

STROMATOLITE

What is it?	A colony of microscopic bacteria that can photosynthesize (use the energy of the sun + carbon dioxide to make food and oxygen). The colony forms a sticky film, which over time creates a mound by trapping particles of sand and mud.
Description of fossils	Stromatolites appear as a very finely layered rock
Geologic Range	3500 million years ago - present.
Habitat	Warm, shallow oceans
Status	Though this type of bacteria is abundant today, actual stromatolite mounds are not, because animals evolved which could feed on them
Significance	Stromatolites, among the oldest known fossils, were the dominant form of life on Earth for about 2 billion years. They invented photosynthesis, and transformed the earth's atmosphere from carbon-dioxide rich to oxygen-rich, thus paving the way for new forms of life, like plants and animals.

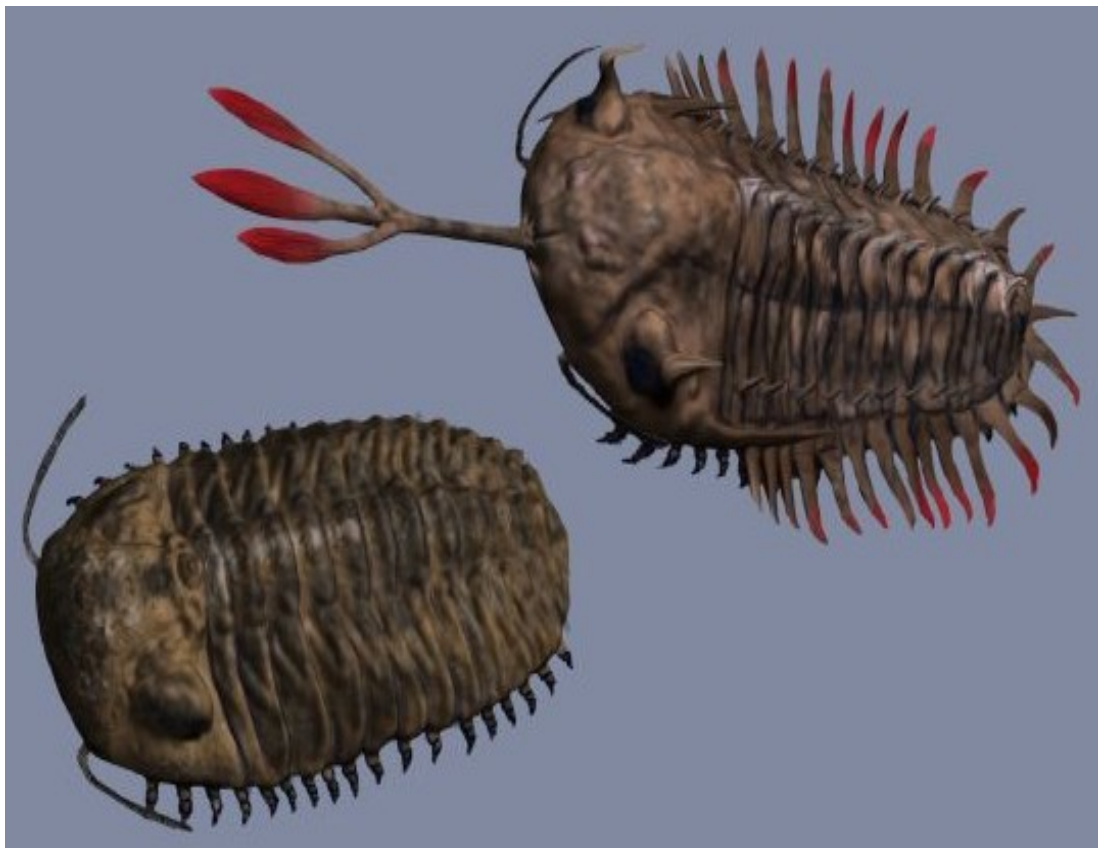
Cyanobacteria, with x100 magnification, from University of Wisconsin Plant Teaching Collection



Modern stromatolites, Sharks Bay, Australia by Paul Harrison
CC-BY-SA-3.0 (<http://creativecommons.org/licenses/by-sa/3.0/>), via Wikimedia Commons

