

Change Over Time & Classification

Section 3: The Fossil Record



Fossils are imprints of organisms that lived in the past, highlighting the differences between the past and the present. Fossils vary in size, type, and shape and form only under certain conditions. Because not all organisms leave a trace behind when they die, the fossil record is not complete. While the

picture of the past is incomplete, the **fossil record** shows how fossils were organized to provide evidence about history of life on Earth, including how organisms have changed over time. It reveals when an organism lived, how it lived, and how it may have died. A **paleontologist** is a scientist who studies fossils. Paleontologists observe skeletal features to make inferences about an organism's behavior or use it to compare similar skeletal structures to hypothesize evolutionary relationships of species.

The formation of fossils is actually a rare event but can occur in three different ways. **Petrified fossils** are found where remains are buried in sediment and then change to rock over time. **Molds and casts** are created from the hollow spaces in sediment in the shape of an organism. The shape leaves a mold. When a mold becomes filled with hardened minerals, it becomes a cast. **Preserved remains** can be found when quickly buried organisms are preserved by ice, volcanic ash or clay before they begin to decay.

Earth's surface is made up of many layers of rock. A fossil's age can be determined depending on which layer of rock it was found in. Geologists use **relative dating** and **radioactive dating** to determine the age of rocks and fossils. Relative dating is when the age of fossils is determined by comparing its placement with that of fossils in other layers of rock. Radioactive dating involves measuring the amounts of radioactive isotopes in a sample to determine its actual age.

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Paleontologists use the geological time scale, or a “calendar” of Earth’s history to represent evolutionary time. After Precambrian Time, about 570 million years ago, the geological time scale is divided into three eras called Paleozoic, Mesozoic, and Cenozoic. Those eras are then subdivided into periods, which range in length from tens of millions of years to less than two million years.

During Precambrian time, the first photosynthetic bacteria formed structures called stromatolites. By the end of this era, organisms such as algae, sponges and jellyfish filled the ocean. During Paleozoic time, there was an explosion of life with many types of invertebrates, including amphibians and reptiles and plant phyla. During the Mesozoic era flowering plants and mammals appear. Dinosaurs roamed the earth. This era is divided into three periods: Triassic, Jurassic, and Cretaceous. During the Cenozoic time period, primates evolved and diversified.

