

Dino Detectives: Identifying Fossils (Gr. 2-4)

DESCRIPTION

In this program learners participate in the scientific process through hands on exploration of a model dig site. Learners analyze clues, identify questions, compare findings, and work as a team to solve a mystery: What dinosaur is buried at our model dig site?

OBJECTIVES

- Model the work of a paleontologist to better understand the nature of science.
- Analyze the basics of fossilization and relevant geologic processes to better understand the fossil record.
- Compare the traits of different animals to better understand how adaptations help an organism survive in an environment.
- Model the nature of science by learning to develop questions and conclusions based on evidence.

OHIO'S LEARNING STANDARDS

Grade 2

Science: Life Sciences

- All organisms alive today result from their ancestors, some of which may be extinct. Not all kinds of organisms that lived in the past are represented by living organisms today.

Nature of science K-2 – Scientific inquiry, practice, and applications

Nature of science K-2 – Scientific knowledge is open to revision, given new evidence.

Grade 3

Science: Life Sciences

- Individuals of the same kind of organism differ in their inherited traits. These differences give some individuals an advantage in surviving and/or reproducing.

Nature of science 3-5 – Scientific inquiry, practice, and applications

Nature of science 3-5 – Scientific knowledge is open to revision, given new evidence.

Grade 4

Science: Life Sciences

- Fossils can be compared to one another and to present-day organisms.

Science: Physical Sciences

- The surface of Earth changes due to erosion and deposition.

Nature of science 3-5 – Scientific inquiry, practice, and applications.

Nature of science 3-5 – Scientific knowledge is open to revision, given new evidence.

Before Your Program

IF YOU ARE VISITING THE MUSEUM...

- If this will be your first trip to the Museum for some of your students, you may want to discuss the following questions:
 - What is a Museum? Why are we going to the Cleveland Museum of Natural History?
 - How should we handle objects at the Museum?
 - Use the vocabulary and additional resources provided in this Teacher Guide to preview or review program content with your class.

IF WE ARE VISITING YOU...

- **Set-up requirements:**
 - **Students will be working in small groups, sharing materials provided by the museum instructor.**
 - **Each student will need a pencil and a flat surface to write on.**
 - **Museum educator will need to project slides. A classroom projector can be used if available. Otherwise, the educator will need a blank wall or white board to project from the Museum projector.**
- Please have student desks clear before the program begins.
- Please provide an empty desk or small table for the museum educator to set up display items.
- Use the vocabulary and additional resources provided in this Teacher Guide to preview or review program content with your class.
- If booking multiple programs, transitions will be easier if museum staff sets up in only one location.

VOCABULARY

birds (avian dinosaurs) - any warm-blooded vertebrate of the class Aves that have a body covered with feathers, lay hard-shelled eggs, and forelimbs modified into wings. Birds are the only living



group of Dinosauria.

carnivore - a meat-eating animal. Carnivoran teeth tend to be sharp and pointed for tearing flesh

Cretaceous Period - the last period of the Mesozoic Era which lasted from 145 to 66 million years ago

dinosaur - a group of prehistoric reptiles that walked with their legs directly beneath their body.

Dinosaurs first evolved during the Triassic Period, some 230 million years ago, and still live today.

See also: birds.

extinct - no longer in existence

fossil - traces or remains of prehistoric life

fossil preparation - the process of cleaning, restoring, and conserving a fossil before study or exhibition

herbivore - a plant-eating animal. Herbivore teeth tend to be flat or rounded for grinding plants.

mammal - a warm-blooded animal that has hair, gives live birth, and produces milk to feed its young

mold - an impression that preserves the surface appearance of an object (example: fossil casts)

paleontologist - a scientist who studies fossils to learn about prehistoric life

prehistoric - before the time of written records

reptile - an animal that is ectothermic (cannot produce its own heat), has a body covered by scales, breathes air with lungs and generally lays eggs (snakes, lizards, crocodiles, turtles, tortoises, etc.)

skeleton - An internal structure composed of bone and cartilage that protects and supports the soft organs, tissues, and other parts of a vertebrate organism

vertebrate - an animal possessing an internal backbone and skeleton

EXTENSION ACTIVITIES

MAKING A FOSSIL

- You can make your own molds and casts to illustrate that particular kind of fossil preservation. Use softened clay for the mold. Press a hard object, such as a shell, into the clay. Remove the shell. The impression in the clay is the mold. Shells also can be pressed



into plaster, but be careful to coat the shell lightly with cooking oil and press into the plaster before it gets too hard. Play-dough is another mold material although it often cracks while drying. (Don't be too concerned about that! It lends an air of reality when the mold is slightly imperfect - nature is often that way). A play-dough mold can then be lightly sprayed with cooking oil and filled with plaster to produce a cast. Allow the cast to harden, and then separate it from the mold.

DINO TEETH

- Teeth give us clues to an animal's diet. Sharp, pointed teeth are characteristics of meat eaters. Flat, chewing teeth are characteristics of plant-eaters. It is very important for herbivores to chew their food before they swallow it to help the stomach get all the nutrients out of the food. Look for pictures of animals in books, magazines or on-line and notice the shapes of the teeth. What kind of teeth do humans have? How do we use our front teeth? How do we use our back teeth? What about animals that don't have teeth? How do those animals eat?

HOW BIG IS A DINOSAUR?

- How big is a dinosaur? Does 'big' mean 'long'? ... tall?... or heavy? Measure a length of string to equal the length of a dinosaur. Have the class stretch it out to see the size of a giant dinosaur. If the students all hold hands and stretch out in a long line would the class be as long as one of the big dinosaurs? The longest known dinosaur is Seismosaurus which may have been 120-140 feet long. Ultrasaurus may have stood up to 55 feet. How many students would have to stand on top of each other to get that high? Seismosaurus and Ultrasaurus may have weighed up to 100 tons (200,000 pounds) each. How many students would it take to weigh that much? Don't forget there were smaller dinosaurs, too! Aquilops was the size of a small dog. Children may be taller or weigh more than some of the smaller species!

ONLINE RESOURCES FOR TEACHERS AND STUDENTS

Click the link below to find additional online resources for teachers and students. These websites are recommended by our Museum Educators and provide additional content information and some fun, interactive activities to share with your class.

[Dinosaurs - YouTube](#)

[Webinar: Natural History at Home – What Is a Fossil? | Smithsonian National Museum of Natural History](#)

[Dinosaurs | Natural History Museum](#)



CMNH Educators regularly review these links for quality. Web addresses often change so please notify us if any links have issues.