TRILOBITE

What is it?	Marine animal with a segmented body, compound eyes, and a hard outer casing, or “exoskeleton”, which it could molt as it grew. They belong to a group of animals known as the Arthropods, which include crabs, lobsters, insects, and spiders.
Description of fossils	1 cm – 70 cm. The outer casing is most often preserved, less often the legs and other soft parts underneath
Geologic Range	521 – 250 million years ago
Environment	Most were scavengers that lived on the ocean floor
Status	Extinct
Closest living relatives	Horseshoe crab
Significance	With over 20,000 different species, trilobites are a very diverse group which dominated the world's oceans for 300 million years; one of the first creatures to develop a hard outer casing and the first creature to develop complex eyes. Died out in mass extinction 252 million years ago.



Artist's reconstruction of live trilobites, © N Tamura

BRACHIOPOD (LAMP SHELL)

What is it?	Small marine animal with two shells that attaches to the ocean bottom and uses a ring of tiny tentacles around its mouth to filter food from the water.
Description of fossils	10 – 20 cm shell. Brachiopod shells can look much like those of clams or scallops, except they often have a distinctive fold or ridge down the middle.
Geologic Range	535 million years ago - present
Environment	Ocean floor
Status	Several hundred species exist, mostly found cold, dark waters. Some appear very similar to their 500 million year old relatives
Significance	Abundant and diverse in the early oceans; hard hit by mass extinction 252 million years ago.



Living brachiopod by Dr. Paddy Ryan, www.ryanphotographic.com

MOLLUSCS

What is it?	A large, varied group of soft-bodied animals that typically have a hard shell. Molluscs include clams, oysters, snails, scallops, slugs, and octopii
Description of fossils	Shell most often preserved
Geologic Range	535 million years ago - present
Environment	Mostly marine, but also found on land
Status	Over 90,000 living species
Significance	Molluscs are a part of almost every ecosystem in the world



Moon snail By Nhobgood Nick Hobgood (Own work) CC-BY-SA-3.0 (<http://creativecommons.org/licenses/by-sa/3.0/>), via Wikimedia Commons

Clams, by Stefan Didam - Schmallenberg ("own work") CC-BY-SA-3.0-2.5-2.0- via Wikimedia Commons



CORAL

What is it?	A small, bag-like marine animal, some secrete a hard outer skeleton. Can be solitary or live in colonies and build reefs. Corals belong to the same group as jellyfish and sea anemones (the Cnidarians)
Description of fossils	Hard skeletons most often preserved
Geologic Range	510 million years ago - present
Environment	Most often shallow, warm waters, but some can live in deep water
Status	Early types of corals died out in the mass extinction 252 million years ago.
Significance	Corals are important reef-builders; reefs form habitat for many marine organisms. The modern corals are the main reef builders in today's ocean, and cover about 1% of the ocean floor.



Coral reef in Papua New Guinea, by Brocken Inaglory CC-BY-SA-3.0-2.5-2.0-1.0 (<http://creativecommons.org/licenses/by-sa/3.0>), from Wikimedia Commons

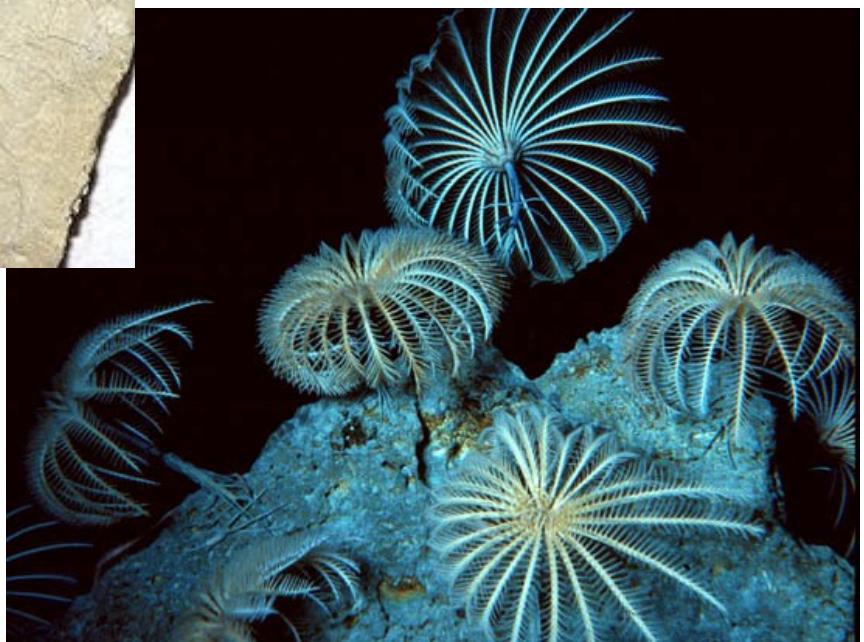
CRINOID (SEA LILIES AND FEATHER STARS)

