Title: Making Rocks

Grade Ranges:
_X_ K-4
____5-8
____9-12

Subject Tag:
Science: Earth Science: Geology
Art and Music: Visual Art

Synopsis:
This science lesson for 2nd and 3rd graders focuses on learning that rocks are made of minerals. Students go on an imaginary journey to the center of the Earth and bring back minerals. Students will make their own rocks using these "minerals" (play dough), create scientific drawings of them, and finally map the rocks.

Keywords:
minerals, rocks, olivine, garnets, quartz, pink feldspar, biotites, scientific drawings

Body:
Prior to this lesson, students should have had some time to observe rocks and ask questions about rocks. This lesson capitalizes on students' interest in rocks. In particular, students often become fascinated with the colors they see on rocks and wonder why they are different colors or what the colors are. These questions are the perfect tie in to this lesson. Encourage these questions before beginning. The steps of the lesson follow:

1. Gather materials for the lesson — play-dough, wax paper, markers, and a digital camera (optional) as detailed below in the technology and materials needed section.
2. Begin by telling students that you're going on a field trip today. Ask them to close their eyes, and then take them on a walk, into a hole, through the different layers of the Earth and finally into the center of the Earth by telling them a story about the trip there. Have them visualize all of the different colored things around them and ask some students to carry them back to your classroom for you.
3. Once you've finished your imaginary journey, ask students to open their eyes and ask them if they know what those different colored things are. Take some suggestions from the group and end by telling them that the colored things are minerals.
4. At that point pull out the minerals, (play dough), and introduce them to the class. Have students repeat each of the names, and as they do so, make a chart on the board for later:

   olivine- the green mineral
   garnet- the purple mineral
   biotite- the black mineral
   quartz- the white mineral
   pink feldspar- the pink mineral

Note: Avoid telling your students that the minerals are actually play dough. Their interest seems to be better retained when they believe there's a possibility that the play dough is actually a mineral from the center of the Earth.

5. Once the class is familiar with these names and colors, show them how to make the rock granite. Explain that granite is composed of 3 different minerals: pink feldspar, quartz, and biotite. Show them an example of a real piece of granite, and make one that looks similar with the three types of play dough.
6. Now that you've modeled the process, ask students to go to their desks. Have helpers give out minerals to each student so that everyone receives a chunk of each mineral. Every student also needs a piece of wax paper to use as a work mat.
7. Have students begin by making a piece of granite.
8. When they've finished, they can construct different kinds of rocks until they have no more play dough.
9. The rocks will need to dry overnight, so find an area for them to stay unharmed for the evening.
10. The next day or next science period, model for students how to make a scientific drawing of the piece of granite. Begin by titling your page. "My Map of Granite" or something similar will do. Underneath, make a detailed drawing of your rock on the board, shading in various parts to make it look as realistic as possible. Use colors to represent the different minerals.
11. Label parts of the rock with their scientific names. For example, finding a pink patch, draw a line from there and put the words "pink feldspar" next to it.
12. Next, students can begin this process. Make sure they draw and label a piece of granite, and then students can choose another of their rocks to draw and label also.
13. Once they've finished they can share their scientific drawings with each other.

Modifications: Using a digital camera to take pictures of the students' rocks is another great way of documenting their work. Then have students glue their pictures into their science journals next to their scientific drawings of the same rocks.

If you have trouble finding different colors of play dough or making them, pick different minerals for the students to use. Blue can be aquamarine or lapis; yellow can be sulfur, etc. Be sure though to have the necessary colors for making granite.

Related Links:
The Official Geology Adventures Web Site
http://www.geologyadventures.com/
The site promotes geology field trips and includes a "gallery" that contains pictures of many kinds of rocks and minerals, many of which are shown in nature.

RocksForKids.Com
http://www.rocksforkids.com/
This site is designed to teach students the basics about rocks and minerals. "How Rocks & Minerals are Formed" and "Identifying Rocks & Minerals" provide excellent overviews. The photos section is still under construction but does contain images of several different minerals.

Play Dough Recipes
http://www.perpetualpreschool.com/playdough.htm
This site lists recipes for play dough, both cooked and uncooked. Many recipes include tips and comments.

Features:
__Contains special education tips
__Quick Activity
__Requires Internet access for students to complete

Objective:
1. Students will learn about and practice making and labeling scientific drawings.
3. Students will be introduced to the idea that rocks are composed of minerals.

Standards:
NY: Physical Setting: 4.3. Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.

NYC: S3a. Properties of Earth materials, such as water and gases; and the properties of rocks and soils, such as texture, color, and ability to retain water. **S7a** .Represents data and results in multiple ways, such as numbers, tables, and graphs; drawings, diagrams, and artwork; and technical and creative writing. **S8c.** A design, such as building a model or scientific apparatus.

NJ: 5.1: All Students Will Learn To Identify Systems Of Interacting Components And Understand How Their Interactions Combine To Produce The Overall Behavior Of The System. **5.10:** All Students Will Gain An Understanding Of The Structure, Dynamics, And Geophysical Systems Of The Earth.

CT: 7. The Earth: Students will understand the processes and forces that shape the structure and composition of the Earth.

Prerequisite Skills:
1. Students should know that rocks are formed in different ways.
2. Students should have had some experience looking at and exploring different rocks.

Time required:
120 minutes divided over two days

Technology and Materials needed:
1. bags of play dough in different colors: green, white, pink, purple, black. (If possible, have a bag ready for each student before class.)
2. a wax paper square for each student to work on
3. markers or colored pencils
4. digital camera (optional)

Procedures:

Assessment Criteria:

1. Observe and assess the students' completed assignments. Their drawings should look similar to rocks and also include the correct labels.
2. Listen in while the children are doing this activity, and write down what students say. This form of continuous assessment is very helpful for later when the teacher is trying to decipher whether the students understood the lesson completely.

Recommended Lesson Plan Review Date:
N/A

Review Comments: