Lesson Plan: Three Types of Fossils

(This lesson was adapted from a lesson found at: http://www.uen.org/Lessonplan/preview.cgi?LPid=18978)

Unit Name: Fossils Grade/Subject: Fourth/Life Science

Evidence Outcomes:

a. Use evidence to develop a scientific explanation for:
    1. What fossils tell us about a prehistoric environment
    2. What conclusions can be drawn from similarities between fossil evidence and living organisms (DOK 1-3)
b. Analyze and interpret data to generate evidence about the prehistoric environment (DOK 1-2)
c. Evaluate whether reasoning and conclusions about given fossils are supported by evidence (DOK 1-3)
d. Use computer simulations that model and recreate past environments for study and entertainment (DOK 1-2)

Lesson Learning Targets: Students will be able to identify three different types of fossils

Vocabulary: Preserved Organisms: remains where an organism's body tissue, or parts there of, become fossilized in an altered or actual state-freezing, covering with sap and becoming amber…

Mineral Replacement Fossil: Replacement takes place when water dissolves the original hard parts and replaces them with mineral matter. This chemical action may take place slowly, reproducing the microscopic structures of the original organism. Bone, shells and wood are often well preserved in this manner. The most common replacement minerals are calcite, silica, pyrite and hematite. The snails of the Green River Formation in Wyoming are often replaced by silica, a variation of quartz. The ammonites and goniatites of Europe and North Africa are commonly replaced by hematite, which is an iron mineral similar to, but more stable than pyrite. When the original hard parts are replaced quickly they often loose all trace of their original structure, leaving the original shape, but no detail. Agatized woods are often preserved in this manner, (agate is a form of quartz).

Cast Fossil: Impression formed when a liquid substance is poured into a form or mold and then hardens into that shape.

Mold Fossil: A hollow structure used to give form to a liquid substance as it hardens.

Materials: Preserved Organisms: 3 X 5 index card, crayons, hot glue gun and glue sticks, brown pipe cleaners or actual insects brought in by students.
Mineral Replacement: Sponges, scissors, sand, salt, water, large container with pouring spout, large Cool Whip containers, Measuring cups, long handled spoon.
Impression Fossils: Bag of Plaster of Paris, bowl and spoon, water, 8 oz. paper cup, measuring cups, plastic fossils, petroleum jelly.

Background information: Background information on the different types of fossils can be found at the following sites:
http://www.ehow.com/info_8147260_describe-types-fossils.html
www.pangeainstitute.us/resources/fossil**types**.pdf
http://www.fossilmuseum.net/fossilrecord/fossilization/fossilization.htm

Learning Sequence: What will happen during the lesson? Include *differentiation strategies, materials needed, and 21st Century Skills* that may be included.

Assessment: How will you know if they got it?

- Student journals can be used to assess student learning.
- Students can be asked to identify several different types of fossils.

Into(Launch): Ask the students the following questions and have them give a thumbs up if they agree or thumbs down if they disagree.

1. Scientists learn about Earth's history by studying fossils.
2. Fossils are usually found in igneous rocks.
3. Only the soft part of an organism can become a fossil.
4. Impression fossils are also called track fossils.
5. An organism can be preserved without changing by being frozen in ice.
6. Amber is an insect found fossilized in rocks.
7. Minerals that fill tiny holes in an imprint form mineral replacement fossils.
8. Replacement fossils are all the same color.

Explain that the students will be observing some fossils, some will be the same they looked at yesterday, to gather new information.

Have all of the fossils with numbers by them spread out on tables. Students will be using their journal to record their observations and then returning to their group to organize the group's observations.

Fossil Observations

In this activity, students will work in cooperative groups of five to six students (depending on class size) to use the process skills of observing, comparing, and inferring. When doing this activity it helps to use a timer; typically, about five to seven minutes allows them enough time to observe their fossil and record the information.

