

Coral Reefs

A Reading A-Z Level U Leveled Book
Word Count: 1,405

LEVELED BOOK • U

Coral Reefs

Connections

Writing

Do you think people should protect coral reefs? Write an answer to the question using details from the book.

Art

Draw or paint a picture of a coral reef. Label your art with at least ten words from the book.

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**Multi
level
N•Q•U**

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Focus Question

What are coral reefs, and why are they being protected?

Words to Know

bleaching	flexible
carbon dioxide	fragile
coral reefs	resilient
dissolve	skeletons
ecosystem	tropical
erosion	tsunami

Title page: Brain corals are stony corals that look like . . . brains!

Page 3: Reefs offer many good hiding places for animals, such as this moray eel.

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Correlation

LEVEL U

Fountas & Pinnell	Q
Reading Recovery	40
DRA	40



Many kinds of corals, fish, and other sea creatures live on coral reefs.

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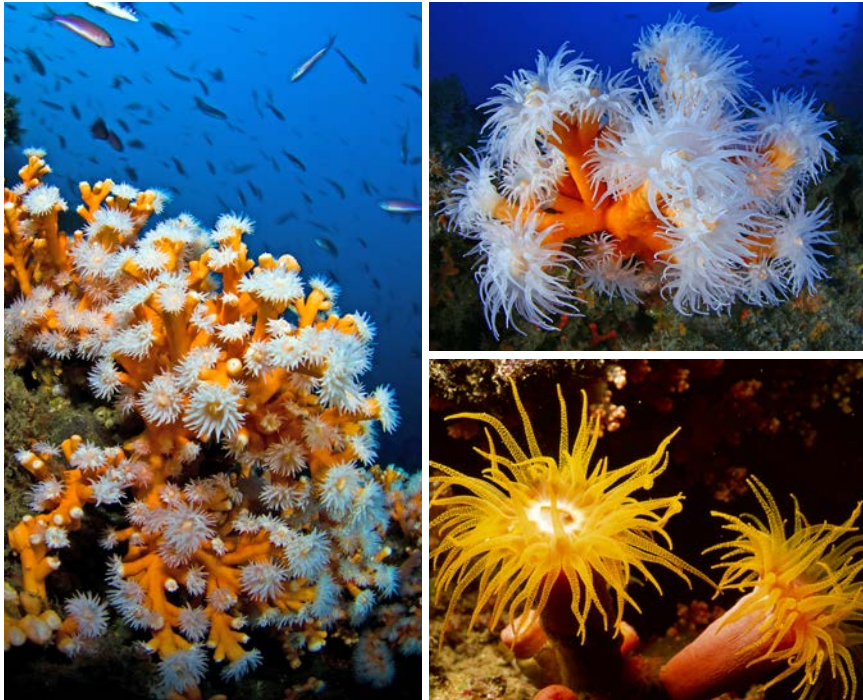
Introduction

Just below the surface of Earth’s **tropical** oceans lie huge undersea communities known as **coral reefs**. These places of wonder and beauty support an incredible variety of life. Coral reefs are home to thousands of living organisms that depend on each other for food, shelter, and safety. Day and night, thousands of animals swim about, hunting, eating, and avoiding being eaten.

Almost one-quarter of all plants and animals in the ocean live around coral reefs. Fish, sea turtles, sea stars, and many other animals make reefs their home. Visitors include seabirds and dolphins.

What Is Coral?

At first glance, coral may look like oddly shaped rocks or spiny plants. Corals are actually tiny animals called *polyps* (PAH-lips). Most polyps are very small—between the size of a pinhead and the size of a pea. One branch or mound of coral can have thousands of these tiny polyps attached to it. Each polyp has a tubelike body and a mouth surrounded by tiny tentacles. Polyps are eating machines. At night, they open their tentacles to catch tiny animals and get the nutrients they need.



Coral polyps attach to the surface beneath them and stay there forever.

Hundreds of kinds of coral live in the ocean. Most belong to one of two types. Hard corals, also known as stony corals, form hard **skeletons**. Over time, many millions of these hard skeletons build up and form reefs.

Most kinds of stony coral live together with a variety of plantlike algae (AL-jee). The algae help supply food for the corals and for many of the fish that live around the reef.



