



food and help remove wastes because they are attached to a surface and cannot move around (see Unit 10).

Reef-building corals require warm, tropical waters where the temperature does not drop below 20°C (68°F). The water also must be clear and shallow—less than 100 feet deep—because some species of coral have algae that live in their tissues, and need lots of sunlight so the algae can produce their food.

Therefore, reefs are most common in the Pacific, but a few are found in Florida. One of the most well known in our state is in John Pennecamp Coral Reef State Park in the Florida Keys.

Coral reefs provide habitats for many of the more unusual and colorful marine animals. Can you guess why? Coral reefs are composed of many types of coral growing together. The different coral types have varying shapes, sizes, and patterns which provide holes and crevices for marine organisms to seek shelter. Corals are classified into two types, hard corals and soft or flexible corals. Examples of hard corals are brain coral and staghorn coral. Soft corals include the gently waving sea fans and the sea pens. Both the soft coral and hard coral provide environments for over 3,000 animal species. Among the colorful marine species are the parrot fish, lionfish, moray eel, sea urchin, cleaner fish, and more.

Coral reefs are productive but fragile environments. Pieces of coral can be broken easily by extreme wave action or from someone touching the coral. Coral is covered by a protective membrane. If the membrane is damaged, then the coral is at risk for infection or disease. Corals around the world are in danger from coastal development, decline in water quality, and too much fishing and diving.

Scientists distinguish among three different types of coral reefs: the **fringing reef**, the **barrier reef**, and the **atoll**.



lionfish



clownfish



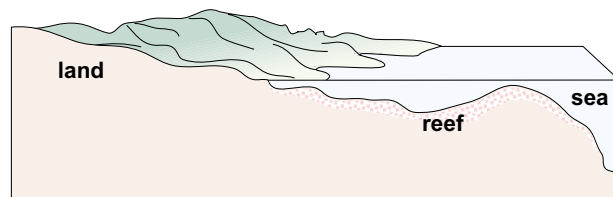
Fringing Reef

Fringing reefs develop in shallow water along the edge of a volcanic island or land mass. These reefs create a fringe of living coral on the border of a land form. The coral on the side farthest from land has more oxygen and food than the land-side coral and so grows more rapidly. Fringe reefs are commonly found in the Hawaiian Islands in the South Pacific and parts of the Caribbean.

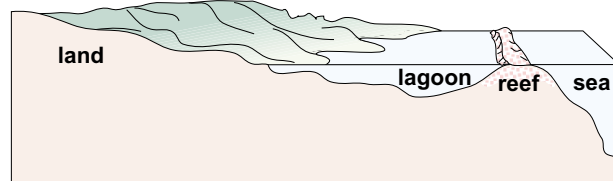
Barrier Reef

Unlike the fringing reef, the *barrier reef* is separated from the land by a body of water called a **lagoon**. The lagoon may be a few miles wide or very narrow.

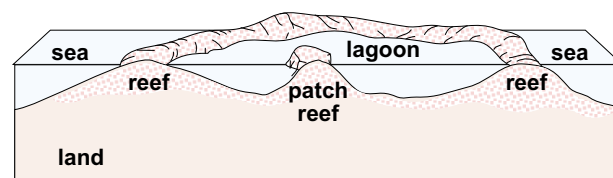
The Great Barrier Reef of northern Australia in the Coral Sea is an example of this type. This reef stretches 1,250 miles along Australia's coast and varies in width from 12 to 100 miles. The Great Barrier Reef is the largest barrier reef in the world.



fringing reef - connected directly to shore



barrier reef - separated from the shore by a lagoon



atoll - surrounded a central lagoon

Atoll Reef

Atolls are ring-shaped reefs that develop from fringing reefs. As the volcanic island or land mass begins to sink, the coral continue to build new layers on top of the old layers. Eventually, the volcanic mountain is completely submerged beneath the water, leaving behind an atoll with a large lagoon in the center.

Atolls are common in the Pacific and Indian oceans and can exist in deep water. The largest atoll, named Kwajalein, surrounds a lagoon over 60 miles long. Kwajalein is in the Marshall Islands, southwest of Hawaii and east of Guam.



