

## MANCHESTER COLLEGE- Department of Education

**LESSON PLAN by:** Sahara Kipfer

**Lesson:** Rock Types

**Source:** Teaching Science for all Children: An Inquiry Approach (5<sup>th</sup> ed.)

**Age or Grade Intended:** 4th grade

**Length:** 45 minutes

### **Academic Standard(s):**

Science 4.3.6- Recognize and describe that rock is composed of different combinations of minerals. (Core Standard)

### **Performance Objectives:**

After having had time to explore the various types of rocks, students will place three different rocks into the categories of igneous, sedimentary, and metamorphic, with 100% accuracy.

### **Assessment:**

Throughout the exploration part of the activity, the teacher will make systematic observations about who is participating and offering suggestions as to how the rocks should be classified. The teacher will also make note of those students who do not seem to be partaking in the activity, as well as those who seem to be struggling.

During the expanding part of the lesson, the teacher will also be making systematic observations, as well as conferring with each group. The teacher will be checking to see if students are grasping the concept of identifying the different types of rocks or whether the lesson needs further instructional time.

At the end of the lesson, during the evaluation part, each student will meet individually with the teacher. The instructor will essentially ask the every student to identify one rock that corresponds to the varying categories, in addition to elaborating on their thoughts by answering various questions. By conducting this verbal assessment, the teacher will be allowed to see if students grasped the concept or if more instructional time needs to be spent on the subject with the class as a whole or just a small group of students.

### **Advanced Preparation by Teacher:**

The teacher will need to:

- Collect several samples of the following types of rocks (enough for each of the four groups): igneous, sedimentary, and metamorphic.
- Have one piece of construction paper for each student.
- Gather 1 plastic jar/container (12 oz. or larger), 1 sheet of construction paper, sand, mud, and water for each of the four groups.
- Obtain the following rock samples: granite, obsidian, limestone, sandstone, marble, and gneiss.
- Create a deck of cards with the various types of rocks written upon them (one name per card and only one card per student will be needed).

**Procedure:**

**Introduction/Motivation (Engage):** The teacher will begin the lesson by telling (Gardner: Verbal-Linguistic) the students that “I went on a walk yesterday, out in the country, near my grandma’s house. While on my walk, I saw that the paved road I was walking on turned into a gravel road, which I continued on its path. Since I was out walking just to enjoy the beautiful day, I took my time observing the scenery. In fact, I noticed that the gravel road I was walking along was made up of different rocks. I picked up several and examined them, in which I was able to see their differences. However, one question that I thought about was ‘How are rocks formed? Are they all made in the same way?’ (Bloom’s: Knowledge) Well today, we are going to try and solve these questions”

**Step-by-Step Plan:**

- Step 1: **(Explore)** The teacher will divide the class into four groups (Gardner: Interpersonal), in which they can turn their desks around to work more cooperatively with one another.
- Step 2: Each group will be provided with one piece of construction paper and several sample rock types, in which they are to closely examine the rocks. (Gardner: Visual-Spatial) After having had time to investigate the various rocks, students will be prompted, by question, to categorize them according to their differences and similarities. (Gardner: Logical-Mathematical) The question that will be posed to the students is that of “How would you classify the different types of rocks?” (Bloom’s: Comprehension) When answering this question, students should group their rocks on the piece of construction paper, in which they can write notes on this paper if they would like, such as “these rocks have sharp edges.” During this time, the teacher will be walking around and observing the various groups, so as to hear their thoughts on the topic at hand.
- Step 3: The different groups will be instructed to set their own classifications to the side, out of the way. Next, the teacher will need to pass out the following materials to each group: a jar, even more rocks, sand, mud, and water. Students will now be directed to place all of their materials into the jar, which is to be tightly sealed shut. It is then to be shaken for a few seconds. Students are then to individually draw a picture, of what the jar looks like, once the materials have settled. If time permits, crayons can be used to color the picture. (Gardner: Visual-Spatial)
- Step 4: **(Explanation)** The teacher will pass out one piece of construction paper to each individual, in which they will be instructed to fold it into three parts.
- Step 5: The groups will be asked to go back to their different piles of rocks that they categorized. The teacher will ask the each group to share their answer to the question of “How did you classify the different types of rocks?” (Bloom’s: Comprehension) Their various responses will be written on the board, in which the teacher can explain that

“Rocks come in all shapes, colors, and sizes. However, they are not all made the same way.” (Gardner: Verbal-Linguistic)

Step 6: The teacher will explain (Gardner: Verbal-Linguistic), with analogies, the three different types of rocks, in which this is where the folded piece of paper comes into play. Students are to take notes and draw pictures within the three sections, which stand for the three types of rocks.

