fossils

ALABAMA Museum of Natural History
THE UNIVERSITY OF ALABAMA

6-8

Science and Social Studies Standards Covered:

SC (6) 2. Describe factors that cause changes to Earth's surface over time.

SC (7) 6. Describe evidence of species variation due to climate, changing landforms, interspecies interaction, and genetic mutation.

SS (7) 3. Describe processes that shape the physical environment, including long-range effects of extreme weather phenomena and human activity.

SS (8) 1. Explain how artifacts and other archaeological findings provide evidence of the nature and movement of prehistoric groups of people.

The Alabama Museum of Natural History (AMNH) is part of the University of Alabama Museums and is located on the UA campus in Smith Hall. Opened in 1910, it is the oldest natural history museum in Alabama, and one of the oldest natural history museums in the nation. AMNH's mission is to broaden the knowledge of natural sciences and human culture through collections and quality programs of research,

Fossil Program: Take a step back 350 million years ago (mya) in Alabama's history to when dragonfly wings were three feet wide and grasses grew to 80 feet tall! Learn about a time when Alabama was mostly covered in oceans, giving way to fearsome aquatic beasts and giant turtles. Discover Alabama's dinosaurs and Ice Age animals, some of which may surprise you! This program is an educational ride through Alabama's prehistoric past which includes a presentation and hands-on experience with actual fossils. And it all happens **in your classroom**! The program discusses what a fossil is, the fossilization process, and how paleontologists recover them including a look at the law of superposition. The presentation also discusses geologic time from the Cambrian period, 350 mya, to the Quaternary period (present) and uncovers what creatures lived in Alabama during those times.

For more information or to schedule this program call **(205) 348-7550 or email **programs@ua.edu****

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Did you know?

The Alabama Museum of Natural History is right on the University of Alabama campus? It is housed in Smith Hall near the Gorgas Library.

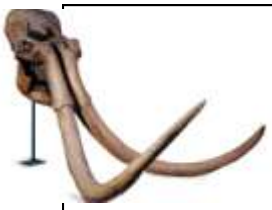
Did you know?

AMNH is a great destination for school field trips. Guided tours cost $3 per student. If you would like a hands-on component added, a tour and Discovery Lab is only $5 per student.

For information regarding field trips, you can call (205) 348-7550 or email programs@ua.edu.

For more info or to schedule this in-school program for your room, email programs@ua.edu

www.amnh.ua.edu



Suggested Pre-visit activities:

- A Day in the Life of Paleontologist Thomas Carr
- Evolution website
- Science Journal questions
- Future Fossils

Suggested Post-visit activities:

- Science Journal questions
- Geologic Time Postcards
- Fossil Beds

books about fossils and dinosaurs:

- *Eyewitness Books: Prehistoric Life* by William Lindsay
- *Giant Sea Reptiles of the Dinosaur Age* by Caroline Arnold
- *When Mammoths Walked the Earth* by Caroline Arnold
- *Rocks and Fossils: A Visual Guide* by Robert Coenraads

videos about fossils and dinosaurs:

- *Discovering Alabama: Tracks Across Time*
- *Discovering Alabama: Geologic History of Alabama*
- *Bill Nye the Science Guy: Fossils* Episode 79

For more information or to schedule this program call **(205) 348-7550 or email **programs@ua.edu****

SCIENCE JOURNALS

Your class can make fossil entries in your science journals! Here are some ideas…

- What is a fossil? What types of materials become fossilized?
- What does relative dating mean?
- What methods are available for absolute dating?
- What is the law of superposition?
- If you were given this set of bones, what animal do you think they came from?

- What is the difference between a paleontologist and an archaeologist?
- Name the current relatives of these ancient species:

  Crinoid-

  Echinoid-

  Trilobite-

  Ammonite-

- According to geologic time, what eon, era, period, and epoch are we in today?

Geologic Time Postcards

Use 5x7 notecards, or half of a sheet of paper to create a postcard from your favorite geologic time era or period. Research each time to find defining characteristics such as

- the dominant species
- physical appearance of the landscape
- position of the continents and state of the oceans
- major events
- other distinctive aspects

Find or create a picture which best depicts your time period.

