Rock Analysis

By Sara Saber and Marie McCrary

Grade Level: 8th grade

Unit Topic: Rock types and measurements

Time/class session allotted to unit: Three class sessions (45 minutes each)

Objectives: The purpose of this lesson is to classify and measure rock samples that were collected at the School of Conservation.

Learning goals:

Students will be able to:

- differentiate between sedimentary rock, igneous rock and metamorphic rock
- measure volume and density of rocks
- determine what types of rocks are expected to be found in different places
- relate different densities due to the differences in composition

Key Vocabulary/Concepts:

- sedimentary rock
- metamorphic rock
- igneous rock
- rock cycle
- magma
- erosion

Materials:

- Different types of rocks
- Graduated cylinder
- Scale
- String
- Scissors
- Rock guides
- Internet
- Rulers
- Ziploc bags

- Markers
- Scratch Plate Kit

N.J. Core Curriculum Content Standards to be addressed:

5.1.8.A, 5.1.8.B, 5.3.8.B, 5.8.8.A, 5.8.8.C, 4.2.8.A, 4.2.8.D, 4.2.8.E, 4.5.8.A, 4.5.8.B, 4.5.8.C, 4.5.8.D, 4.5.8.F, 4.5.8.E.1

Procedure:

Day 1:

1. Before beginning the experiment review the different types of rocks and how each type forms showing them actual rock samples.
2. Separate the students into groups of four.
3. Give each group a mixture of different types of rocks and ask each group to separate the rocks into the three types.
4. As the students are working go around and watch them separate the rocks into the different groups making sure that they are not doing so incorrectly.
5. Introduce Moh's Scale of Hardness and have students rank their samples using scratch plates. Have students record the physical appearance and the hardness number in their notebooks.

Day 2:

6. Have students explain and derive formulas for area, density, and volume.
7. Separate the students into groups of four and give each student three rocks of different density.
8. Using the rock guides, have students determine what type of rock they have.
9. Ask them to predict which rock will have a greater density (asking them to compare between the two rocks of similar size).
10. Next, tell students to measure the area of the rocks using the string and rulers by wrapping the string around the rock and then taking that piece of string and measuring its length against a ruler.
11. Next, tell them to measure the volume of the rocks using the graduated cylinder string and water. Explain to them that they must record the original volume of the water and the final volume which is after the rock is dropped into the graduated cylinder with a piece of string wrapped around it. They should then subtract both volumes to obtain the final volume.
12. Next, tell the students to use the scale to weigh the rocks and let them record the mass.
13. Next ask them to calculate the density using the formula (density = mass/volume).
14. Ask the students to determine if their predictions were correct.
15. Finally, using the hardness and density data, have students identify their rock samples.

Accommodations made for students with disabilities and for ELLs:

- Each student within a group will be given a specific task so as to accommodate students with disabilities by giving them a task they enjoy doing and that conforms to their capabilities.
- To accommodate ELLs, use the guides as well as pictures from the Internet and actual rocks to ensure that they understand thoroughly the meaning of each type of rock.

Assessment:

As the students perform their experiments, go around the classroom and evaluate their participation with their group members as well as the performance of the group as a whole in terms of differentiating between the rocks and making the correct measurements.