HOME SCIENCE TOOLS
THE GATEWAY TO DISCOVERY

Young Science Explorers
Science fun for 4 to 9-year-olds!

October 2009 – Dinosaurs & Fossils

If no one has ever seen a living dinosaur how do we know anything about them? What are fossils and what can they tell us? Learn the answers in this issue!

Fossil Science Projects

Make a Fossil!

Use shells, plants, or other small objects to make prints in a special clay made with coffee grounds.

What You Will Need:

- 1 cup coffee grounds
- 1 cup flour
- 1/2 cup salt
- 1/2 cup cold coffee
- Mixing bowl
- Mixing spoon or spatula
- Wax paper
- Cookie cutter or glass to make circles
- Shells, ferns, or small animal and insect toys

What To Do:

1. Mix the dry ingredients together, then stir in the coffee to make a dough.
2. Press the dough onto the wax paper with your hands or a spatula.
3. Cut circles out of the dough using the cookie cutter or upside-down glass.
4. Press the objects into the dough, then carefully lift them out.
5. Let the dough "fossils" harden overnight. If they are not completely dry, turn them over and let them dry for another day.

What's Happening?

In this project, you made your own fossil by using clay, and pressing objects into it to make a print. When the clay hardened, the print still showed up. Sometimes footprints left by animals and prints of plants turn into fossils. When they do, the prints are pressed into rock, just like the prints you made in this project. When fossils of hard objects like bones and teeth are formed,

they usually form a raised-up "rock" in the shape of the object instead of an indentation. That's because the objects get buried and their shape is filled in with different minerals from the ground they are buried in.

What Would A Dinosaur Eat?

Dinosaurs like sauropods (examples: Apatosaurus and Brachiosaurus), stegosaurs (examples: Stegosaurus and Kentrosaurus) and ceratopsians (examples: Triceratops and Styracosaurus) were herbivores, which means they only ate plants. They would probably eat just about every part of plants like leaves, stems, roots, blades of grass, and even twigs and branches. Dinosaurs who were herbivores had to eat a lot more than those who were carnivores (meat-eaters) to get full, since plants are not as filling at meat. They had blunt or flat teeth to help them pull leaves off of plants and grind up the plants. Some herbivore dinosaurs had pouches in their cheeks where they could store food before swallowing it and some would swallow rocks which helped them grind up the plants they ate.

Get permission to go outside and hunt around your yard or a park for things that herbivore dinosaurs might have liked to eat. Think about what kinds of plants different dinosaurs might have liked or been able to find. For example, dinosaurs with long necks like Apatosaurus could reach way up in trees while smaller ones with short necks and large heads like Polacanthus probably liked to eat shrubs and plants that grew lower to the ground.

How many plants do you think a dinosaur could eat? It's hard to know exactly, but we can get an idea of how much they might have needed by studying other large herbivores that are still alive today, like giraffes. An adult male giraffe can eat up to 100 pounds of plants in a day! Most plant-eating dinosaurs were much larger than giraffes, so they needed even more plants to eat.

What do you think the places where dinosaurs lived looked like compared to what your yard or the park you visited looked like? Do you think there would be more plants? What else do you think the land needed for the dinosaurs to live?

Fun Facts

- The dinosaur with the longest name is Micropachycephalosaurus (pronounced MY-cro-PACK-ee-SEF-ah-lo-SAWR-us).
- Dinosaurs that ate mostly plants would sometimes swallow stones or rocks to help their stomachs break up their food.
- Triceratops have three horns on their head, and their skull is about 10ft tall!
- Scientists have found and identified fossils of over 300 different kinds of dinosaurs!

Silly Science

- What do you get when a dinosaur steps on your garden?
    - *Squash!*
- What makes more noise than a dinosaur?
    - *Two dinosaurs!*
- What dinosaur is the worst driver?

    - *Tyrannosaurus Wrecks.*
- What do you get when a dinosaur sneezes?
    - *Out of the way!*

Way Cool Websites

- Play this fun game, and learn how fossils can be made at the bottom of the ocean.
- Color this picture online of a dinosaur hatching from an egg.
- Dig up some fun while finding fossils of different dinosaurs in this game. Be sure to read the "factoid" for each dinosaur to learn more about it!

Teacher Tidbits

What are Fossils?

