

SciGirls Activity 2

Dinosaurs



Icebreaker

Use this activity to model how paleontologists estimate the age of fossil discoveries.

SciGirls Skill: Predicting

Preparation

Make stacks out of the newspapers. You may wish to unfold the papers to full length for stacking purposes. The oldest newspaper goes on the bottom of the stack. Insert a string somewhere into the middle of the paper (allowing one end to stick out, like a bookmark), and place a playing card (suggestion: use the 6 card from any suit) between the pages where the string is. Take the next newspaper (one week more recent than the first), and add it to the top of the stack. Insert a second string and playing card somewhere into the new newspaper (now use the 7 card of that suit). Continue building the stack, adding the next most recent paper to the top and putting in a card (increasing in sequence). Make a total of at least 6 layers of weekly papers in the stack, with a corresponding number of strings and playing cards.

Guide your girls as they

- 1) Examine the stack of newspapers, using the centimeter ruler to measure how far down each string is from the top of the stack. Write down the measurement.



You'll need:

- Sunday newspapers, collected over 6-8 weeks, one stack per group of three kids
- ruler (centimeter or inches)
- string, cut into 12-inch lengths
- a deck of cards (use 6 individual cards per stack of papers)

Icebreaker Continued

- 2) Use the string to locate the topmost card. They may remove the card as a "fossil find," but before they do they must identify the "age" of the card based on "evidence" in the surrounding pages of newspaper (that is, find a date printed somewhere on a neighboring page). Continue extracting "fossil" cards, moving to the next layer down, until all fossil cards are found. WRITE DOWN THE DATE associated with each fossil card on a sheet of paper or in a notebook.
- 3) Create a data table which includes distance from the top of the stack, "date" of the fossil card, identity of the fossil card, and "fossil age" calculation. Example:

Data Recorded August 15, 2006

Card Identity	"Date"	Distance from Top	Fossil Age
10 of hearts	July 26, 2005	5 cm	About 57 weeks
9 of hearts	July 19, 2005	12 cm	About 58 weeks
8 of hearts	July 10, 2005	20 cm	About 59 weeks
7 of hearts	July 3, 2005	26 cm	About 60 weeks
etc.	etc.	etc.	etc.

- 4) Discuss the answers to these questions: Where were the oldest fossils found? [A: deeper down] How do we estimate the "date" when the fossil cards were buried? [A: evidence from pages surrounding the card] How do we determine the "age" of the fossil? [A: count backwards from today to the "date" of the fossil.]
- 5) Make a graph showing distance down vs. date of fossil, or distance down vs. fossil age.



SciGirls Suggestion: This activity addresses a number of abstract concepts in paleontology and geology. Impress upon your students that geologic layers are important clues as to the age of fossils. Students will often have a hard time conceiving how these layers came to be. They'll also struggle with the scale of geologic time. Use the newspaper stack as a concrete model of these abstractions. Make reference to this activity when discussing real fossil discoveries.

Investigation Bone Identification

We're Ashley and Brandy, and we live in Texas where some of the biggest dinosaurs on Earth once lived. But we're more interested in TINY fossils because they tell the rest of the story about life on Earth millions of years ago. These microfossils are things like teeth, jawbones, and other small bones from animals including crocodiles, fish, and even mammals. Our question: What kinds of creatures lived alongside the big dinosaurs in Texas?



You'll need:

- commercially prepared owl pellet (available from science suppliers such as pellet.com), one for every pair of children
- 9-inch cake pan (no longer usable for baking!), one for each pair of children
- magnifying glass
- tweezers, one for each pair of children
- sheets of white office paper
- bone identification chart (also available from pellet.com)
- optional: latex gloves [Note: non-latex gloves are available for individuals with latex allergy.]
- anti-bacterial soap

We went to the Fort Worth Museum of Science and History and learned how to recognize microfossils. We even tried out our paleontology skills at a cool exhibit called DinoDig. Then we went to a real dig site called Jones Ranch, which is run by the Museum, to look for our own microfossils.