You can find an example on the next page.

John Doe

5555 Paleozoic Ave.

Tuscaloosa, AL 35487

Hello from the Coal Age! Well, its actually the Pennsylvanian period, but its called the Coal Age because this is the period of time where all of our coal today comes from. Plants, who get their energy from the sun, were buried deep in peat bogs and swamps, and were unable to release their stored energy. Over time, heat and pressure turned these plants into rock, trapping their stored energy. Thanks to heat and pressure, and a few dead plants, we have coal!

Everything was larger in the Coal Age. Trees and grasses grew over 60 feet tall, and insects could be a big as this guy, with a wing span of three feet! Cockroaches could even be six inches long!

I'm glad I didn't live back then, because I do not like big bugs!

Future Fossils

by Gerald WM. Foster

Materials and Equipment:

The whole class will need– real fossils

Each student will need– Objects that can be used to make impressions and imprints such as: paper clips, washers, key chains, twigs, leaves, sea shells, keys, coins/Different kinds of clay such as: play-doh, plasticene, floral or potter's clay, flour and salt mixture, plaster of paris, sand, dirt, clay/Water/A shallow container/Newspapers

Focus:

Webster's New World Dictionary defines a fossil as "any hardened remains or traces of plant or animal life of some previous geological age preserved in earth's crust."

Scientists generally agree that fossils can be created by four different processes. One process involves animal remains such as shells, bones, and teeth that leave impressions in beds of sand or sticky mud which then slowly turns into rock. In another process mud fills and object, such as a shell, and then hardens into stone. The object then dissolves or decomposes, leaving a stone cast.

The other two processes involve the formation of fossils from softer animal or plant parts. The plant or animal is covered with mud with slowly hardens. Mineral-laden water traveling through the hardened mud seeps into the plant or animal material. Bit by bit minerals fill the spaces in and around the dead cells of this material and harden. This process is referred to as petrification. Finally, other fossils are created by a very slow decay of skin, flesh, leaves, etc. that become thin black sheets of carbon. Scientists can use these fossil remains to understand the type of prehistoric animals and plants that once existed, whether they lived on land or in water and the type of climate that supported them.

Challenge:

Can you tell what kind of object made from an imprint in a material? Describe the characteristics of the medium that would make the best fossil imprint. How do the characteristics of the object affect the type of imprint it makes?

Time: 40-60 minutes

Procedure:

Question– Do you know how fossils are formed?

1.Have students bring to class any examples of real fossils they can find or may have already collected and pass them around the class.

2.Spread out newspapers to cover the work surface. Take several small objects (the objects should vary in pliability and hardness) and make imprints in a small amount of clay. Use a different piece of clay for each object. The greater variety of objects your students use, the more likely they will be to understand why only certain kinds of plants and animals left behind abundant fossils.

Question-Which of the following objects are likely to form a clear imprint in the clay: peanut shell, grape, penny?

3. Divide the class into groups of four or five students each, an then have the students pass their clay impressions on to the other members of their group to guess what object made the imprint.

4.Repeat steps 2 and 3 using other types of clay.

Question-What kinds of objects leave the clearest imprints? Which media best hold an imprint? How clear is a paper clip or twig imprint in modeling clay compared to one left in a sand/water medium?

5. Try other media which can make a more permanent, fossil-like imprints such as plaster of paris or flour, salt, and water mixture, or try using different kinds of soils such as sand or clay with water. As you mix water with these various media, maintain a soft, clay-like mixture.

6.To wrap up this activity, take a walking field trip to search for evidence of natural or human-made fossils (such as footprints). Keep written and photographic records of fossils found in different places. Students can make up stories about the conditions under which the fossils were made.

Further Challenges:

Try to create mixtures that will give clear imprints of objects when they are buried in the mixture. Choose one or several media, for example, sand and plaster of paris could be mixed together with water or sand and glue. Bury several objects with the mixture in a paper cup, and let the mixture harden. Peel away the paper cup from the mixture, an use a nail or some other object to excavate the objects and their imprints. Note the detail and depth of the imprint left by the objects. Students can compare their mixtures and the imprints left by the objects. What mixture made the best fossil medium?

