

# Read About The Fossil Record

## WHAT IS THE FOSSIL RECORD?

Fossils are evidence of past life. Fossils that have been found and placed into chronological order, are part of “The Fossil Record.” Scientists examine the fossil record for patterns that indicate when ancient organisms lived, and how they are related. Fossils found in rock at the bottom of a sequence of layers are older than the fossils found near the top of the sequence.

*To better understand the fossil record...*

## LET'S BREAK IT DOWN!

### Evidence of Past Life

Anything that is evidence of past life is a fossil, such as bones, footprints, and shells. Some fossils are trace fossils, that tell about an organism’s activity while it was alive. Examples of this are footprints, burrows, or even fossilized poop! Body fossils are the remains of animals and plants or parts of animals and plants. Examples of body fossils include bones, teeth, shells, and imprints of bark and leaves. When living things die, they decompose, however, under the right circumstances, the organism becomes trapped, rapidly buried, and compressed in sediment allowing remains or traces to be preserved.

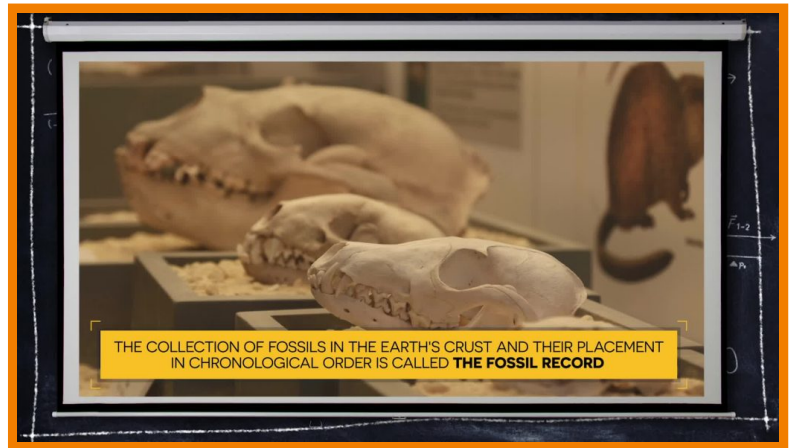


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## The Fossil Record

All of the fossils collected over time and arranged in chronological order are known as the fossil record. The fossil record provides evidence that past life existed and how some living things changed over long periods of time (evolved), allowing them to survive changing environments. The fossil record spans millions and millions of years. Scientists look for patterns in the

fossil record to make predictions about which organisms descended from others, how groups of organisms changed over time, and how the Earth's atmosphere changed the types of plants and animals that were able to survive over long periods of time.



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## Formation of Fossils

There are many different ways fossils form. Fossil molds are the most common. Molds form when buried remains of plants and animals decompose and/or dissolve leaving a space in the rock. These spaces may preserve the texture of remains (ridges on shells, for example). Sometimes, these molds may fill with minerals

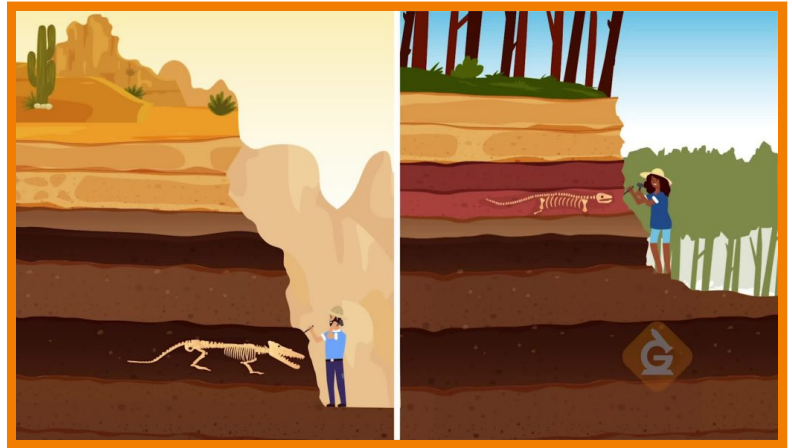
deposited by groundwater flowing through the rock or sediments that later harden. The mineral crystals and sediment take on the shape of the original remains and are called casts. Trace fossils can also be molds and casts. Most dinosaur bone fossils form in a different way; the bone matter is replaced by mineral crystals bit by bit. The resulting fossil retains all of the original structures of the bone; this is why they still look like bones even millions of years later. Insects can be preserved by becoming trapped in tree sap. The hardened tree sap is known as amber.



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## Fossils Exposed by Natural Events

Fossils can be buried and compressed within layers of sedimentary rock. Paleontologists look for fossils in areas where ancient environments provided the right conditions for fossil formation such as the shores of lakes, rivers, and oceans. Sometime paleontologists dig for fossils but more often fossils are exposed by geologic processes such as weathering and erosion. Dinosaur



National Monument is located in Utah where the hot and dry climate contributed to erosion of sediment by wind, exposing dinosaur fossils. Mountain-building and earthquakes can also reveal fossils that were previously buried deep below the Earth.

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## Transitional Fossils

Transitional fossils are fossils that provide evidence organisms may have transitioned from water to land. An example of this is the Tiktaalik fossil. It has fins and gills like a fish, but it also has leg bones and lungs like a land mammal. These fossils are important because scientists examine the fossil record for patterns, or similarities and differences over time, to tell them more



about how and when organisms may have lived. Because nobody alive today was alive when these organisms were, scientists can only make predictions based upon the evidence from the fossil record.

## THE FOSSIL RECORD VOCABULARY

### Fossil

Preserved remains or traces of ancient plant and animal life.

### Trace fossil

Impression or other preserved sign of activity such as feeding, scratching, burrowing, walking, or resting.

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### Body fossils

Preserved remains of the plant or animal itself, or the preserved parts of the animal or plant like bones, teeth, and shells, or the imprint of parts of the animal or plant.

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### Mold fossils

Hollow space left in a rock by animal or plant remains that have dissolved.

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### Cast fossils

When molds fill in with minerals or sediments that later harden, the resulting fossil is called a cast.

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### Permineralization

Groundwater fills pore spaces in animal or plant remains and deposits minerals. Most dinosaur body fossils are formed this way.

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## THE FOSSIL RECORD DISCUSSION QUESTIONS

### How are fossils discovered?

Earth processes like erosion and earthquakes can move sediment from one location to another, often uncovering and exposing fossils. Scientists also concentrate their search efforts in areas that are known to have lots of fossils, like Utah.

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### How do trace fossils provide evidence of past life?

Trace fossils provide information about how an organism lived, including but not limited to how it moved, what it ate, and where it lived.

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### How do layers of rock provide information in the fossil record?

Over time, sediment forms layers beneath the Earth's surface. The deeper fossils are found in the Earth's crust, the older they are. The closer to the surface fossils are found, the younger they are.

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### How is the fossil record evidence for evolution?

The fossil record provides evidence that organisms that are extinct today once existed. It also gives a chronological history for how organisms have evolved in water and on land.

## **How have organisms changed over time, according to the fossil record?**

Organisms have become progressively more complex over time. Early in Earth's history, organisms were very simple, many made of a single cell. As millions of years have passed, organisms have evolved to be more complex, with human beings the most complex of all!

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## **What patterns do scientists identify in the fossil record?**

Organisms living in the water all possessed characteristics that allowed them to breathe underwater, such as gills. Over time, these organisms adapted to live successfully on land with structures like lungs and legs.

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