

## How Does the Rock Cycle Work

### Grade Level:

- 3
- 4
- 5
- 6

### Lesson Time:

40 minutes

#### Objective:

- Students will be able to explain how heat and pressure affect rocks by making observations of crayon shavings that are placed under heat and pressure.

#### Preparation

Before going to the classroom, you will need to:

1. Contact the teacher to find out the length of the class period and the number of students in the class. Discuss any previous discussions about the rock cycle or understanding of the three main rock types.
2. Alert the teacher that this investigation requires an electrical outlet to plug in the iron (see description of materials for clarification) and you will need extra safety support with the iron.
3. Prepare the crayon shavings from 3 to 4 different color crayons by using a hand held pencil sharpener or a pair of scissors to scrape the outside of the crayon like a carrot and a carrot peeler.
4. Divide about a spoonful of shavings into a sandwich bag, one for each student. The shavings will represent sediments in this investigation.
5. Duplicate the work sheet, with potential modification for grade level. If you are working with Kindergarteners it is important to remember that they will not all be reading. Describe the pictures rather than using just words so the students know where you are on the diagram.
6. Collect any giveaways for the students, such as fossil posters or geologic time scale bookmarks.

#### Materials:

For each student:

- Two pieces of 11" X 11" wax paper
- One bag of crayon shavings
- A handout showing the steps of the rock cycle
- A heavy book or large, clean, wooden cutting board to demonstrate compaction

For instructional purposes:

- A clothing iron to "metamorphose" the sediments

### Purpose

The rock cycle is the combination of all the processes that act to break down rocks, move sedimentary materials from place to place, and produce new rocks. In this investigation, students will discover what happens to rocks under lots of pressure and heat through a simulation that uses crayon shavings.

### Safety

This investigation is considered safe to do with students. An adult will help with the compaction. Make sure that only an adult does the ironing of the crayons to metamorphose them. Be prepared to keep the activity moving and allow for extra clean-up because the crayon shavings can get on the floor.

### Investigation Question

How does the rock cycle work?

### What to do

1. **(5 minutes)** Spend the first five minutes getting to know the general geologic knowledge of the class. Try to keep the whole discussion as dynamic as possible. Most students should have some interest or have made observations about Earth processes. The key is to get them to discuss these ideas, so that they will be more involved in the activity as a whole. Be sure to accept as many explanations as you can. Questions you might ask are:
  - Have you ever collected a rock?
  - Do you have a rock collection?
  - Do you know the three major types of rocks?
2. **(5 minutes)** The next step is to introduce the three types of rocks (igneous, sedimentary, and metamorphic). Introduce the term sediment. Be sure to accept as many explanations as you can. Some questions you might ask are:
  - What are sediments?
  - Where are sediments found (on a beach, in a river, etc.)?
  - Can you find sediments inside a volcano? If not, why not?
3. **(5 minutes)** Explain that liquid rock or lava is found inside a volcano and whether that liquid rock is cooled below ground or above ground controls the size of the crystals. Now getting back to sediments, the igneous rocks get broken into smaller and smaller pieces; this is how the sediments form. Once you have introduced the concept of sediment, hand out the diagram of

the rock cycle.

4. **(5 minutes)** Have the students take turns identifying the directions that sediments change between the arrows on the diagram. Ask them why at some places on the circle are there two paths that the sediments/magma can take. Now ask them if they would like to have their own sediments to follow the cycle with.
5. **(7 minutes)** Hand out the wax paper and the crayon shavings. Explain that the different colors of crayons represent the sedimentary rock forming minerals (quartz, feldspar, micas, and limestone). Have students make a pile of the crayons on their wax paper similar to the way sand might pile up due to wave action on a beach. Ask the students to consider what might happen to those sand grains next on the rock cycle. Might they be compacted and buried?
6. **(10 minutes)** This is the most fun part of this activity, the compaction and metamorphism phase. Have the students place the second piece of wax paper on top of their sediments. If the teacher is in the room, he or she can help take the heavy book or cutting board around to students, place it on top of their wax paper and help them pound on their sediments to compact them. Have them make observations about how their pile of sediments changed after adding pressure. Once they are satisfied with the compaction, an adult should use the iron to melt the crayon shavings to metamorphose them. Depending on the classroom set up and the age of the students, either have the metamorphic processes occur on their desk or have the students carry the pieces of wax paper carefully to an area where they can be ironed one at a time. Make sure to point out how the colors have blended together to form a new color-this is a similar process to mineral re-crystallization that occurs in metamorphism.
7. **(5 minutes)** At the end of the activity, start a discussion into what happened with the crayon shavings. Be sure to accept as many explanations as you can. Some questions you might want to ask include:
  - What happened to the crayon shavings when you put pressure on them with the book?
  - Do you think that the same thing happens to rocks when they are placed under lots of pressure? Why/Why not?
  - What happened to the crayon shavings when you added heat?
  - Do you think that the same thing happens to rocks when they are placed under lots of heat? Why/Why not?
8. **(2 minutes)**. Thank students for their time and attention. You can leave giveaways behind for the classroom teacher to distribute.