Other discussion questions might include the following: What kind of fossilized remains of our society will future generations find? What evidence do we now have of past generations? Where can you find evidence left by past generations? Can you find natural fossils in human-made structures?

References:

Krockover, G.H. (1986, Winter). Excavating. *CESI News*.

Krockover, G.H. (1986, Winter). Fossils are Fun. *CESI News.*

This lesson plan was found in Water, Stones, and Fossil Bones edited by Karen K. Lind.

Fossil Beds

By David R. Stronck

Materials and Equipment:

Each group of two students will need: A large cardboard box with a bottom surface of at least 30 cm x 30 cm, sand (or loose soil) to cover the bottom with a thickness of 2.5 cm-7.5 c.m., bones of a chicken or other small animal, a sturdy plastic fork, a magnifying lens (optional), a picture of the animal whose skeleton is being reconstructed.

Safety note: provide plastic forks for the students to dig up the bones as there is a slight risk of them injuring themselves on sharp bones if they sure their hands to do the sifting.

Focus:

Fossils are impressions, traces, or remains of dead plants or animals that are preserved in rocks. After scientists find fossils, they work on the problems of interpreting their origin. They try to answer such as questions as: What did the living animal or plant look like? What did it eat? How did it move? Why did it die?

Challenge:

Can you reconstruct the skeleton of an animal for its "fossil" bones and describe what it was?

Time: 45 minutes

Procedure:

1.This activity should follow one on human bones. For example, the students could learn how to name major bones shown on a cardboard Halloween skeleton to "feel" these bones in their own bodies.

2.Obtain the bones of enough small animals to provide one skeleton for each box. Perhaps the easiest bones to collect are those from whole fryer or roaster chickens. Other possibilities are turkey, if your boxes are large enough, and fish. The key is to have all or most of the skeleton. Simply collect the bones after eating and remove any fat or skin by boiling the bones in soapy water.

3.Scatter the bones of one animal over the surface of the sand or soil in the bottom of a box, and then carefully bury them. Middle school students may be able to manage the activity by having the bones of two different animals in the same box.

4.Discuss how scientists know so much about dinosaurs, explaining that all of our knowledge about dinosaurs has come from scientists digging bones out of rocks. Scientists then organize the bones by following the model of animals that are now living.

5.Carefully dig up the bones from the box with a plastic fork. (If they use their hands they might cut or puncture themselves on any sharp bones.)

Question– How many legs did your animal have? Could if ly? How did it eat? Could it run quickly? How tall was it? How much did it weigh? Why did it die?

1.Working from a picture of the animal species whose bones are buried, arrange the bones in the form of that animal. Tell the students there is one "fossilized" animal in each box. As an option, they may examine the animal's bones, especially the small ones, with a magnifying lens. Under magnification, the students may discover such things as the long bones are hollow and the ends of the bones have cartilage. After finding all the bones, ask the students to describe their anima. If the students want to "preserve" their skeletons, they may glue the arranged bones to a cardboard sheet or wooden board.

Further Challenges:

Encourage the students to bring to class models of dinosaurs and books about dinosaurs. Some children have stuffed animals that are dinosaurs. Help the children to discuss theories about how dinosaurs became extinct. Perhaps they died of cold and starvation after the Earth's atmosphere was filled with dust or volcanic ash either from a giant meteorite or from volcanic activity.

To explore real fossils, find out if there is an exposed fossil bed near your school and either take the children to dig some fossils or bring some of the fossils to the school into examine and discuss. To find out whether there is a fossil bed near your area, contact the geology department of your local community college or university.

References:

Stronck, David R. (Ed.). (1983). *Understanding the healthy body: CESI sourcebook III*. Columbus, OH: SMEAC Information Reference Center.

Bare Bones Poster. (1984). National Science Teachers Association. Washington, DC.

This lesson plan was found in Water, Stones, and Fossil Bones edited by Karen K. Lind.