

# Traveling Programs

## Educator Guide: Dig Into Dinosaurs

This document is a resource for teachers whose classes are participating in the Museum of Science’s Dig Into Dinosaurs Traveling Program. The information in this document may be used as a classroom resource and/or as background information for the teacher concerning the subject of paleontology.

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# Vocabulary List

This is a list of common paleontology terms that teachers may wish to be familiar with for the Dig Into Dinosaurs program. This list is also a suggestion of vocabulary for students participating in the Dig Into Dinosaurs program to learn, though prior study of these words is not required for student participation.

**Biped** – an animal that walks on two legs

**Bird** – a warm-blooded animal with a backbone, that breathes air, is covered in feathers, walks on two legs, and had egg development

**Carnivore** – an animal that only eats meat

**Coprolite** – fossilized animal dung

**Cretaceous** – the last time period during the Mesozoic, when dinosaurs like *Tyrannosaurus rex* and *Triceratops* roamed (144 – 65 million years ago)

**Dinosaur** – a reptile that walked with its legs held beneath its body. They spread around the world with great success 230 million years ago. Birds are considered, scientifically, to be the only surviving dinosaurs on the planet, having descended from two-legged, meat-eating dinosaurs (known as theropods).\*

**Erosion** – the wearing away of rock layers through time, via natural events like water or wind rushing over the layers

**Excavation** – the slow, careful process in which fossils are removed from their surrounding rock

**Extinction** – when the last member of a species dies and none are left

**Flying Reptile** – animals such as Pterodactyls and other Pterosaurs, which flew using an extended finger attached to a large flap of skin for a wing. They are not dinosaurs, nor are they birds, though they lived at the same time as the dinosaurs.

*\*Technically, this also means that birds are just a specialized, evolved form of reptile. Depending on the students, this may or may not be an interesting discussion to get into.*



**Fossil** – any remnant or clue about life from an earlier age that has been preserved in some way until the modern day; examples include bones and footprints

**Quadruped** – an animal that walks on four legs

**Herbivore** – an animal that only eats plants

**Jurassic** – the middle time period during the Mesozoic, when dinosaurs like *Stegosaurus* and *Allosaurus* roamed (206-144 million years ago)

**Marine Reptile** – a swimming type of reptile that lived during the age of the dinosaurs, such as Plesiosaurs, Mosasaurs, and Ichthyosaurs. Not considered to be dinosaurs.

**Mesozoic** – the age of the dinosaurs (248-65 million years ago)

**Mineral** – a solid that is only made up of one type of substance, such as iron; can be found in rocks, dirt, water, and even in our own bodies

**Omnivore** – an animal that can eat both plants and meat

**Paleontologist** – a scientist who studies prehistoric life

**Paleontology** – the study of prehistoric life, mainly by the study of fossils

**Prehistoric** – from a time before written history

**Reptile** – *Classical definition:* a cold-blooded animal with a backbone that is covered in scales, breathes air, and usually has egg development. *Modern definition:* an animal with a backbone that has scales, breathes air, and usually has egg development (this definition pertains to dinosaurs, as not all of them were cold-blooded and some had feathers in addition to scales).

**Rock** – a solid that is made of many different types of minerals

**Species** – a particular type of animal



**Trace Fossil** – a type of fossil that is not actually part of the plant or animal, such as an impression in the ground where it stepped (footprint) or where it sat (skin print). Other examples include eggshells, droppings, burrows, and root trails in the ground.

**Triassic** – the dawn of the dinosaurs and the first period of time from the Mesozoic (248-206 million years ago)



## Further Background Reading

This is a suggested reading list for teachers looking to improve their understanding of paleontology.

### Books

*The Complete Guide to Prehistoric Life* by Tim Haines and Paul Chambers. Firefly Books. 2007.

*National Geographic Dinosaurs* by Paul Barrett. National Geographic Children's Books. 2001.

*Evolution: What the fossils say and why it matters* by Donald Prothero. Columbia University Press. 2007.

### Links

DinoBuzz – a website devoted to the science behind dinosaurs - <http://www.ucmp.berkeley.edu/diapsids/dinobuzz.html>

Most recent dinosaur news – <http://www.dinosaurnews.org>

Smithsonian's fantastic in-depth guide to dinosaurs – <http://paleobiology.si.edu/dinosaurs/info/everything/what.html>

The Paleontology Portal – great resource for teachers! – <http://www.paleoportal.org/>



# Classroom Materials

Below are some suggestions for books, videos, and websites to help students increase their understanding of paleontology.

