

Colorado National Monument

Environmental Education

National Park Service
U.S. Department of the Interior



Lesson Plan: Roca, Roca, Roca

Class Description

Students will explore different rocks and identify characteristics. They will make the three different types of rocks and discover how they are formed.

Location: Classroom

Duration: 1.5 hours

Standards Addressed: Earth Systems Science

GLE 3.1 Earth's Materials can be broken down and/ or combined into different materials such as rocks, minerals, rock cycle, formations of soil, and sand- some of which are usable resources for human activity

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Theme:

There are three major types of rocks and they each have different characteristics and are formed differently.

Major Concepts:

- Characteristics of rocks
- How rocks are formed

Objectives:

- Students will be able to identify and list characteristics of igneous, sedimentary, and metamorphic rocks
- Students will be able to describe how each rock is formed

Learning Target: (to be written on board)

I can identify the three types of rocks and describe how they are formed.

Puedo identificar los tres tipos de rocas y describir cómo se forman.

Inquiry Questions:

What are Rocks? **¿Qué son rocas?**

How are rocks formed? **¿Cómo se forman las rocas?**

Vocabulary:

Igneous - **ígnea**, sedimentary - **sedimentario**, metamorphic- **metamórfico** ,rock- **roca**

Materials:

6 rock samples- 2 of each type of rock, 6 pieces of construction paper, 6 markers, 24 of the small Play Doh tubs a variety of colors, 1 letter size piece of foil or wax paper

Class Outline

Opening:

KWL Chart- as a class fill out the first two columns of the chart.

Ask- What do you know about rocks? **¿Qué sabes sobre rocas?**

What do you want to know about rocks? **¿Qué quieren saber sobre rocas?**

What do you know about how rocks are formed? **¿Qué sabes acerca de cómo se forman las rocas?**

What do you want to know about how rocks are formed? **¿Qué quiere saber sobre cómo las rocas se forman?**

Inquiry Activity:

List the three types of rocks on the board. Igneous, Sedimentary, and Metamorphic

Set out 6 rocks and number each rock- 2 of each type if possible, a piece of construction paper, and marker at each rock. Divide the class into groups of 4. Have each group go to a rock and spend 1- 2 minutes looking at the rock and writing down characteristics that they noticed. After 1- 2 minutes, have the groups go to another rock and do the same. After they have gone to each rock, gather and discuss what they noticed.

Discussion:

Ask: What did you notice? **¿Qué notó?** Did you find any rocks that had similar characteristics? **¿Había algunas rocas que tenía características similares?**

Put the rocks together that they thought were similar or the same type of rock. Show a sedimentary rock and discuss characteristics. (layers, grainy, color) Show an igneous rock and discuss characteristics. (weight, color, air holes, smooth, rough) Show a metamorphic rock and discuss characteristics. (weight, swirls, color, texture)

Activity: Making rocks

Give each child 2 halves of clay of different colors and 1 letter size piece of wax paper or foil.

For the igneous rock have children:

1. Choose one ball of Play Doh and roll in hands for 15 seconds.
2. Break the ball that you are working with in half and exchange one half with someone else who has a different color. Even a different color to the other ball you have.
3. Flatten the small ball by pressing down on it with the palm of your hands. The clay should be thin but not too thin. This piece represents the Earth's crust.
4. Take the other small ball of clay and roll it around in your hands for 15 seconds. Take the flattened "crust" and carefully lay it on top of the ball.
5. Hold the ball of clay with one hand and lightly stabilize the flat piece on top with other hand. Push ball of clay up strongly into the flat piece. Ask: What happens to the Earth's crust when pressure comes from below? **¿Qué pasa a la corteza de la Tierra cuando la presión viene desde abajo?** This action represents what happens as magma rises from the mantle into the Earth's crust. Where it finds an opening, or a thin, weak place in the crust, it can come out onto the land.

The ball of clay acts like magma it may push out through the crust and then cool or it may just cause the crust to rise or dome up and the magma cools before it reaches the surface. This shows how igneous rock is formed. At this point ask which of the rocks they explored earlier would be igneous. List some of the characteristics of igneous rocks. Write on a chart.

