

INFORMATION ABOUT FOSSILS

What is a fossil? A fossil is any trace of a once-living organism preserved in rock, a relic of the Earth's past. Much of what we know of our planet's history comes from fossilized plants and animals, some of which may be 600 million years old or even older. The tooth of an extinct bear, the claw of a dinosaur, and a flower from a prehistoric plant preserved in amber are all fossils.

When living things die, their bodies usually decompose in a short time. But sometimes a plant or animal's body parts become buried out of reach of the factors that cause disintegration. Then they are transformed into a durable, rocklike substance that survives for millions of years. This is how fossils form. Generally, a living creature's soft parts do not fossilize; only the harder, more durable parts are preserved. So you are more likely to see the skeleton or teeth of an animal in fossil form rather than the muscles, internal organs, or skin.

Animal fossils are divided into two basic groups: invertebrates and vertebrates. The invertebrate category consists of animals with no internal spinal column or backbone. Some animals from this category are worms, snails, coral, insects, and shellfish. The vertebrate category, on the other hand, consists of animals with an internal spinal column. These are considered to be more advanced than the invertebrates. Fish, reptiles, birds, and mammals are considered to be vertebrates. Because vertebrates have a rigid internal skeleton, fossilized remains have been found for many specimens.

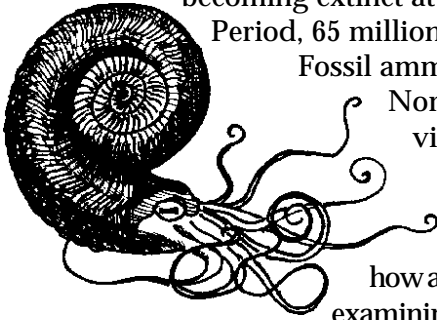
Scientists who study fossils are known as paleontologists. Over the past two or three centuries, they have learned much about the Earth's past by studying fossils. For example, they often find fossils of sea creatures in rocks that today are on dry land, far from any bodies of water. Sometimes such fossils occur high up on mountain slopes. This tells paleontologists that millions of years ago, what is now dry land and mountains was once water—perhaps beneath a river delta, or the bottom of a lake or sea.

Studying fossils from different places around the world, paleontologists have also helped to confirm that the Earth's continents slowly change their positions over millions of years. Fossils also teach us that the plants and animals of Earth's past were different from those we see around us today. We have learned from fossils that there were once dinosaurs alive on Earth, how long ago sabertooth cats

lived, and when humans first appeared on Earth. There are no written words or photographs to record these things; we know about them from studying fossils. It is amazing what fossils can teach us!

AMMONITE

Ammonites were ancient marine mollusks belonging to the cephalopod class. They were related to today's squid and octopus. Each ammonite produced a hard, multi-chambered shell to protect its soft tissue. Ammonites existed on Earth for about 330 million years, becoming extinct at the end of the Cretaceous Period, 65 million years ago.



Fossil ammonite shells are common in North America. Such shells are virtually the only ammonite remains available for study; soft body parts are very rarely preserved. Scientists study how an ammonite might have lived by examining its closest living relative, the

hard-shelled chambered nautilus. Like the nautilus, ammonites probably used their shell for flotation as well as protection, becoming buoyant by replacing fluid inside the shell's chambers with gas. This enabled them to maneuver through ocean waters.

Because they are plentiful and occur in great variety, ammonites help paleontologists to date the Earth's rocks. When the same kinds of ammonites are found in rocks at different places, we know that those rocks were created at about the same time, millions of years ago, regardless of how far apart the places might be.

CRINOID

Crinoids are flower-like marine animals belonging to the echinodermata phylum (primary division of classification). Fossil crinoids are abundant at various sites around North America . Crinoids



lived from the late Paleozoic Era (345 million years ago) to the present. Crinoids varied greatly in size and shape and may have been beautifully colored. Although most species lived on the ocean bottom, attaching themselves to material on the sea floor, some ancient forms were able to crawl or swim.

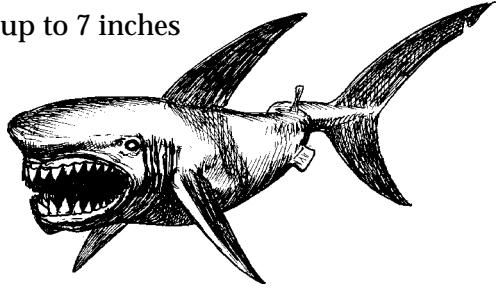
A crinoid, or “sea lily,” is made up of a root, a stem, a body, and arms, and looks very much like an ocean flower. It possesses no internal spinal cord and is considered an invertebrate. The root attaches to an object on the sea floor and helps to keep the crinoid from being moved. The stem is generally the longest part of the crinoid; fossil crinoids have been found with stems up to 50 feet long. The body contains the vital organs, including the mouth, the anus, the gonads, the podia, and the water inlet. The arms, or tentacles, spread like an opening flower to catch passing food.

