

TITLE: Who is the ‘Poop-etrator?’

Audience: All ages especially those aged 6 and above

Activity Overview:

Participants investigate what a coprolite is, what trace fossils are, how coprolites can become trace fossils and what these fossils can tell us about the animal that made it. Participants will encounter both real and replica coprolites.

Program/Exhibit Criterion addressed:

As well as coordinating with the feature exhibit *Dinosaurs: Ancient Fossils, New Discoveries*, this demonstration fulfills the following Discovery Place, Inc. Learning Experiences program criteria:

- Guided Inquiry Programming: Experience will be hands on and investigative.
- Social Context: Participants will construct the meaning of the contents with family, friends and staff as they make their conclusions about the animals eating habits.
- Complexity: Demonstration allows the participant to learn about the basic information presented or delve further into why and how the animal ate.

Objectives/Desired Outcomes:

Participants explore that dinosaur feces can be fossilized and know how to identify information about the animal it came from.

NATIONAL STANDARDS ADDRESSED

Science as Inquiry

Content Standard A:

As a result of activities in grades K-8, all students should develop

- Understanding about scientific inquiry

Life Science

Content Standard C:

As a result of activities in grades K-4, all students should develop an understanding of

- The characteristics of organisms

Content Standard C:

As a result of activities in grades K-4, all students should develop an understanding of

- Structure and function in living systems

Earth and Space Science

Content Standard D:

As a result of activities in grades 5-8, all students should develop an understanding of

- The Earth's history

Time Involved:

- 30 minutes for preparation of replica coprolites
- 10 minutes set up time
- 10 minutes activity time
- 10-15 minute clean up time

Materials Needed:

- Fake coprolites – see recipe
- Real coprolites
- Gastroliths
- Fake animal scat
- Plastic knives (or butter knives)
- Silk/fake greenery – leaves, plants
- Twigs, stems- - dried or with leaves/material in them
- Thoroughly boiled and cleaned chicken bones (leg or thigh) broken into pieces (for carnivore coprolites) – use caution with possible sharp pieces
- Fossil carnivore teeth - replica
- Fossil herbivore teeth – replica
- Modern carnivore teeth
- Modern herbivore teeth
- Plastic bags
- Photos of coprolites

Fake Coprolite Recipe:

- 2 cups (500 ml) flour
- ½ cup (125 ml) salt
- 1 cup (250 ML) warm water
- Food coloring
- 'mix-ins' – small bits of twig, oatmeal, dried fruit, etc.

1. Mix flour & salt.
2. Start with $\frac{3}{4}$ cup water and add water and mix until it makes a thick dough. Add more water as needed. Shape into a ball.
3. Knead the ball of dough for about 5 minutes until it feels soft and easy to squeeze. Add food coloring to get an even color throughout the mixture.
4. Put a variety of 'mix-ins' into the dough and lightly knead/mix.
5. Add any food coloring to get specific colors in areas.
6. Shape in to desired form.

Note: Store in plastic bag when not in use so it doesn't dry out.

Reproducibles: none

Background:

The study of coprolites is important to the understanding not only of how the actual dinosaurs ate and lived but also of what other animals and plants lived millions of years ago. Some things that we can learn from a dinosaur coprolite include: what the dinosaur ate, where the dinosaur lived, how the dinosaur digested its food and what other organisms lived around it. All this information is left behind in the form of fossilized feces.

Other important hints to how an animal ate are the shape of its teeth. Sharp teeth helped carnivores tear and cut at the meat. Flat, wider teeth indicate that an animal had to grind its food and was an herbivore. Often found in addition to these flat teeth are gastroliths. Gastroliths are rocks of various sizes that are eaten by an animal to help break down food inside its stomach. These rocks, like the teeth and coprolites, are left behind for paleontologists to investigate.

Lesson Steps:

1. Present the fake scat of an herbivore and a carnivore. Ask the participant what can this tell us something about the animal that made it?
2. Show greenery and bone fragments. Discuss if these items could be found in scat? Explain that greenery is found in herbivore scat and bone fragments are found in carnivore scat.
3. Show the participant the modern teeth and ask them which type of animal they think it is (herbivore/carnivore) and how they came to that conclusion. Explain that herbivore's teeth are for grinding plants while carnivore's teeth are made for cutting and tearing.
4. Help the participant match the fake scat to the teeth they just identified. Make the connection between the type of tooth an animal has and the scat it produces.
5. Show the participant the replica fossil teeth. Ask which type of animal do they think the teeth belong to? An herbivore or a carnivore? Why?

6. Present the coprolites. Did they belong to an herbivore or a carnivore? How can they investigate and find out? Show picture of sliced coprolite showing bits of material inside.
7. Present the replica coprolite to the participant and let them cut it open. Encourage them to look closely and investigate which type of animal it came from. If there are bits of plant material then it is from an herbivore; if there are bone fragments, then it is from a carnivore.
8. Show the participant the gastroliths. Ask what they think they are. Tell the participant they were found in what would be the stomach of a large herbivore. Ask why they would be there. Ask if they know what a chicken's gizzard is for (helps grind up what the chicken has eaten). Explain that scientists think large herbivore dinosaurs used these smooth rocks in their stomach to help grind up the plant material they had eaten.

Academic Extensions/Modifications:

Dissect an owl pellet – it is similar to scat, but without the health factors.

Evaluation:

Demonstration will be evaluated by asking questions about coprolites to the participants.