations to gather evidence about unidentified samples that need to be organized into the three field sites they came from.

Learning Objectives:
-Rocks have different properties
-Rock come from different rock formations around the world
-Properties of rocks give them different uses
-Scientific explanations need to be supported by evidence that

Premise:
A geologist at AppState is trying to sort through a big pile of rocks that his/ her students left in the repository/ lab...

> *"My students are driving me crazy. We went on several geology field trips last semester and they left the lab in shambles when they went home for the break. Such a mess! Now we don't know which samples came from which field site. I heard you guys might know something about rocks and I came to get your help."*

Set Up:
Students move around the four stations in groups. Each group gets a bag or box containing numbered samples A-G. Some of them (or all) could be inside zip lock bags with a slip of paper containing student notes to add to the effect. Eg. For pumice: "Looks like pumice, used to make toothpaste and scrub away dead skin!" or for granite: "Granite? Looks like my kitchen counter top or bathroom tiles!". They also get a clipboard containing the pictures and notes on each of the three sites (see the pages that follow), as well as a copy of the Sample Scramble Data Sheet. Read about each station below for information on how to set them up.

Field Site #1: Maui (Hawaii)
Field Site #2: Sena (New Mexico)
Field Site #3: Blowing Rock (North Carolina)

<u>STATION 1: Look Carefully</u>
Using magnifying glasses/ loupes and if available a stereo microscope, students look at their rocks samples and known rock samples available at the station. They compare them to

determine whether they have crystals, grains or bands and try to determine which field site they could have come from.

STATION 2: Fizzy Rocks

Students first try Pop Rocks. Point out that these are not rocks, duh, but that the way they react on your tongue is similar to the way some rocks react when you add acid to them. This is because they have a compound called carbonate which releases bubbles of gas in a reaction (same bubbles that make soda fizzy).

They add vinegar to their rock samples and jot down any fizzing, which would indicate they are from the sedimentary rock field site.

STATION 3: Crystals and Fossils

There are three pans- sand+ crystals, -sand+fossils, -sand alone. They are samples of ground rock from different field sites. They see what they find in each pan (ie. fossils in one, crystals in another, nothing in the last). If they have any crystals or fossils among their unidentified samples, they check which site they are probably from. They can then determine which crystal they have by doing a simplified hardness test. Maybe just to determine if its quartz (and or chalk?) or not.

STATION 4: Uses of Rocks

Objects are displayed that are made from rocks mined from the different field sites (eg. Exfoliating pumice stone, mica-based make-up, granite tile/ brick, gem jewelry, clay, etc.). Students try to figure out if their unidentified samples have the properties that would make them match the known samples. Some samples will also include notes the undergraduates jotted down about their sample that will provide clues (E.g. “Used for toothpaste and dead skin” on pumice).

As the students move from one activity to another, they record their evidence on their chart. By the end, it should be clear from their evidence which unidentified sample came from which field site.

When recording on their chart, they write down the number of the site they think it is based on the evidence. For example, in the first box for sample A, under the Look Carefully column, they would write 1, 2 or 3 based on whether the rock has crystals, bands or layers (ie. a rock with crystals will have come from Site 1, a rock with grains from Site 2 and a rock with bands from Site 3). If they don’t know, they can put down a question mark.

Ideas for what to make each unknown sample/ answers:

A- Granite

B- Scoria or pumice
C- Sandstone
D- Gneiss
E- Quartz crystal
F- Seashell or shark tooth (ie. fossils)
G- Chalk (?- something else that fizzes with vinegar)

Field Site #1 (HI)= A, B, E
Field Site #2 (NM)= C, G, F
Field Site #3 (NC)= D

FIELD SITE #1: Maui (Hawaii)

The site could be described as volcanic/ igneous.

-rocks found in this site are made up of crystals, some small and others big

-some of the rocks found here are really light because the lava cools quickly and has "air bubbles" in it.

-no fossils were found in this site.

-rocks found here did <u>not</u> fizz with acid.

FIELD SITE #2: Sena (New Mexico)

This site could be described as sandy sedimentary.

- grainy rocks
- some rocks were so soft that they crumble in your hand
- other rocks have large pebbles stuck together
- rocks made up of pieces of other rocks and shells
- found a bunch of fossils!
- rocks fizzed with acid when tested!

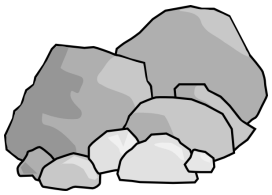
FIELD SITE #3: Blowing Rock (NC)

This site could be described as metamorphic.

- -very hard rocks
- -rocks had bands of different colors
- -very small crystals, arranged in layers
- -no fossils found here
- -the rocks did not fizz with acid when tested

Sample Scramble Data Sheet

Help! Which rock samples come from which field sites?



Samples	Look Carefully	Fizzy Rocks	Crystals or Fossils	Uses of Rocks
A				
B				
C				
D				
E				
F				
G				

FIELD SITE #1= Rock samples _____

FIELD SITE #2= Rock samples _____

FIELD SITE #3= Rock samples _____

Use the following pages as “table tents” to label each station. They will work best if printed on cardstock.

STATION 1:

Look Carefully!

STATION 2:

Fizzy Rocks

STATION 3:

Crystals & Fossils

STATION 4:

Uses of Rocks