

Corals are the first living creatures catalogued in the Kumulipo, a Hawaiian chant that describes the creation of the universe, so for many generations, the people of Hawai‘i have understood that ‘āpapa, or coral reefs, are the foundation of island life. But what are they?

Are Corals Animals, Plants, or Rocks?

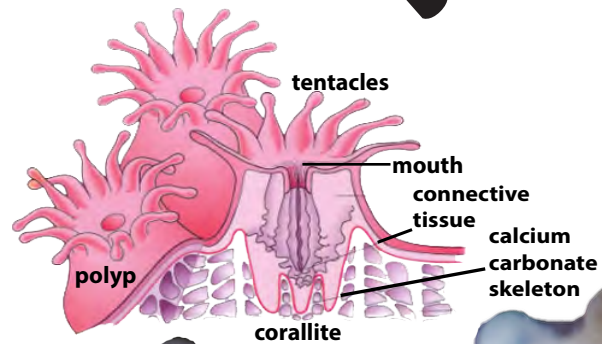
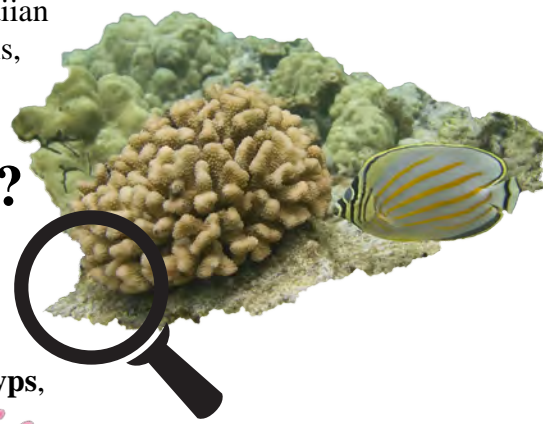
Yes, Yes and Yes... Maybe.

Animals? Look closely at a **coral head** or patch and you’ll see it is a colony of thousands of individual yet identical **polyps**, all cloned from one original, and connected through a common skin, growing on the surface of a **calcium-carbonate skeleton**. As tiny as the period at the end of this sentence, each polyp is basically a mouth and stomach, crowned with tiny arms, or **tentacles** (in multiples of six), each equipped with stinging cells, that help them catch tiny prey (**zooplankton**) drifting in the ocean. That’s good for proteins and nutrients but what about sugars for energy?

Plants? Corals that build reefs have single-cell partners called **zooxanthellae** they have “invited” to live in their tissues. These algae photosynthesize and give about 80% of the sugars and oxygen they make to the polyp, who in return gives nitrogen, carbon dioxide and phosphorus to the algae. The zooxanthellae also get a stable place to grow and reproduce in the sun instead of being swept down into dark depths. Up to a million zooxanthellae can be found living inside a single coral polyp and they help give the corals their colors. There are approximately 66 species of coral in Hawai‘i, but there are many more species of zooxanthellae. A mature coral can incorporate new zooxanthellae from seawater if it needs to, but they may be incompatible. So most corals may keep the same species they were born with. As the coral grows from one polyp to thousands, the number of zooxanthellae inside the colony increases as the colony grows from a hamlet to a town and finally to a metropolis.

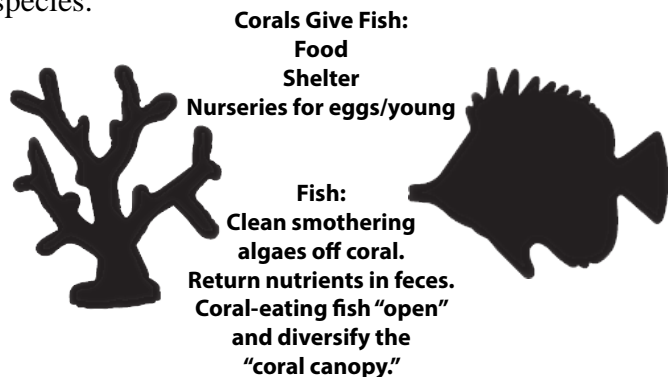
Rocks? This symbiotic relationship allows corals to survive in nutrient-poor waters and take calcium from seawater to build their ever-expanding skeletons. They are the only animals that can build rock. Each polyp sits atop a depression on the outermost layer of the skeleton called a **corallite**. The shape of these little “thrones” and the overall branching patterns are how biologists can distinguish one coral species from another. Other types of corals, which do not have internal gardens of algae (‘wire,’ ‘soft,’ and ‘black’) cannot form reefs.

This is why standing on coral kills: it crushes the polyps against their own skeleton, amputating tentacles, severing tissues between polyps, or worse.



Location, Location, Location... and Friends.