What is it?	Crinoids look like flowers, but they are actually marine animals that belong to the same group as sea stars, sea urchins and sea cucumbers (Echinoderms). They consist of a cup with feathery feeding arms around the top, and most have a long stalk which attaches to the ocean bottom.
Description of fossils	Most often find stalk fragments, which look like columns of stacked discs
Geologic Range	490 million years ago - present
Environment	Preferred shallow ocean bottoms
Status	600 living species
Significance	Stalked forms dominated early shallow ocean bottoms; many of these died out in the mass extinction 252 million years ago. Today Crinoids are a rather unfamiliar group, but are still a part of deep water ecosystems and are abundant in some reef habitats. Stalked forms have been observed to crawl!



Fossil sea lilies from Germany, by Berengi
(Transferred from de.wikipedia) CC-BY-SA-3.0
(<http://creativecommons.org/licenses/by-sa/3.0/>), via Wikimedia Commons

Modern sea lilies, from the Smithsonian National Museum of Natural History photo gallery of living fossils
(www.mnh.si.edu/livingfossils/crinoid1.htm)



AMMONITE

What is it?	Squid-like marine animal with tentacles and large eyes that lived in a coiled shell and swam by shooting water. Ammonites belong to the same group of animals as octopus and squid (Cephalopods, which are a type of Mollusc)
Description of fossils	Up to 1m in diameter. Most commonly shells preserved, sometimes with original pearly lustre. Shells coiled, ribbed, divided into chambers.
Geologic Range	240 – 65 million years ago
Environment	Oceans
Status	Extinct
Closest Living Relatives	Octopus, Squid, Cuttlefish, Nautilus
Significance	An abundant and diverse group, Ammonites were important predators in the early seas; they may have been the first efficient hunters to evolve. They were hard hit by several mass extinctions and disappeared completely in the mass extinction 66 million years ago.



Artist's rendition of living Ammonite, © N Tamura

DINOSAUR

What is it?	A varied group of terrestrial reptiles with long, upright legs. Birds, which evolved from small, two-footed dinosaurs about 160 million years ago, are considered a subgroup of dinosaurs. Over 1,000 species known.
Description of fossils	Most often bones and teeth
Geologic Range	230 million years ago – present
Environment	All land habitats
Status	10,000 species of birds, which makes them most diverse vertebrate after fish.
Significance	Dominated the land from 230 – 66 million years ago, and include the largest land animals to have lived; all types except the birds died out in mass extinction 66 million years ago.



Artist's reconstruction of a diverse group of dinosaurs, with a human for scale. © N Tamura

Archaeopteryx, the first bird © N Tamura



SEA URCHINS

What is it?	Small marine animal with a round, spiny shell. Sea urchins belong to the same group as sea stars, sand dollars, and crinoids (echinoderms). Like sea stars, sea urchins have tube feet that allow them to move slowly.
Description of fossils	3 – 10 cm, most often find shells and individual spines, which fall off after the urchin dies.
Geologic Range	450 million years ago - present
Environment	Intertidal to deep ocean
Status	About 950 living species
Significance	Sea urchins are important marine scavengers



Purple Sea Urchin, a species which can be found in BC waters Copyright © 2007 David Monniaux cc-by-sa-2.0-fr via Wikimedia Commons

Sea Urchin spines fall off after the organism dies. © Nina Aldin Thune via Wikimedia Commons



SEED FERNS, TRUE FERNS, and TREE FERNS

What is it?	Plants with fern-like leaves that reproduce using either seeds or spores
Description of fossils	Often find black carbon films or impressions of leaves, also bark and seeds
Geologic Range	360 million years ago - present
Environment	Humid
Status	Seed ferns extinct; ~12,000 species of ferns and tree ferns
Significance	Seed ferns, true ferns, and tree ferns, along with giant horsetails and moss-like plants, made up the vast, swampy forests which covered the earth between 360-290 million years ago and were the source of much of the coal we mine today.