For the sedimentary rock have children:

1. Place the foil or wax paper out on table – break up the “igneous rock” we just made onto the center of the paper into small pieces. What does this breaking up represent? **¿Qué significa esta rompiendo?** How would you see this in nature? **¿Cómo vería esto en la naturaleza?**
2. When the clay is broken up, pile up the pieces in the center of the sheet and fold the sheet over the top of the pile. Then place the palm of one hand on the sheet and press down lightly to flatten. (Not hard or not long) What does this action represent? **¿Qué representa esta acción?**
3. Open up the packet and inspect what is inside. What happened to the clay? **¿Que paso con el Play Doh?** This represents sedimentary rock. **Esto representa la roca sedimentaria.**
4. Break your rock in half and look inside. What do you see? **¿Que ves?** List some of the characteristics of the sedimentary rock. Write on a chart.

For the metamorphic rock have the children:

Explain how metamorphic rock is formed. Metamorphic rock is formed when pre-existing rock is exposed to extreme pressure or high temperature. **Roca metamórfica se forma cuando la roca preexistente se expone a una presión extrema o alta temperatura.**

1. Take the ball of clay that hasn't been used. Roll in hands 15 seconds and then flatten it into a small pancake and place on one side of the wax paper or foil.
2. Take the “sedimentary rock” and place on top of it. This represents the layering of rocks. **Esto representa las capas de rocas.**
3. Cover the clay with the remaining portion of the wax paper or foil. Take off one shoe. Place packet on floor and have kids step down hard with all their weight onto the clay packet. (Do not twist or grind or jump) This action represents pressure (lots of weight from layers of rocks) **Esta acción representa la presión (un montón de peso de las capas de rocas)**
4. Have students open up packets. How does it look? **Como se ve?** How is it different from the earlier sedimentary rock? **¿Cómo es diferente de la roca sedimentaria antes?** How is metamorphic rock different from sedimentary rock? **¿Como es la roca metamórfica diferente de la roca sedimentaria?** **¿Que causa la diferencia?** List some of the characteristics of the metamorphic rock. Write on a chart.

Wrap Up:

Ask the class- What are the three types of rocks? **¿Cuáles son los tres tipos de rocas?** How was each rock formed? **¿Cómo se formó cada roca?** Hold up a sedimentary rock from the rock samples and ask the kids: What type of rock is this? **¿Que typo de roca es?** How can you tell? **¿Como sabes?**

Have them fill out their journal page and have kids go up to the KWL chart two or three at a time and fill in one thing that they learned or a question they have.

Background Information for teacher:

Rocks form in three ways. The first is from hot, molten material from the Earth's mantle rising up to create igneous rock. Examples include granite, basalt and pumice. They are usually unlayered (except basalts) and contain visible crystals.

The second way is from loose sediments compacting and cementing together into sedimentary rock. They commonly looked layered. Any rock can erode, be redeposited, and become sedimentary rock

The third way that rocks form occurs when high heat, lots of pressure, or both act on igneous or sedimentary rock to change or recrystallize them into metamorphic rock. Sandstone metamorphoses into quartzite, limestone into marble, and granite into gneiss. Crystals commonly seen in metamorphic rocks are usually oriented in lines or sheets, at times giving both small hand samples and outcrops a wavy or crinkled appearance

What are rocks and where to they come from?

Rocks are consolidated mixtures of minerals that occur naturally. The different mineral grains are held together very strongly through chemical and physical bonds. Over time, and exposure to the elements, rocks may decay and break down into soil, or the fragments may be carried away by wind and water, eventually to become lithified into new rock.

A good book resource is Rocks: Hard, Soft, Smooth, and Rough by Natalie M. Rosinky ;Picture Window Books, 2003. If possible have the teacher read book before you come in.

KWL Chart

<p>K What do you know? ¿Qué sabes?</p>	<p>W What do you want to know? ¿Qué quieres saber?</p>	<p>L What have you learned? ¿Qué has aprendido?</p>