

Part 1: Teacher and School Information

Year Attended Workshop: 2014

School: SCARLET OAK SCHOOL Grade(s): 3 & 4 Class Size(s): 27

School Address: 5731 ALBERT DRIVE, OAK FOREST, ILLINOIS

Part 2: Utilization of workshop knowledge

Using the supplies and materials donated from sponsors I taught my students to use their five senses to learn about rocks. I combined lessons from the National Energy Foundation's book, *Out of the Rock* and the USGS website for primary education lessons for the unit on Rocks, Minerals and Mining.

The lesson: Mock Rock Cycle was used to focus the students' attention as a 'Point of Inquiry' to how rocks are formed. Students were asked questions about the characteristics (hardness, texture, color, size) to assess their knowledge and to stimulate interest in learning ("can you see different grains in the rock?") using hand lenses and rock samples from the teacher kit.

How can your lesson be improved?

Students' understanding, focus and continued interest in rocks would increase by having a digital microscope and rock tumbler available.

Students will be better equipped to closely examine rocks, collect data and sort and categorizing if they had the use of a digital microscope in the classroom to share. The Dino-Lite can be connected to our existing proboard to project images for the class to view which would increase student understanding.

Using a rock tumbler would increase their understanding of geology. The objective the lesson would be to model the weathering of rocks by abrasion.

Part 3: Proposal to enhance teaching using grant money

Dino-Lite digital microscope

The lesson, *USGS: Rock Stories* would be enhanced by teaching students how to make geologic observations by more closely examining rock specimens. Students will learn that not all rocks look the same, and the things that make rocks look a little different from one another give clues about each rock's "story". By having access to a digital microscope, students will understand that sedimentary rocks are made up of pieces of smaller rocks or "grains". Learning about grain size teaches students about how much energy it took to move the grains. Transport of big grains requires a lot more energy

than smaller grains. Noticing the shape of the grain teaches the students about the mechanical weathering history. Then will understand that the longer a rock spends in a weathering environment, the rounder it gets. Rock specimens from the teacher kit will be used for investigation. Currently, students can only use small plastic hand lenses to make observations of the rock characteristics. When students can closely examine the rocks they can use that knowledge and understanding to demonstrate their learning to build a mock rock as a culminating activity.

Rock Tumbler

Using a rock tumbler will give students a hands-on learning experience of weathering rather than a lecture about weathering and erosion. Students will have the opportunity to demonstrate their understanding of these concepts and work with geologic materials as they make predictions and take measurements, record data, and do simple calculations.

Objective: To model the weathering and erosion of rocks by abrasion.

Materials: five different rock samples (granite, sandstone, limestone, gabbro, and slate), rock tumbler, sand, water, scale

Procedure:

1. Describe, draw and identify the rock samples in student science notebook. Write definitions of weathering and erosion.
2. Create an experiment, using a rock tumbler, to quantify (evaluate with numbers) the rate at which different rocks weather and erode. Predict which rock will be most resistant? Students will draw all five rocks in order from most resistant to least resistant in the notebook and justify their predictions based on what they know about each rock (I think this because). Find the mass of each rock sample and record the data in the table. Run the rock tumbler for 24-hour intervals, weigh the samples and record the data.

Once students have completed all rounds of tumbling and data collecting they will graph their mass results. Students will draw and label all five rocks in order from most resistant to least resistant in their notebooks. Discuss if the order matches their prediction? Teacher will ask students to consider and comment on how the rock's origin might influence its hardness. Justifying their predictions provides insights into their understanding of rocks, weathering, and erosion.

Outcomes: The weathering is the physical abrasion of rocks hitting one another or the walls or grinding against the sand. The erosion, or transport, is the constant tumbling (rolling, falling) of the stones in the tumbler. The experiment highlights the physical

characteristics of these rocks. The most resistant rocks are in order: granite, gabbro, sandstone, limestone, slate.

Part 4: Budget (500 characters maximum)

1. Dino-Lite AM3111 0.3MP Digital Microscope **\$149.00**
(Most popular hobbyist digital microscope)
2. MS21W Articulating Stand **\$39.00**
Microscope.com
1222 McDowell Avenue NE
Roanoke, VA 24012
3. LORTONE BIG Rock Tumbling Kit 4 Grits 3lb **\$173.00**
<https://www.amazon.com>
(The tumbler is quiet, sturdy and easy to operate. Positive customer reviews are 4.4 out of 5, 77% of purchasers gave it a 5 star rating)

Both items will notably enhance student learning by promoting earth science and the aggregate mining industry which can be used for many years and shared between 6 teachers.