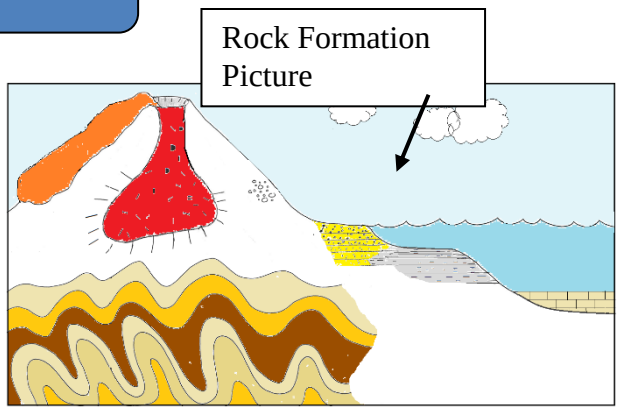
Discovering STEM Program

Rock Formation and Identification



Description: Students are provided with a rock formation picture that has 12 rocks placed in specific locations based on how they are formed (Sedimentary, Metamorphic, Igneous). Students then move the rocks from the formation picture to an identification card based on the descriptions. A leader will then check each identification card. (Rocks are numbered and a key is provided for the leader.) Students are awarded a sticker and asked to return the rocks to the correct location on the formation picture. Discussion about rock formation and properties happens as students move through the exercise. All of this information is provided in detail in the Teacher Background section.

Age Group: Lower Elementary

Estimated Time: Approximately 15 minutes

Recommended Group Size: 1-2 students per group (kit supports up to 8 groups)

Key Questions: What are some visual things you notice about igneous rocks? How does it look like they are formed based on the picture? What are some things you notice about sedimentary rocks? How do they form? What are some things you notice about metamorphic rocks? How do metamorphic rocks form?

Content Expectations Addressed:

Inquiry involves generating questions, conducting investigations, and developing solutions to problems through reasoning and observation.

Inquiry includes an analysis and presentation of findings that lead to future questions, research, and investigations.

Reflecting on knowledge is the application of scientific knowledge to new and different situations. Reflecting on knowledge requires careful analysis of evidence that guides decision-making and the application of science through history and within society.

Earth materials that occur in nature include rocks, minerals, soils, water, and the gases of the atmosphere.

Teacher Background:

Igneous rocks are formed when melted rock cools. There are two ways in which this cooling can take place. One is the cooling of volcanic lava above ground forming rocks with very small or no individual crystals on the rock surface. These rocks are classified as EXTRUSIVE igneous rocks. The other method in which igneous rocks can be formed is through the slow cooling of magma below the earth's surface. These rocks are classified as INTRUSIVE igneous rocks and have larger individual crystals easily seen on the surface of the rock.

Sedimentary rocks provided in the kit are formed in two ways. The first way in which sedimentary rocks can be formed is through the compression (and/or cementing) of sediments (or broken up rock fragments). Sedimentary rocks formed using this method are classified as CLASTIC sedimentary rocks. The second way in which sedimentary rocks can be formed is through the precipitation of sediments that were originally dissolved in water. These rocks are classified as CHEMICAL sedimentary rocks. (Note: There are other ways in which sedimentary rocks can be formed. We have only listed the two primary methods that formed the sedimentary rocks in this kit.)

Metamorphic rocks form in two different ways. One way is the application of heat **and** pressure. These are called FOLIATED metamorphic rocks. You can see the layers of a foliated metamorphic rock. The other way in which metamorphic rocks can be formed is to simply heat an existing rock so that the original rock is significantly altered and/or the heat triggers a chemical reaction. These rocks are classified as NONFOLIATED metamorphic rocks. These are a bit like baking chocolate chip cookies. The "dough" can be sedimentary and/or igneous rock; but when cooked, they become NONFOLIATED metamorphic rocks.

Materials: 8 Rock Formation pictures, 8 bags with numbered rocks, 8 Identification cards, 3 laminated Identification cards for teachers and also in binder, and achievement stickers.

Set-Up:

A. Each station will need:

- 1 Rock Formation picture **with rocks in appropriate locations**. Use the KEY to know where to place the rocks. Rocks are numbered 1 – 12.
- 3 Identification discussion cards (Igneous, Sedimentary, Metamorphic).

Procedure:

1. With excitement, talk to students about how IGNEOUS rocks are formed. Ask them if they can find four igneous rocks on the Rock Formation picture. (USE TEACHER BACKGROUND SECTION). Ask students: What are some visual things you notice about igneous rocks? How does it look like they are formed based on the picture?
2. Read the descriptions with/for the students and help them as needed move the IGNEOUS rocks from the Rock Formation picture to the ID card. (The level of independence on this step depends on how advanced your reader is.)
3. Talk to students about how SEDIMENTARY rocks are formed. Ask is they can find four sedimentary rocks on the Rock Formation picture. (USE TEACHER BACKGROUND SECTION). Ask students: What are some things you notice about sedimentary rocks? How does it look like they are formed based on the picture?
4. Read the descriptions with/for the students and help them as needed move the SEDIMENTARY rocks from the Rock Formation picture to the ID card. (The level of independence on this step depends on how advanced your reader is.)
5. Talk to students about how METAMORPHIC rocks are formed. Ask them if they can find four metamorphic rocks on the rock formation picture. (USE TEACHER BACKGROUND SECTION).
6. Read the descriptions with/for the students and help them as needed move the METAMORPHIC rocks from the Rock Formation picture to the ID card. (The level of independence on this step depends on how advanced your reader is). Ask students: What are some visual things you notice about metamorphic rocks? How does it look like they are formed based on the picture?
7. Encourage students to return the rocks to the picture and have them tell you the story of how the rocks are formed. (Be sure students return the rocks to the correct locations on the Rock Formation picture before next group begins.)
8. Give students a sticker if they complete their rock identification.

Resources:

Kelly Heid – GVSU geology