Step 7: The first example that will be given is that of lava from a volcano. Students will be asked “What happens to the lava when it dries?” (Bloom’s: Knowledge) From there, the teacher will explain (Gardner: Verbal-Linguistic) that “It becomes a hard rock called *igneous*, meaning “fire formed.” Also at this time, the teacher will hold up two different igneous rocks, granite and obsidian. (Gardner: Visual-Spatial)

Step 8: Next, the teacher will refer back to the shaken jars (Gardner: Visual-Spatial), in which they should pay close attention to the layered materials. Students will then be asked if their group classified any of the rock samples based on whether you could see layers. The word *sedimentary* will need to be written on the board (Gardner: Visual-Spatial), in which it will be further explained. (Gardner: Verbal-Linguistic) To be exact, they are formed in water by layers of the varying types of rocks and other decaying organic matter. Examples of these types of rocks, limestone and sandstone, will be shown.

Step 9: Students will be asked if they thought any of the rocks had not been described yet. If there is a group that thinks they have identified a third category, then they will be invited to share their rock samples with the rest of the class, in addition to explaining why they think they belong in this category. (Gardner: Visual-Spatial and Verbal-Linguistic) The teacher will then explain to the students that when the igneous or sedimentary rocks are put under extreme heat and pressure inside the earth, it changes the book of the rock. These rocks are then referred to as *metamorphic* rocks. Examples of these types of rocks, marble and gneiss, should be shown. (Gardner: Visual-Spatial) It should also be explained (Gardner: Verbal-Linguistic) that metamorphic rocks are very hard, which is a result from the extreme pressure that they are placed under.

Step 10: (**Expand**) The teacher will have a table set up in the back of the classroom, which will contain numerous rocks upon it. Each group will be dismissed to go the table, but they will be working independently. (Gardner: Intrapersonal) Upon the table will also be a deck of cards, which will be labeled with one of the types of rocks. Whatever type of rock the students’ card says, they are to choose a rock sample of that type from the table (Gardner: Visual-Spatial and Logical- Mathematical) and then head back to their seat.

Step 11: Once each student has selected a card and a rock to match it, they will explain (Gardner: Verbal-Linguistic) it to their group. The group

should then come to a consensus as to whether the student correctly classified their rock. If they are incorrect, then they are to go back to the table and exchange their sample. The teacher will be walking around the classroom at this time and conferring with each group.

**Closure (Evaluation):** The teacher will explain the assessment activity at this point, in which students will be conferring with the teacher individually for this part of the lesson. When students are not meeting with the teacher they are to be reading trade books from the science book baskets. However, when a student is meeting with the teacher, they will be asked to identify the three types of rocks, in which the teacher will announce one type of rock and the student is to select a sample from the table that was previously set up. The way that the teacher will go about doing this is by asking the following questions: How would you explain the differences in the three types of rocks? (Bloom's: Evaluation) and "What is the relationship between metamorphic rocks and other others? To help you think on this question, consider how metamorphic rocks are formed. (Bloom's: Analysis)" If a student incorrectly answers a question or misidentifies a type of rock, then the teacher will quickly review the correct responses.

**Adaptations/Enrichment:**

A boy with a hearing impairment- Instead of having him submit to a verbal assessment, the teacher could create a written assessment. In order to do this, the teacher could create an audiotape of the assessment and then have the student write his answers to the questions on a separate sheet of paper. Although, when it comes to labeling the rocks, the student could rip a few pieces of paper off his original answer sheet and place them underneath the actual rocks.

A boy who is gifted in science- For the assessment part of the activity, the teacher could have the student summarize how the rocks are formed. For instance, igneous rocks are formed "from fire" and metamorphic are formed from being placed under heat and pressure. The student could verbally state this to the teacher when they conferred with one another.