Elkhorn coral looks like the broad antlers of an elk. (Elk don't have horns.)



Sea pens collapse and hide in sand if creatures get too close (top). Sea fans branch up and out like wide fans. Their shape helps them trap tiny organisms to eat (bottom).

The second common type is soft coral. These corals grow **flexible**, woody cores instead of hard skeletons. They often look like trees, bushes, or other plants. Soft corals can bend with the currents. Some soft corals have algae growing in their bodies, but others do not.



Golden butterflyfish and a school of red bigeye fish swim past soft corals in Egypt's Red Sea.

A Busy Underwater Community

Most people think of brightly colored fish when they think about coral reefs—and with good reason. Over four thousand species of fish live on reefs. The reefs provide them with food as well as protection from predators. Some fish live off the algae and plankton around the reef, and some eat other fish that live there. A few types of fish even eat the coral itself.

Shrimp, lobsters, and crabs also consider reefs a favorite dining spot. Sea urchins and sea stars catch clams and smaller shellfish hidden among the coral branches. Waving sea anemones, which look like graceful flowers, hide in shallow openings, waiting for their next meal to drift past. Large holes in reefs make good homes and hiding spots for eels. No space is wasted on a busy reef.

Coral reefs not only support thousands of species of organisms but also help protect shorelines from floods and storms. By shielding the coast, reefs reduce **erosion**, property damage, and loss of human life.

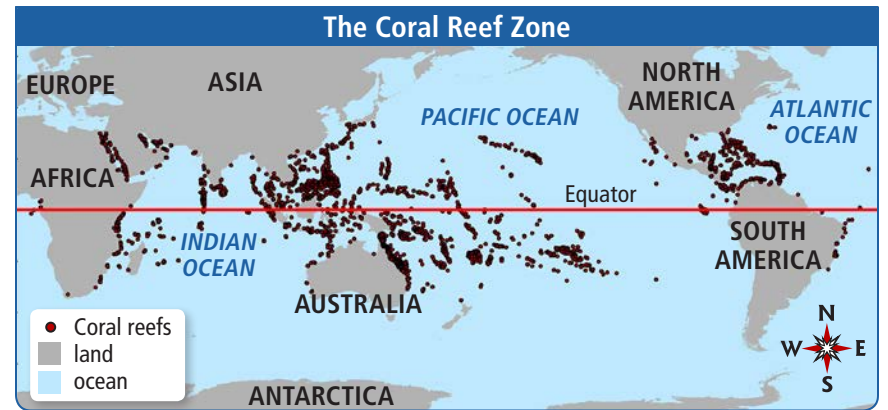
Coral reefs also feed and shelter animals that provide much of the world's seafood, thereby helping the economies and diets of many countries. Diving tours and sport fishing also bring visitors—and income—to areas near coral reefs. Reef plants and animals provide ingredients for medicines, too. Coral reefs are a valuable natural resource.



Reefs like this one in the Caribbean Sea buffer the land and protect it from damage.

Medicines from Coral Reefs

Scientists have developed medicines from reef organisms, and more are likely on the way. Corals produce a substance now used in the treatment of asthma and arthritis. Medicines that treat several different types of cancer come from coral reefs, too. Scientists are also studying other reef organisms that may treat skin conditions as well as infections caused by viruses and bacteria.



Most coral reefs are found near the equator.

Where Are Coral Reefs?

