



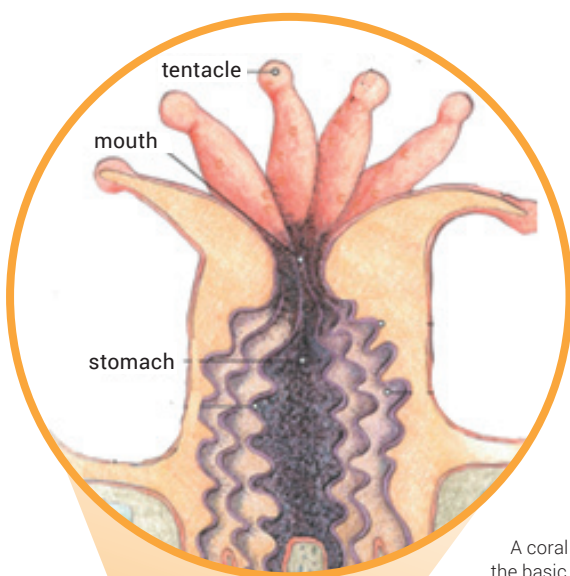
Deep-Sea Corals: What Are They?

Corals can form beautiful living structures that resemble plants and are generally rooted in place. But they are animals, not plants! They belong in the phylum Cnidaria, which also includes anemones and jellyfish. They all have stinging cells, cnidocytes (“nye-doh-sites”), used to capture prey or for defense. Unlike anemones and jellyfish, corals secrete a skeleton that gives structure to their often elaborate shapes. Hard corals secrete a rigid calcium carbonate skeleton, while soft corals create a more flexible protein-based structure.

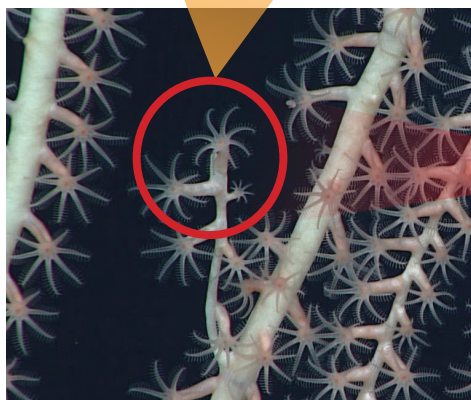
Coral Anatomy

Coral skeletons protect **polyps**, the soft bodies of coral. A polyp is made up of a sac-like body with a single opening (a mouth) that is surrounded by tentacles, and a cavity that contains the stomach. Tentacles house thousands of cnidocytes, each with a special stinging organelle called a nematocyst. These special microscopic structures fire like a miniature harpoon, either sticking to their target or injecting it with venom. To capture food, the tentacles wave in the water, and the nematocysts stun small food items, such as zooplankton and small crustaceans that flow past in currents. The tentacles then pull food into the mouth and stomach, where it is digested.

Many corals are **colonial**, meaning what looks like a single coral organism is actually made up of hundreds of thousands of polyps. A **reef** is made up of multiple colonies of coral, either of the same species or several species, and other benthic invertebrates, such as sponges. In some cases, new corals will continue to grow on top of the skeletons of old or dead corals over time, creating coral mounds that can rise high off the seafloor. If undisturbed, these deep-sea coral colonies can form large mounds that are hundreds of thousands of years old!



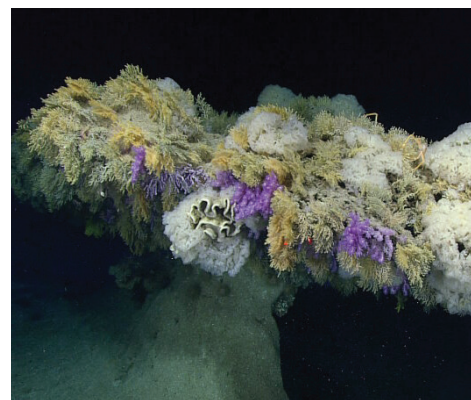
A coral polyp is the basic building block of all corals. A polyp has a central mouth, surrounded by many tentacles. Image adapted from NOAA Coral Reef Conservation Program.



Most corals, like the bamboo coral shown here, are colonial, meaning they are made up of many polyps. Coral colonies begin when a polyp buds into a new polyp. Repeated budding eventually forms a coral colony. They may even share one stomach cavity! Image courtesy of NOAA Ocean Exploration.