Hawai‘i has about 7,000 marine species, ¼ of which are endemic or found only here. Compared to any other area of the same size in Earth’s oceans, Hawai‘i has twice the number of endemic coral species.



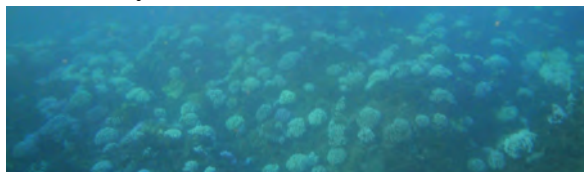
Hawaiian Shallow Reef Corals Need:

- ✿ Solid rocky surfaces they can anchor on without sand or debris covering them when seas are rough.
- ★ A place in the sun to photosynthesize and a little zooplankton in the water, but not too much of either.
- ♻️ Sea water that’s not too hot or too cold: between 73 to 84 degrees Fahrenheit, (23-29 Celsius).
- ♻️ Salinity between 33-35 parts per thousand, which is why reefs are rare where rivers enter the ocean.
- ♻️ Clean water free of chemicals, sewage, or loose soil carried into the ocean by heavy rains.
- 💎 Friends: partnerships with fish, crabs and other invertebrates keep the reef ecosystem healthy.

Human activities often change all of these. Too much or too little of any of these factors puts corals under stress, then they become susceptible to a host of diseases that can sweep through a reef. Learn more at:
<http://www.coralreefnetwork.com/network/hcri.htm>

The Forest Fire Underwater That We Couldn’t Put Out:

In September/October of 2015, Hawaiian waters were the warmest ever recorded, averaging 88 degrees F, four degrees too hot, and that lasted a staggering eight weeks. Scientists agree that human-made climate change caused that event, killing at least 30% of all corals in Hawai‘i, and in some locations, even more. The hot water stressed the coral polyps, making them expell their zooxanthellae and “bleach” or turn white. Without these partners, coral colonies hundreds of years old slowly starved to death.



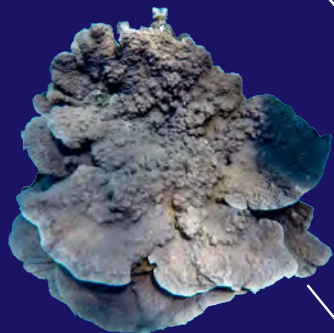
Corals have existed on Earth since before the days of the dinosaurs, but just three more events like the 2015/16 “bleaching” could mean the end of this ecosystem for all of Earth, forever.

What You Can Do Wherever You Live:

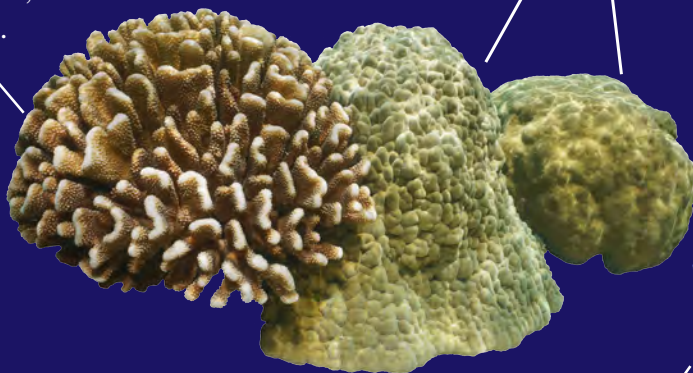
- ✿ Use only zinc or titanium sun-blocks or cover-ups for sun protection. Chemical sunscreens are toxic to all marine life.
- ★ In the ocean, Never Stand Unless on Sand.
- 💎 Never collect live corals – in Hawai‘i it is illegal.
- ♻️ Only choose and patronize chemical and pesticide - free hotels, golf courses, or other businesses. It all goes to the ocean.
- ✈️ Eat only from sustainable fisheries.
- ♻️ Reduce, re-use and recycle your plastics - they are toxic to all marine life.
- ♻️ Reduce your personal carbon footprint – slowing climate change starts with each of us.

4 Most Common Types of Reef-building Corals Seen in Hawai‘i

Cauliflower/antler corals – flattened branches forming domes that can resemble heads of cauliflower in size and branching, covered in small bumps. Tans, browns- rarely green, purple or pinks.



Lobe/mound-building corals – forms massive mounds, from a few inches to the size of cars.



Rice/encrusting corals – forming sheets or plates, with small bumps the size of rice grains, sometimes covering rocks as if they were painted. Tans, browns, orange-reds, rarely bright blue.

Finger corals – upright stalks the size and thickness of human fingers, sometimes in large patches. Greys, light yellows, light blue.

