Part 1: Teacher and School Information

Teacher: E-Mail Address:

Year Attended Workshop: 2007

School: Lettie Brown Elementary Grade: 4th Class Size: 2 classes @ 24 students each

School Address: 2550 N. Morton Ave. Morton, IL 61550

Part 2: Teaching Activity

In the past as part of my 4th grade Earth Science unit, I have used an activity I learned at the Rocks, Minerals, and Mining in Today's Society Teacher's Workshop for teaching part of the rock cycle. The activity is called Sedimentary Sandwich and Metamorphic Munch and it is part of my rocks and minerals unit. The activity involves using white and wheat bread, and peanut butter and jelly to simulate the layers that make up sedimentary rock. This activity requires the students to use the science process skill of making a model. Once the students have created their sedimentary sandwich, we cut the sandwich in half and talk about the different layers we can observe. Next the students insert their sandwich in a zip-sealed sandwich bag. As a class we then discuss how metamorphic rock can be formed from heat and pressure. I instruct the class to place the sandwich on their chair. We sit down carefully on the sandwich and use our body weight to apply heat and pressure. Finally, we remove the sandwich from the bag and observe the changes that occurred as we went from a sedimentary sandwich to a metamorphic munch. I point out the ribbon –like layers that are characteristic of many metamorphic rocks. The class is then invited to enjoy eating the metamorphic munch. This activity has always been a highlight of the Earth Science unit, and I feel it has been an effective teaching tool that helps the students learn about the rock cycle.

As excellent as the sedimentary sandwich activity has been, I feel it could be improved by making a connection to the mining industry in Illinois. I would start by creating a Smart Board notebook to show the class. It would feature the Mine Safety and Health Administration website. This site, called Cyber Prospectin' found at http://www.msha.gov/KIDS/MINING.HTM allows the class to research what each state mines. After showing the class a sampling of a few of the states and their mining products, I would click on Illinois. We would learn that the principal minerals mined in Illinois are crushed and broken stone, portland cement, sand and gravel, and coal. The notebook would also have a slide that shows that much of the crushed and broken stone is limestone and dolomite, both of which are sedimentary rocks. Another slide would show that portland cement is made from limestone and clay. Additionally, I would

create slides which explain that sand and gravel are components of sedimentary rock and that many coal deposits are composed of layers of coal separated by layers of sandstone, shale or limestone. I would like to find a model that uses real materials, which students could use to observe how sediment layers form. I would also like to add some ingredients to the sedimentary sandwich activity to incorporate what we learned about mining products in Illinois.

Part 3: Proposed Activity Using Grant Money

To enhance the rocks and minerals unit, I would obtain Sedimentator kits from Nasco Science available at http://www.enasco.com/product/SB27466M . This kit includes a tube with different sediments that demonstrates to students how materials are deposited and layered. The kit contains all the needed materials as well as a 12 –page student booklet and a teacher's guide. I would also order 10 additional Sedimentator tubes. This would allow students to work in small groups on the sedimentation activities. By using the Sedimentator tubes the class will be able to have first- hand experience observing the process of sedimentation. In addition to the Sedimentator sedimentation model, I would also add some additional edible materials to the Sedimentary Sandwich activity to mimic the mining products of Illinois. Since portland cement is made of limestone and much of the crushed and broken stone is limestone, the white bread in the sandwich would represent those products in the Sedimentary Sandwich. The wheat bread slices would represent sandstone. Peanut butter will be used to mimic clay and jelly to represent mud. The cereal Reese's Puffs are rounded and colored appropriately to make good pieces of "gravel". Pecan chips, mini-marshmallows and slivered almonds would make good representations of the dolomite and limestone that are mined as crushed or broken stone or aggregate, as it is also known. Vanilla wafers could be rubbed together to simulate weathering and erosion, and sprinkled on the sandwich to be deposits of sand. Finally raisins would be used as coal deposits.

After the students had a chance to use the Sedimentators to observe how sedimentary rocks are formed, I would show them all the materials that would be available for their sedimentary sandwich model. I would ask them to make a labeled diagram of what their sedimentary sandwich model will look like. These diagrams will serve as a design "blueprint" as the students construct their sandwich. Students will construct their sandwiches using the ingredients of their choice in different layers as their diagram shows. By adding the step of diagraming before constructing the model, the students will be incorporating science and engineering practices found in the Next Generation Science Standards. The additional ingredients allow the students to have a better idea of the mining products of Illinois. Once the sandwiches are stacked in sedimentation layers, I will direct the class to use their hands to gently press on the sandwich to simulate the processes of cementation and compaction. The class would then use a plastic knife to cut their sandwiches in half so they can see a cross-section of their sedimentary model.

The students would then place their sandwiches in a zip-seal bag, and then in a second bag to prevent leakage. I will direct the class to place the sandwiches on their chairs and sit on them to apply heat and pressure and turn the sedimentary sandwiches into metamorphic munch. The class will take the sandwiches out of the bags and observe the changes that have taken place. Finally, the students would be invited to eat their sandwich models.

To assess student learning, the students will draw models, and label the components of the formation of sedimentary and metamorphic rock during the rock cycle. This will take place during the next science lesson. I will provide a rubric detailing what is expected of the students. This is an enhancement of what I have done in the past. Previously, I had the students fill in a rock cycle worksheet. I believe by giving the students more materials to work with, connecting it to the real-world application of the mining products of Illinois, and incorporating the model drawing and diagraming step, the students will be making the connections necessary to remember what they experienced and share their knowledge in a concrete way.

Part 4: Budget

Items	# Needed	Price per Each	Total
White sandwich loaf bread	6	$2.50	$15.00
Wheat sandwich loaf bread	6	$3.20	$19.00
Peanut butter – 4 lb. jar	2	$9.00	$18.00
Jelly – 32 oz. jar	3	$2.70	$8.00
Reese's Puffs cereal –box	1	$4.70	$4.70
Slivered almonds -2.5 oz. bag	3	$2.50	$7.50
Raisins - box	1	$4.00	$4.00
Pecan chips - 2.5 oz.	2	$4.00	$8.00
Vanilla Wafers – box	1	$3.80	$3.80
Mini-marshmallows – 1 lb. bag	1	$2.50	$2.50
Sedimentator Kit	1	$16.20	$16.20
Sedimentator Tubes	10	$13.15	$131.50
		TOTAL	**$238.20**