A modern fern and tree fern dominated forest in Australia, By JJ Harrison (jjharrison89@facebook.com) (Own work) CC-BY-SA-3.0 (<http://creativecommons.org/licenses/by-sa/3.0/>), via Wikimedia Commons

INSECT

What is it?	Animals with an external skeleton, three pairs of jointed legs, a three-part body, and compound eyes. Insects belong to a group of animals known as the Arthropods, which include crabs, lobsters, spiders, and trilobites.
Description of fossils	Preservation relatively rare, as their external skeletons are relatively thin; can find in amber or where quickly buried
Geologic Range	~ 400 million years ago - present
Environment	Nearly all environments
Status	More than 1,000,000 living species known, which represents more than half of known animals, probably many more exist
Significance	Insects represent more than half of all known living organisms



Blow fly, showing compound eyes and jointed legs. By JJ Harrison (jjharrison89@facebook.com) (Own work) CC-BY-SA-3.0 (<http://creativecommons.org/licenses/by-sa/3.0/>), via Wikimedia Commons



Cricket, by Ernie (Own work) [Public domain], via Wikimedia Commons

SHARK

What is it?	A group of fish with skeletons made of cartilage
Description of fossils	Most commonly find teeth, as sharks grown tens of thousands of them over a lifetime. Megalodon (giant shark) teeth up to 15 cm
Geologic Range	420 million years ago
Environment	Oceans, a few species are freshwater
Status	470 living species
Significance	Sharks are the top of the ocean food chain, and have a large effect on the marine community



Megalodon, an extinct giant shark, chasing two large whales. Megalodon reached more than 16 m, which is bigger than a city bus. By Karen Carr (<http://www.karencarr.com/tmp1.php?CID=196>) [CC-BY-3.0 (<http://creativecommons.org/licenses/by/3.0/>)], via Wikimedia Commons

WOOLY MAMMOTH

What is it?	Large, hairy elephant ancestor, adapted to the cold
Description of fossils	From 5 – 7 tons, 4m high at shoulder. Most often find bones and ivory tusks, but also entire frozen or mummified animals.
Geologic Range	4.8 million years ago – 3,600 years ago
Environment	Cold climates; northern tundra/grasslands
Status	Extinct, probably due to climate change and hunting by humans
Closest Living Relatives	Elephants
Significance	The best known of all prehistoric species, because frozen/dried mammoths are nearly intact



A herd of woolly mammoths, along with horse relatives, a woolly rhinoceros, and cave lions with a reindeer carcass. By Mauricio Antón [CC-BY-2.5 (<http://creativecommons.org/licenses/by/2.5>)], via Wikimedia Commons

BONY FISH

What is it?	Fish with skeletons made of bone, as opposed to cartilage, like sharks
Description of fossils	Skeletons most likely to be preserved
Geologic Range	420 million years ago - present
Environment	Ocean and fresh water
Status	Around 25,000 living species
Significance	Early fish were the first animals to have backbones (vertebrates); the bony fish are the most numerous and diverse vertebrates today.



A small, herring-like bony fish from 50 million years ago, Wyoming USA. © N Tamura

CONIFER

What is it?	Tree or shrub with seeds in cones, most with needle-like or scaly leaves. Many keep their leaves year-round.
Description of fossils	Most often find fossil wood, impressions of needles and cones, pollen, and hardened resin (amber).
Geologic Range	300 million years ago - present
Environment	Worldwide
Status	630 living species
Significance	Though not as diverse as flowering plants, today conifers are the dominant trees in cool climates



Dawn Redwood tree, a conifer from the time of the dinosaurs. Conifers were most likely an important food source By H Zell
(Own work) CC-BY-SA-3.0
(<http://creativecommons.org/licenses/by-sa/3.0/>), via Wikimedia Commons



Conifer stump showing growth rings, by Ronja Addams-Moring (Own work) CC-BY-SA-3.0-2.5-2.0-1.0
(<http://creativecommons.org/licenses/by-sa/3.0/>), via Wikimedia Commons