SHARK

Shark skeletons are made of cartilage, not bone, so they usually decompose before burial and leave nothing behind for fossilization. But shark teeth are bone, not cartilage, and great numbers of these litter the fossil record. Sharks generally have triangular, serrated (saw-like) teeth set in numerous rows. As they wear out, the teeth in the front row fall out and another row of new, razor-sharp teeth takes their place from behind. A single shark might have generated many fossil teeth.

The largest shark teeth, up to 7 inches long, belong to the species *Carcharodon megalodon*. Almost everything we know about *Carcharodon megalodon* is derived from these huge fossilized teeth.

This shark would have dwarfed its smaller relative, the dreaded great white shark of today. Once thought to have reached a length of more than 80 feet, this warm-water monster would have been 3 or 4 times the size of a great white. But more recent estimates make it only about half this size—still a very formidable marine predator. The shark is a member of the vertebrate family.



TRILOBITE

Trilobites were ancient sea creatures that roamed the ocean's depths from the beginning of the Cambrian Period (570 million years ago) to the end of the Permian Period (245 million years ago). They belong to the most abundant and diverse phylum of all time, Arthropoda. Among the arthropods that exist today are insects, lobsters, crabs, spiders, and scorpions.

The word "trilobite" reminds us that the trilobite body was divided longitudinally into three lobes: the axial lobe down the middle and two pleural lobes on either side. The front of the trilobite is

called the cephalon, or head;

the rear is called the pygidium, or tail;

and in

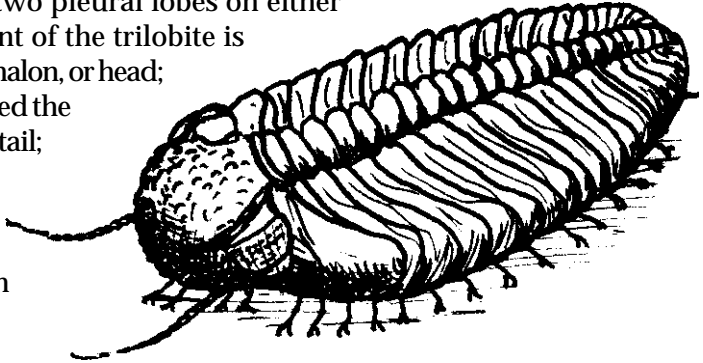
between lies

the thorax, or

chest, to which

its numerous

legs were



attached. An exoskeleton, or skeletal shell, covered the entire body and supported and protected the muscles and internal organs.

To protect its underside, a trilobite could roll itself up; many are found fossilized in this state. As it grew, a trilobite shed its exoskeleton many times. Thus, a single trilobite could have left many such exoskeletons behind for fossilization.

Trilobites were among the earliest life forms to possess vision. A trilobite usually had two crescent-shaped eyes that gave it a 360-degree visual field on the ocean floor. The amazing preservation of the eyes in some specimens has enabled scientists to dissect these ancient sensory organs and study their structure.

Trilobites existed for more than 300 million years, during which time they evolved into over 10,000 species. Their fossils come in a multitude of interesting shapes and sizes, from the tiny *Shumardia*, less than a quarter of an inch long, to the giant *Uralichas*, more than 28 inches long. Some were spiny and rough, while others were almost perfectly smooth.

Ammonite color suggestion

Reddish brown with black in crevices.



Crinoid color suggestion

Green to gray with black in crevices.



Shark tooth color suggestion

Beige to brown. The root of the tooth is generally darker in fossilized teeth.



Trilobite color suggestion

Black with gray matrix (stone base).



IMPORTANT NOTE:

The non-grooved side of the magnet is the side that is most strongly attracted to metal. Magnets should be cut lengthwise down the middle and then into one-inch pieces. The following chart indicates the number of 1" magnets. Remember to glue the grooved side of the magnet (when in doubt test on metal) to the fossils.

Description	Magnets
Ammonite	6
Crinoid	6
Shark tooth	6
Trilobite	6

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Individual Kits

Three-dimensional casting kits

Includes molds, casting material, paints, paint brush, glue and magnets