The coral colony creates a skeleton from calcium carbonate in the seawater. This skeleton gives deep-sea corals their shape, like the branching shape of the bamboo coral seen here. The skeletons also provide the overall architecture of deep-sea corals. Image courtesy of NOAA Ocean Exploration.



An unusual umbrella-shaped pillar feature covered in deep-sea corals and sponges found on the southeastern side of Jarvis Island in the Pacific Ocean. Image courtesy of NOAA Ocean Exploration.



Deep-Sea Corals: What Are They?

Differences Between Deep-Sea and Shallow-Water Corals

Shallow-Water Corals

Found in high-light, shallow, clear waters that are less than 30 meters (98 feet) deep.

Most live in warm waters and are concentrated in the tropical latitudes between 30°N and 30°S.

Depend on symbiotic photosynthetic algae, called zooxanthellae, for most nutrients.

Grow 0.3 - 10 centimeters (0.1 - 4 inches) per year, depending on species.

Can range in size from a single polyp to a colony that is several meters tall.



The Great Barrier Reef, located off the Northeast Coast of Australia, is the most expansive shallow-water coral reef system in the world. *Image courtesy of Wikipedia.*

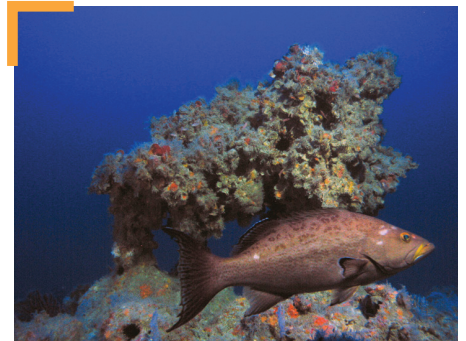
Mesophotic Corals

Typically found at depths ranging from 30-50 meters (98-164 feet).

Found in cooler, low-light waters of the mesophotic zone (Mesophotic translates to “middle light”).

Colonies grow in shapes that allow them to get as much light as possible in this dimly lit zone, as they still get a lot of their nutrients from symbiotic, photosynthetic zooxanthellae.

Scientists have hypothesized that mesophotic coral ecosystems may serve as sources to replenish degraded shallow-water coral reefs impacted by climate change.



Many mesophotic coral reefs are located in Flower Gardens Bank National Marine Sanctuary, in the Gulf of America. *Image courtesy of the Cooperative Institute for Exploration, Research, and Technology.*

Deep-Sea Corals

Found in waters deeper than 50 meters (164 feet).

Thrive in cold waters that are 4-12°C (39-54°F), and have been found as cold as -1°C (30°F).

Live in deep water that has little to no light, so they lack photosynthetic zooxanthellae and instead get all of their nutrients by using the tentacles on their polyps to filter food out of the surrounding waters.

Most species grow very slowly, some only a few millimeters per year.

Many live for hundreds of years, with some colonies living over 4,000 years. Over time, these slow-growing corals can build mounds that rise over 150 meters (500 feet) off the seafloor.



Color is not necessarily an indicator of health in deep-sea corals. Some species, like this *Iridigorgia* soft coral, can be white in color due to their lack of photosynthetic zooxanthellae. *Image courtesy of NOAA Ocean Exploration.*

Polyp diagram (image): https://coast.noaa.gov/data/coralreef_noaa_gov/media/images/polyp_186.jpg

Coral polyps (image): <https://oceanexplorer.noaa.gov/oceanos/explorations/ex2104/dives/dive03/media/anemone-coral-hires.jpg>

Coral colony (image): <https://oceanexplorer.noaa.gov/oceanos/explorations/ex2104/dives/dive02/media/bamboo-corals-hires.jpg>

Coral reef (image): <https://archive.oceanexplorer.noaa.gov/oceanos/explorations/ex1705/logs/may6/media/umbrella-hires.jpg>

Shallow-water coral (image): https://upload.wikimedia.org/wikipedia/commons/9/9c/Great_barrier_reef.JPG

Mesophotic coral (image): https://archive.oceanexplorer.noaa.gov/explorations/15pulleysridge/background/mce/media/mce_ish_igure_1_800.jpg

Deep-sea coral (image): <https://archive.oceanexplorer.noaa.gov/oceanos/explorations/ex1711/background/mpas/media/iridigorgia-800.jpg>