To learn more about this investigation, visit pbskidsgo.org/dragonflytv/show/dinosaurs.html. Then surf to pbskidsgo.org/dragonflytv/contact/index.html to tell us what you learned!



Check out this investigation on the SciGirls DVD. Select "Dinosaurs" from the main menu.



SciGirls Want to Know

How can animal skeletons help us determine what kinds of animals live together in an ecosystem?

Guide your girls as they

- 1) Use excellent hygiene when handling the owl pellets. Keep hands away from eyes, nose, and mouth while handling the pellets. Wash hands thoroughly when done.
- 2) Carefully unwrap the pellet from its foil. Gently break it apart by hand.
- 3) Sift through the pellet, looking for bone pieces. Most pellets contain recognizable skull, jaw, leg, or rib bones. Use tweezers to remove bones from the pellet debris.
- 4) Lay out each bone on a clean sheet of white paper.
- 5) Wash hands with anti-bacterial soap when finished.



SciGirls Secret

Most pellets contain bones from a small rodent, such as a mouse or vole. Occasionally, a pellet will contain bones from a larger rodent. If you are working with a large group of children and have ten or more pellets being examined, count the number of occurrences of mouse, vole, chipmunk, or other animal types found within the pellets.



SciGirls Synthesize Data and Analysis

Guide your girls as they

- 1) Count the number of bones found in one pellet.
- 2) Determine the identity of each bone. Match bones to the bone identification chart.
- 3) Attempt to lay the bones out into a rough skeleton arrangement. Parts of the skeleton may be missing, so leave those parts blank.



SciGirls Secret

Discuss with children which bones of the rodent skeleton are often missing, and why that might be. Small, delicate bones are often difficult to find within the pellet, but larger, rugged bones regularly can be found. Also invite them to compare the size and shape of these bones to the bones in their own body.

Keep Exploring!

Explain to kids that they can't dig just anywhere and expect to find fossils. They want to look in places where old layers of earth have been exposed, such as near hillsides and cliffs, or near river and stream banks. Remind them to be safe as they explore in these areas and always have an adult along. Also, they'll need permission to dig at a location. Digging can harm landscapes, so they must be respectful.



Even More to Explore

Here's another way to give your students the experience of working at a dinosaur dig site, right at your facility!

Preparation

Prepare each box by putting down a layer of sand, perhaps an inch deep, in the bottom of the box. Place one bone onto the sand. Add another inch of sand, to cover the bone. Place another bone on top of this layer. Add sand again, covering the second bone. The bones in the box are now ready for "excavation."



You'll need:

- chicken wing and/or drumstick bones, cleaned and sanitized, two per group
- boxes, such as a large shoe or boot box, one per group
- sand, enough to fill each box three-quarters full
- buckets, to hold "excavated" sand
- plastic spoons, as digging tools
- 1-inch wide paint brushes
- string
- tape
- markers
- paper and rulers

Guide your girls as they

- 1) Receive their box "dig site," preparing it for excavation. Use tape to fasten strings across the top of the box, like grid lines. The box should have approximately a four-by-four grid marked out with the strings.
- 2) Carefully trace a line inside the box at the level of the sand, using a marker. This line represents the top of the sand after sand is removed.
- 3) Begin excavating the bones by slowly and carefully removing the top one-inch layer of sand. If the surface of a bone is discovered, DO NOT lift it out of the box. With a paintbrush, carefully brush away sand to expose the entire outline of the bone. Bring all the sand in the box to the same level.
- 4) Make a line inside the box to represent the level of sand where the first bone rests. Later, measure the distance to this line from the first reference line.
- 5) Before removing the bone, look straight down on the box, and observe the bone's position in the grid of strings. Sketch the bone's position on paper that has grid lines drawn on it.
- 6) Continue to excavate sand, one-inch layer at a time, until all bones are discovered. Be sure to make a new grid sketch each time a bone is found.