## Books

*Digging Up Dinosaurs* by Alikei. Harper and Row. 1988.

*National Geographic Dinosaurs* by Paul Barrett. National Geographic Children's Books. 2001.

*Dinosaur (DK Eyewitness Books)* by David Lambert. DK Children. 2010.

*The Fossil Factory: A Kid's Guide to Digging Up Dinosaurs, Exploring Evolution, and Finding Fossils* by Niles Eldredge. Roberts Rinehart Publishers. 2002.

## Videos

Walking With Dinosaurs. BBC Warner. 2006.

## Links

DinoMight (kid-geared website of games, facts, and videos) - <http://www.sheppardsoftware.com/scienceforkids/dinosaurs/index.htm>

Paleontology for kids on the American Museum of Natural History's "Ology" website - <http://www.amnh.org/ology/index.php?channel=paleontology#channel>

Dinosaur Train (interactive, fact-filled website from the popular PBS television show) - <http://pbskids.org/dinosaurtrain/>



# Activity Descriptions

See the “Documents” section on the website to download these activities.

## **Reconstructing a Dinosaur**

In this activity, students must play the role of a paleontologist. Starting with nothing but a jumble of cut out bones, they must piece the bones together like a puzzle to create a full skeleton. Students are then encouraged to draw what the living dinosaur would have looked like based off of its reconstructed skeleton by deciding what color it was, if it had feathers, and even what type of environment it lived in. After each child has made their drawing, they can then be given time to share their ideas with their fellow classmates, just as real paleontologists share their ideas with their fellow scientists. Students may also be encouraged to share their ideas with the museum!

## **Make Your Own Trace Fossil**

This activity allows students to create their own trace fossils. Using an easy-to-mix dough, which can be prepared ahead of time by the teacher, students will make impressions with natural objects, such as twigs, leaves, shells, or bones. This replicates the fossilization process for trace fossils. By letting the dough dry for a few nights, students each have their very own trace fossil to take home later that week!



# Video Descriptions

See the “Media” section on the website to download these videos.

## **Bobcat Walking**

This video illustrates how a four legged animal walks, and how its footprints would appear on a trackway behind it.

## **Chicken Walking**

This video illustrates how a two legged animal walks, and how its footprints would appear on a trackway behind it.

Combined, these two videos can help students better understand the trackway activity in the Dig Into Dinosaurs program, and can get children thinking about how something extinct can still leave clues that help us figure out how it moved when it was alive.



# Document Description

See the “Documents” section of the website to download this document.

## Popular Prehistoric Animals

This document covers many of the dinosaurs and other prehistoric animals that kids are familiar with and gives teachers some basic background information about each of them. This information can also be useful in the classroom if students are researching particular dinosaurs.

Document includes information on:

- Allosaurus
- Ammonite
- Ankylosaurus
- Apatosaurus
- Archaeopteryx
- Brachiopod
- Brachiosaurus
- Camarasaurus
- Chacharodontosaurus
- Coelophysis
- Compsognathus
- Deinonychus
- Deinosuchus
- Dilophosaurus
- Diplodocus
- Dromaeosaurus
- Edmontosaurus
- Giganotosaurus
- Ichthyosaur
- Iguanodon
- Keichousaurus
- Mastodon
- Megalodon
- Mosasaurus
- Oviraptor
- Pachycephalosaurus
- Parasaurolophus
- Plesiosaurus
- Protoceratops
- Pteranodon
- Pterodactylus
- Quetzalcoatlus
- Saurolophus
- Smilodon
- Spinosaurus
- Stegoceras
- Stegosaurus
- Triceratops
- Trilobite
- Troodon
- Tyrannosaurus rex
- Utahraptor
- Velociraptor
- Woolly Mammoth



## PowerPoint Description

See the “Documents” section of the website to download the PDF of this PowerPoint.

### **How Bones Become Fossils: The Story of a Triceratops**

This PowerPoint PDF is a great visual aid to describe the death, fossilization, and discovery of a Triceratops from the Cretaceous period. It begins by taking students through the death of the Triceratops, and the scattering of its bones by creatures like T. rex, and then explains how fossilization occurs from burial over millions of years. Finally, students can see how erosion allows humans today to find these bones that were buried so long ago. Perfect for illustrating how dinosaurs went from walking around millions of years ago to ending up as skeletons in science museums today!