1. Students in each group should count off from one to five. Then students assemble with students from other groups who have the same number. Each numbered group will examine a different fossil, discussing the characteristics they observe.
2. Students will record their fossil observations in their own science notebook, along with a detailed drawing of the fossil. Their written observations should include such things as size, color, shape, texture, and any defining features.
3. Students go back to their original group to share what they have observed and learned about their fossil. Use the Fossil Chart to organize the group's information.
4. Students can then use their observations to ascertain similarities and differences among the fossils. They should use logical thought processes to show relationships and make inferences as to the fossil organism's original environment. It is also important that students use the identified features to compare the fossils to living organisms that are familiar.
5. Each group can then share with the class as a whole.

Share the following PowerPoint program on fossils with the students:

http://teacher.scholastic.com/scholasticnews/magazines/scienceworld/assets/SW-POWERPOINT-FOSSILS.ppt

Explain to the students that they will be recreating three of the fossils the PowerPoint mentions.

Creating Three Different Types of Fossils:

Preserved Organisms- Model of Amber

Begin by discussing with students what a fossil is and how scientists use fossils to help explain Earth's past. Since there are currently no living dinosaurs, the only evidence we have about dinosaurs and other prehistoric organisms is what can be inferred from fossilized remains. Physical models that correspond to real objects and events can be used to explain and understand things and how they work. Using the process skill of formulating models, students will develop a physical representation of a preserved organism:

1. Give each student a 3 x 5 index card. Have each student draw about a one-inch circle on the left hand side of the index card. Have them color it the color that they think is closest the color of real amber.
2. Students should place the item representing the insect on the colored circle.
3. Students will bring the index card and insect to you to encase in hot glue, covering the colored circle and insect.

4. Discuss how this represents the resin that fossilized into amber over a period of millions of years, preserving the insect.
5. On the right hand side of the card, have them write the process that preserved the insect.

Mineral Replacement- Sponge Fossil

Using the process skill of formulating models, students will develop a physical representation of a mineral replacement fossil:

1. Each group will place their sponge shapes into a container holding sand, covering the sponge shapes completely. There should be a layer of sand below and above the sponges.
2. Mix two parts salt to 5 parts water in another container. Make sure that the salt is dissolved into the water.
3. Slowly poor the salt water on top of the sand until it completely soaks the sand.
4. Leave the container of sand in a warm, dry place until it completely dries. You can expedite the process by putting it in the oven at 250 degrees F for a few hours, but you will need to use a container that can go into the oven.
5. When it is dry, excavate the sponges with a spoon. Have students use a grid to record where each "bone" was found.
6. See how the sponges turned "bonelike." Discuss with students how when the salt water was added to the sand, it filled the pores in the sponge. When the water evaporated, the salt remained in those pores. This simulates how dissolved minerals replaced the cells in bones, wood, etc. Fossils are found in sedimentary rocks that are formed by cementation and compression.

Impression Fossils- Making Traces

In this model, Plaster of Paris represents the soft sediment that an organism would fall into before it becomes a fossil. Using the process skill of formulating models, students will develop a physical representation of an impression fossil:

1. Mix up Plaster of Paris to about the consistency of thick cream.
2. Pour approximately an inch into each student's cup, or have students mix their own in a margarine tub or their school milk carton that has been opened completely and rinsed out. Have them measure 1⁄2 cup of Plaster of Paris dry, then add approximately 1/4 cup water, and stir. Let it sit for a couple of minutes to start setting up.
3. Place their leaf, feather, shell, or other small item vein side down, gently into the Plaster of Paris until it makes complete contact with the surface. (I've had better results in getting the object out, if they have put a thin layer of petroleum jelly on the surface of it before putting it into the plaster.)
4. Allow this to cure for several hours.
5. After the object making the impression is removed, have students in different groups trade and match fossils with the objects that made the fossil.
6. Students should respond to these questions in their journals: How are your fossil models like a real fossil? How are your fossil models different from a real fossil? How can your fossil models help us to understand real fossils? What can real fossils tell us about the world at the time they were formed?
7. Follow the journal writing with a class discussion sharing their journal responses.

Closure: After you have created all three types of fossils, put them side by side with the actual fossils and have the students discuss how their representations match the originals.

Beyond(Independent project/practice): Students that want to go further can research the other ways fossils are made.

Reflection: What worked well? Didn't? How will you proceed with the next lesson based on your formative assessment?