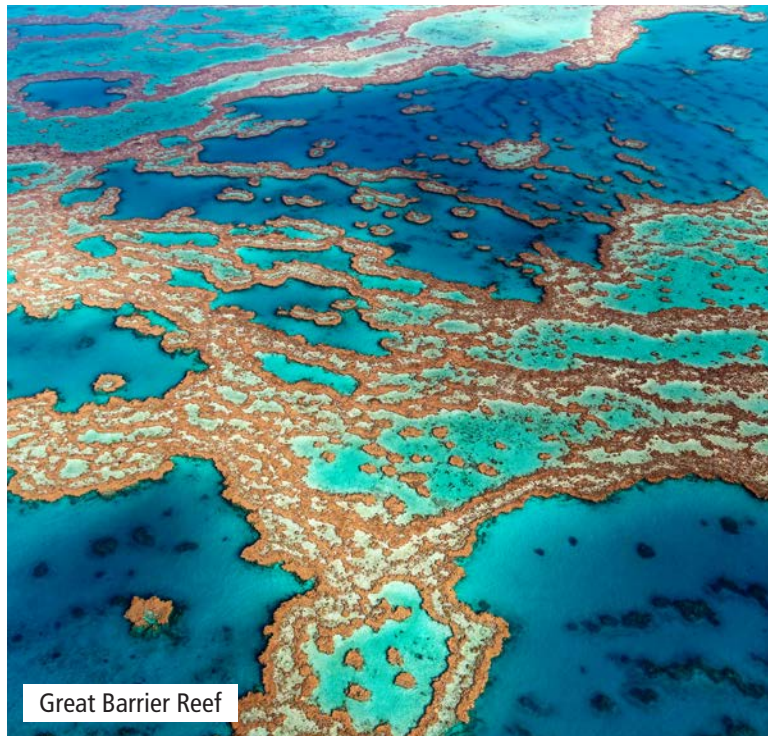
Most reefs are located close to shore in warm tropical waters. They also form where warm currents flow from the tropics, such as in Florida and parts of Japan. Corals grow best in warm water that is between 21 and 29 degrees Celsius (70–84°F). Since algae need sunlight to make food, most corals live near the water's surface.

Even with these conditions in place, coral reefs cannot survive in many areas. They do not grow well near the mouths of rivers, where dirt, trash, and fresh water flow into the sea. Fresh water can kill corals. Dirt and trash can damage or even **smother** reefs.

Because corals grow very slowly, a reef takes a long time to increase in size or recover from damage. Some living coral reefs began growing twenty-five million years ago.

Three types of coral reefs exist. The first type, *fringing reefs*, are located close to shore. They usually follow the natural shoreline, or fringe, of the land.

The second type, *barrier reefs*, create a deep lagoon, or area of water, between the reef and the shore. The world's largest barrier reef is the Great Barrier Reef in Australia. It is 2,300 kilometers (1,429 mi.) long and is made up of over three thousand reefs and islands. The Great Barrier Reef is home to nearly two thousand species of fish.



The Great Barrier Reef

The Great Barrier Reef is between six and eight thousand years old, but coral reefs have been growing in this same spot for about five hundred thousand years! Many changes in sea levels occurred during that time, and low sea levels caused earlier reefs to die. New reefs formed during times of higher sea levels, including after the last ice age ended. Scientists think that the current Great Barrier Reef is at least the sixth one to form in that location.

Atolls, the third type of reef, form in a circular pattern around a sinking island or an aging island volcano. As an island sinks or an island volcano ages and breaks apart, the remaining land disappears beneath the ocean's surface. When that happens, the growing reef forms a circle around a central lagoon.



The Maldives is a country in the Indian Ocean made up of twenty-six atolls.



Pollution and high ocean temperatures can quickly kill a coral reef.

Threats to Coral Reefs

Coral reefs are **fragile**, and many things can damage them. Large, powerful waves caused by a hurricane can destroy reefs. So can a **tsunami** (soo-NAH-mee). Most damage is caused by people, however.

Poor water quality caused by human pollution is a likely factor in coral diseases. These diseases can wipe out an ancient coral reef in weeks. Another likely factor, also caused by people, is higher ocean temperatures as a result of global warming.

Global Warming

Global warming is an increase in the average temperature of Earth's atmosphere and oceans large enough to change long-term weather patterns. Global warming today is mainly the result of human activities such as clearing land for farming, industrial processes, and burning coal, oil, and gas. These activities create large amounts of carbon dioxide gas, which enters Earth's atmosphere and traps heat close to Earth's surface.

Global warming is causing many problems, including wildfires, extreme weather, and threats to coral reefs and other natural communities. Scientists expect the problems to get worse unless we reduce the activities that create so much carbon dioxide.

Another problem that is killing corals is known as **bleaching**. Today, the most common cause of bleaching is ocean temperatures becoming too warm. When this happens, the algae that live in coral polyps undergo a chemical change that harms the polyps. The polyps expel the algae to stop the damage. Algae provide coral polyps with food as well as color. When corals expel algae, they lose their main source of food and begin to starve. They also lose their color, which makes them look bleached.

