



# TEACHER GUIDE

## FOSSILS AND EXTINCTION GRADES 3-5

### COMMON MISCONCEPTIONS

- **Scientists know everything about the past.**  
Scientists learn about the past by studying fossils—evidence of past life. As new discoveries are made, we learn more. New fossils are found every year around the world.
- **Scientific information does not change.**  
Our scientific understanding is based on the evidence we have at any given time. As more evidence (new fossils) are found, we learn more and our understanding may change from what we thought previously.
- **Fossils only come from dinosaurs.**  
Any plant or animal can become a fossil under the right conditions, but the conditions needed to form a fossil are rare. Dinosaur fossils are popular and often how students are introduced to fossils, but fossil evidence for past life exists from many different time periods.

### FOSSILS

Fossils are remains or traces of plants and animals that lived a long time ago. They provide evidence about past life and environments. Fossils are not distributed evenly across the map and although they are rare, some evidence of past life (fossils) can be found in most places. Rocks of different ages are exposed in different places, and the age of the rock determines how old the fossils it contains are. Fossils also vary from place to place depending on what type of environment used to exist there. Fossilization occurs when animals or plants die and are buried with sediment. Over time soft tissue decomposes and hard parts - such as bones, teeth, and shells - remain. These hard parts are eventually replaced with minerals and become fossils. Trace fossils are fossils where an imprint or record of a living thing's activity are preserved—such as worm burrows, footprints, or bite marks. Even poop can be preserved when it becomes mineralized. Fossilized poop is called coprolite.

## PALEONTOLOGY

Paleontology is the study of ancient life. Paleontologists dig fossils out of the ground and study them. Usually the fossils are still surrounded with rock when they are removed from the ground. Fossil Preparators use various techniques to remove the remaining rock from around the fossils. In the video, the Fossil Preparator uses a liquid to dissolve the asphalt (rock from the tar pits) from around the bone. Often Preparators have to carefully chip and scrape away all the rock using a range of tools (including dental picks) depending on how hard the rock is. After bones are removed from rock, they can be studied. Paleontologists study anatomy of existing animals similar to those from the past to compare similarities and differences, and learn from the fossilized bones.

Fossils help us understand the environment from the past, and also the characteristics of each animal and plant. For example, by looking at the fossilized teeth of an animal we can learn about what that animal ate. Animals with flat grinding teeth were plant eaters (herbivores) while those with sharp ripping teeth were carnivores. Those with both likely ate both plants and meat—like humans do. Fossilized bones can also help us understand much more about animals of the past, for example how large an animal was, how strong it was (by looking at muscle attachments), whether it was a predator or prey (eye socket placement), and how good its sense of smell was (nasal cavity size). Fossilized leaves, seeds, and bark can help us understand both what types of plants were growing in the surrounding environment and what some of the animals were eating.

## EXTINCTION

Plants and animals that are extinct once existed on Earth but are no longer found alive today. Studying fossils can help us understand why some animals and plants became extinct, while others adapted and survived.

## LA BREA TAR PITS

The La Brea Tar Pits in Los Angeles, CA represents one area where a lot of fossils are found. In this location, near the end of the last ice age (40,000-50,000 years ago) tar - or thick crude oil - seeped up to the Earth's surface. As gases evaporated it became thick and sticky natural asphalt. Animals that lived in the area during that time would easily become stuck in the asphalt. When these trapped animals died, their remains were preserved as fossils. The asphalt also preserved fossils of plants that grew in that environment.

Fossils found in the La Brea Tar Pits are much younger (more recent) than dinosaur fossils (dinosaur fossils are found in rocks that are about 65-225 million years old). Dinosaur fossils are not found in the La Brea Tar Pits. Fossils from different time periods can be found in different locations on Earth.