Fossils are what's left of plants or animals after being buried in mud for a very long time until it turns into rock. Hard parts of animals, like bones and teeth, are the most common things that turn into fossils. Fossils can also be in the shape of something that has been left behind by an animal, like a footprint or a burrow - a hole that an animal dug in the ground to live in. Some fossils are the remains of animals that lived long ago and are now ***extinct***, like dinosaurs. Although there are no dinosaurs alive now, we know they existed because of fossils that have been found all over the world. There are many different kinds of fossils, and the scientists that study them are called paleontologists (PAY-lee-un-TAL-uh-jests).

What Makes Fossils?

A fossil is made when a plant or animal gets buried very quickly in wet dirt and sand. When animals or plants are under many layers, their bodies are protected from things that would normally break down their bodies or eat them, like other animals and bacteria. Being trapped in all those layers of mud preserves the plant or animal. This happens most easily during a natural catastrophe like a flood, mud slide, or earthquake. The hard parts of animals (such as bones, teeth, and shells) that get trapped in these layers of mud are slowly replaced with minerals from the mud, which turn them into a hard material, very similar to rock. A fossil is formed in the same shape as the hard part of the animal, like a tooth or bone. The soft parts of plants or animals, such as the scales of a fish or the leaves of a plant, sometimes leave a little bit of color in the rock before they eventually break down into nothing. Soft things that turn into fossils usually leave an imprint of their shape as they slowly break down, so it is pressed into the rock instead of being raised up like fossils from hard things are.

Where Are Fossils Found?

Some fossils have to be dug up from the ground and some are visible in rocks. Fossils are most commonly found in soft rocks like limestone, shale, and sandstone. Those rocks get worn down by water and wind more easily than most rocks do. Sometimes larger rocks have layers of fossils inside of them and as the rock gradually wears away over many years, the fossils

become visible. Fossils have been found all around the world - on every continent, even Antarctica!

All About Dinosaurs

Dinosaurs are animals that lived a long time ago. They are extinct now, which means that as far as we know, all of them have died. Dinosaurs were reptiles, like lizards and turtles. However, most dinosaurs were very large, the biggest ones were bigger than the largest reptiles that are alive today. Most dinosaurs hatched from eggs.

There are lots of pictures of dinosaurs and even complete dinosaur skeletons on display in museums. Since dinosaurs are extinct, no one has ever seen a living one. That means the pictures you see of dinosaurs are just guesses at what dinosaurs look like. When fossilized dinosaur bones are discovered, they have to be put together like a puzzle. Some of the bones might be missing and some might be broken into pieces. Sometimes the bones that are found in one spot are from several different animals! All of those things make it very difficult for scientists to figure out what dinosaurs really looked like, so even full skeletons that are on display in museums are just scientists' best guesses of what the animals might have looked like. The picture to the right is an example of a drawing of what scientists think two types of dinosaurs looked like, based on bones that have been discovered and pieced together.

Scientists have discovered many species of dinosaurs over the years and even more are being discovered as more fossils are found. As more and more fossils are found, what scientists believe about dinosaurs may change.

When Did Dinosaurs Live?

Since scientists only have bones to guess by, it is impossible to say exactly when dinosaurs lived. There are several ideas, but it is hard to find scientific evidence to prove them. A lot of people think dinosaurs lived millions and millions of years ago. Scientists who believe in Creation believe dinosaurs were on the earth at the same time as man, which is thousands of years ago (instead of millions). It is hard to tell exactly what the earth was like back then, with only fossils to go by.

What Did Dinosaurs Eat?

Most dinosaurs ate plants. Even though they were so huge, Sauropods like Brachiosaurus lived on green grass and shrubs. Scientists know this from looking at their teeth that have been found in fossils. Some dinosaurs ate meat. One of the most famous dinosaurs, Tyrannosaurus Rex, was a meat-eater and had sharp teeth and claws to help him get his food. Animals that eat plants are called ***herbivores***. Animals that eat meat are called ***carnivores***.

Science Words

Extinct - when a species of animal that once lived on earth has all died and no longer exists.

Herbivore - an animal that eats plants.

Carnivore - an animal that eats meat.

Printable Worksheet

Use the worksheet below to help kids visualize how huge most dinosaurs were compared to a human and other animals. Discuss that there is a lot of variety in animal life. This is also a great time to review what different animals eat and how they live. Ask kids to describe how they think an animal's size affects its ability to eat and protect itself. Help them number the pictures on the page in order from largest to smallest.

You can also find printable coloring pages of different dinosaurs at the end of this page and dozens of online coloring pages here.

Color the pictures.

Which animal is the largest? Put a number 1 next to its name.

Find the next biggest one and put a number 2 next to it.

Keep numbering the animals until you get to the smallest one, number 7.