Corals can sometimes recover from bleaching. But if the cause of bleaching continues, both the corals and the reef will die. Bleaching now affects three-quarters of coral reefs.



Once-colorful coral reefs around the world are turning white from bleaching.

The same human activities that cause too much **carbon dioxide** in Earth's atmosphere also cause too much carbon dioxide in oceans. This process makes ocean water more acidic. When this happens, corals can't take in calcium carbonate, which keeps their skeletons healthy. Instead, the stony skeletons that support corals and reefs **dissolve**.

People cause harm to coral reefs in other ways, too. Fishing methods that use poisons and explosives have destroyed over half the reefs in the Philippines. Coastal homes and other buildings create soil erosion and fresh water that pours into oceans. Fresh water damages coral, and it may also contain chemicals as well as waste.



Ships and smaller boats have gouged out scars in Florida's barrier reef.

Another danger to coral reefs is breaking off chunks of them, whether by accident or on purpose. Some people take pieces home as souvenirs or to sell.



Since 2011, the area of threatened reefs has increased by 30 percent. Even if we could stop global warming now, scientists predict that more than 90 percent of coral reefs will die by 2050. If we stand by and do nothing, though, we could lose them all.

Boaters damaged this elkhorn coral.

Protecting Coral Reefs

Many countries have taken steps to preserve nearby reefs. In the United States, a government group makes maps of coral reefs. Satellite images help scientists watch for problems. Floating buoys measure sea levels, water temperature, wind speed, and air temperature. All this information helps scientists better understand reef damage and work to reduce it.



Coral Nurseries

Scientists can grow pieces of healthy coral in nurseries. The pieces may be rescued from boat-related damage or coastal construction projects. Scientists hang the pieces from bars, place them in baskets, or attach them to stands on the ocean floor. They later move the pieces to damaged reefs to help restore them.

In Florida and on the Great Barrier Reef, it is against the law to take fish, plants, or coral from protected areas. People and boats are not allowed near many fragile reefs. But these efforts are only a start.

Half of the world's reefs have already been destroyed. Most of those that remain are threatened. It is up to all of us to help save coral reefs. Even if you don't live near an ocean, you can help by doing your part to reduce global warming. Use less energy, walk or bike more, and recycle as much as you can.



Each year, volunteer divers help remove trash from reefs.



Indonesian people plant mangrove trees to help protect nearby coral reefs.

You can also help by learning how communities around the world support **resilient** reefs. These reefs stay healthy or recover when faced with climate-related challenges. Community members plant crops that provide shade for coral reefs, which helps them stay cool. Other people grow plants that help prevent erosion and keep pollution from entering the ocean. Still others protect fish that help reefs maintain a balanced **ecosystem**.

Each of us can do something to help coral reefs remain a beautiful natural wonder for centuries to come. What can you do?

Glossary

- bleaching** (*n.*) the process of something losing its color, such as when coral turns white after its algae die (p. 14)
- carbon dioxide** (*n.*) an invisible gas that is formed by the chemical breakdown or burning of organic substances, such as fossil fuels (p. 15)
- coral reefs** (*n.*) underwater ridges that are found in warm seawater and are made from the external skeletons of small marine animals called *polyps* (p. 4)
- dissolve** (*v.*) to break down or disintegrate, usually because of contact with a liquid (p. 15)
- ecosystem** (*n.*) a community of living things together with their habitat (p. 19)
- erosion** (*n.*) the natural removal of rock or soil by water, wind, or ice (p. 9)
- flexible** (*adj.*) able to bend without breaking (p. 7)
- fragile** (*adj.*) easily damaged or broken; delicate (p. 13)
- resilient** (*adj.*) able to recover after something bad happens (p. 19)
- skeletons** (*n.*) hard frameworks that support and protect the bodies of some animals (p. 6)
- tropical** (*adj.*) of or relating to the geographic region around the equator that has a hot, humid climate (p. 4)
- tsunami** (*n.*) a series of large, destructive ocean waves caused by an underwater earthquake, landslide, or volcanic eruption (p. 13)