

Rocks From Reefs

Reading Focus

Key Concepts

- How do coral reefs form?
- What evidence do limestone deposits from coral reefs provide about Earth's history?

Key Term

- coral reef

Target Reading Skill

Using Prior Knowledge

Before you read, look at the section headings to see what this section is about. Then write what you know about coral reefs in a graphic organizer like the one below. As you read, write what you learn.

What You Know

1. Coral reefs grow in the oceans.
- 2.

What You Learned

- 1.
- 2.

Lab
Zone

Discover Activity

How Does a Rock React to Acid?

1. Using a hand lens, observe the color and texture of limestone and coquina.
2. Put on your goggles and apron.
3. Obtain a small amount of dilute hydrochloric acid from your teacher. Hydrochloric acid is used to test rocks for the presence of the mineral calcite.

Using a plastic dropper, place a few drops of dilute hydrochloric acid on the limestone. **CAUTION:** *Hydrochloric acid can cause burns.*

4. Record your observations.
5. Repeat Steps 2 through 4 with the sample of coquina and observe the results.
6. Rinse the rock samples with lots of water before returning them to your teacher. Wash your hands.

Think It Over

Drawing Conclusions How did the two rocks react to the test? A piece of coral reacts to hydrochloric acid the same way as limestone and coquina. What could you conclude about the mineral composition of coral?



Off the coast of Florida lies a “city” in the sea. It is a coral reef providing both food and shelter for many sea animals. The reef shimmers with life—clams, sponges, sea urchins, starfish, marine worms and, of course, fish. Schools of brilliantly colored fish dart in and out of forests of equally colorful corals. Octopuses lurk in underwater caves, scooping up crabs that pass too close. A reef forms a sturdy wall that protects the shoreline from battering waves. This city was built by billions of tiny, soft-bodied animals that have skeletons made of calcite.

FIGURE 14

A City in the Sea

A coral reef provides food and shelter for many different kinds of living things.



FIGURE 15

Coral Animals and Reefs

The coral animals in the close-up feed on tiny organisms carried their way by the movement of ocean water. (The view has been magnified to show detail.) The aerial photograph shows an island in the South Pacific Ocean that is ringed by a coral reef (light blue areas). **Inferring** Why are there no coral reefs in the dark blue areas of ocean water?



Coral Reefs

Coral animals are tiny relatives of jellyfish that live together in vast numbers. They produce skeletons that grow together to form a structure called a **coral reef**.

How Coral Animals Live Most coral animals are smaller than your fingernail. Each one looks like a small sack with a mouth surrounded by tentacles. These animals use their tentacles to capture and eat microscopic creatures that float by.

Tiny algae grow within the body of each coral animal. The algae provide substances that the coral animals need to live. In turn, the coral animals provide a framework for the algae to grow on. Like plants, algae need sunlight. Below 40 meters, there is not enough light for the algae to grow. For this reason, almost all coral growth occurs within 40 meters of the water's surface.

How a Coral Reef Forms To form their skeletons, coral animals absorb the element calcium from the ocean water. The calcium is then combined with carbon and oxygen to form calcite. Recall that calcite is a mineral. **When coral animals die, their skeletons remain. More corals build on top of them, gradually forming a coral reef.**

Coral animals cannot grow in cold water. As a result, coral reefs form only in the warm, shallow water of tropical oceans. Reefs are most abundant around islands and along the eastern coasts of continents. In the United States, only the coasts of southern Florida and Hawaii have coral reefs.

Over thousands of years, reefs may grow to be hundreds of kilometers long and hundreds of meters thick. Reefs usually grow outward toward the open ocean. If the sea level rises or if the sea floor sinks, the reef will grow upward, too.



Reading
Checkpoint

What conditions of light and temperature do coral animals require?



Limestone From Coral Reefs

A coral reef is really organic limestone. **Limestone deposits that began as coral reefs provide evidence of how plate motions have changed Earth's surface. These deposits also provide evidence of past environments.**

Limestone from coral reefs has been forming in Earth's oceans for more than 400 million years. The limestone formed when shallow seas covered the low-lying parts of the continents. The limestone was exposed when the seas retreated. Later, plate motions slowly moved these limestone deposits far from the tropical oceans where they formed. In the United States, reefs that formed millions of years ago are exposed in Wisconsin, Illinois, Indiana, Texas, New Mexico, and many other places.

Deposits of organic limestone help geologists understand past environments. Where geologists find fossils of an ancient coral reef, they know that the reef formed in an area with a warm climate and shallow ocean water. In North America, these conditions existed for millions of years when much of the continent lay closer to the equator than it does today. Shallow seas covered the central part of North America, allowing large coral reefs to form. Today, the reefs are thick deposits of sedimentary rock.



FIGURE 16
Limestone From Coral
A band of light-colored limestone marks an ancient reef that forms part of Guadalupe Peak in Texas. This reef is now 2,600 meters above sea level!

Section 4 Assessment

Target Reading Skill Using Prior Knowledge

Review your graphic organizer about coral reefs and revise it based on what you just learned.

Reviewing Key Concepts

- Describing** What is a coral animal?
 - Summarizing** How do coral animals build a coral reef?
 - Predicting** If sea level rises above a coral reef, what may happen to the reef?
- Identifying** What type of rock is made up of ancient coral?
 - Inferring** A geologist finds an area where the rocks were formed from an ancient coral reef. What can the geologist infer about the ancient environment where the rocks formed?

Lab zone

At Home Activity

Earth's Coral Reefs Obtain a globe or world map. Find the lines that represent the tropic of Cancer and the tropic of Capricorn. The area that lies between these two lines, called the Tropics, is where most coral reefs form in warm ocean water. Locate the northeast coast of Australia, the Red Sea, and groups of tropical islands in the Caribbean Sea, Indian Ocean, and Pacific Ocean. Point out these features to family members and explain that these are areas where coral reefs occur today.