Coral Reef Formation

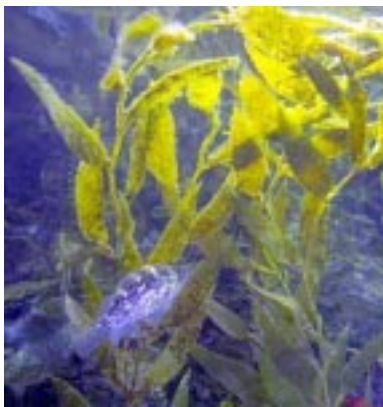
For a long time scientists did not understand how atolls could have been formed in deep water when they knew that living coral required shallow, sunlit waters. Charles Darwin, the famous biologist, studied atolls and developed a theory of reef formation in 1831. He suggested that volcanic islands provided the shallow-water base that coral needed to grow on. As the islands slowly sank or the sea level rose, the coral grew upward, creating lagoons between the coral and the land, forming a barrier reef. By maintaining growth upward, the coral remained in shallow waters, and the top portions of the coral stayed alive. As the islands continued to sink or as sea level rose, eventually only the coral portion remained near the surface, forming an atoll surrounding a shallow lagoon.



Reef-building corals require warm, tropical waters.

Summary

Two coastal habitats important to maintaining the balance of life both in the sea and on land are *wetlands* and *coral reefs*. Wetlands contain bacteria that help to break down pollutants in water before they reach the sea. Wetlands also provide a nutrient-rich, protected breeding ground for many aquatic animals. Different types of wetlands include *estuaries*, *salt marshes*, *swamps*, *mudflats*, *mangrove swamps*, and the *Everglades*. Commercial development has destroyed many wetlands and endangered these essential buffer zones.



Seagrasses provide food and protection for many smaller animals.

Coral reefs are made of layer upon layer of calcium carbonate. They develop only in sunlit, tropical waters and provide habitat for many of the oceans' more colorful and unusual animals. Different types of coral reefs include the *fringing reefs*, the *barrier reef*, and the *atoll*. Like wetlands, coral reefs are threatened by commercial interests.



Practice

Answer the following using short answers.

1. What is a *wetland*? _____

2. What are the three types of coral reefs? _____

3. What conditions must coral have to grow? _____

4. Why are estuaries called *nurseries of the sea*? _____

5. Where is the Everglades located? _____

6. Why are wetlands valuable to us? _____

7. What are ways that mankind is destroying wetlands? _____



Practice

Use pages 261-266 to correctly complete the chart below.

Classifying Near-shore Ecosystems				
Habitat	Common Plants	Water	Effect of Tides	Animals
Estuaries				
Salt Marshes				
Swamps				
Mangrove Swamps				



Practice

Match each definition with the correct term. Write the letter on the line provided.

- | | |
|---|------------------|
| _____ 1. decaying plant and animal material | A. coral reefs |
| _____ 2. large mixed wetland area in South Florida dominated by grasses | B. corals |
| _____ 3. fringing, barrier, and atoll | C. detritus |
| _____ 4. combination of water and land | D. widgeon grass |
| _____ 5. tiny sea animals with a limestone skeleton | E. estuary |
| _____ 6. common Florida seagrass | F. Everglades |
| _____ 7. an area where freshwater and saltwater meet | G. mudflats |
| _____ 8. low, flat coastal wetlands bordering estuaries or bays | H. salt marshes |
| _____ 9. wooded wetland located further inland than marshes | I. swamps |
| _____ 10. slightly sloping beach with dark, muddy sand | J. wetland |



Lab Activity: Near-Shore Ecosystems



Investigate:

- Investigate some adaptations necessary for life in a salt marsh by building your own bird.

Materials:

- page of bird bodies
- page of bird beaks
- page of bird feet
- scissors
- glue or tape
- colored pencils

Procedure:

1. Use the information discussed in class or from your text about salt marsh habitats to design the perfect marsh bird.
2. Ask yourself the following questions about the marsh bird you wish to create.
 - What kind of food will my salt marsh bird eat?
 - What type of beak will the bird need?
 - Will the marsh bird need a short or long neck? Why?
 - How mobile is my marsh bird?
 - What type of feet will my bird need? Why?
3. Decide upon the body, beak, and feet of your "perfect" marsh bird. Use a **copy** of pages 276-278 and **cut** out the selected body parts. **Color** each section appropriately. **Glue or tape** the parts together.
4. After creating your marsh bird, complete the **Analysis** section of the lab.



Analysis:

1. Describe the shape of the body of your marsh bird. _____

2. Describe the beak of the your marsh bird. _____

3. Why do you think a marsh bird would need the type of beak you selected for its environment? _____

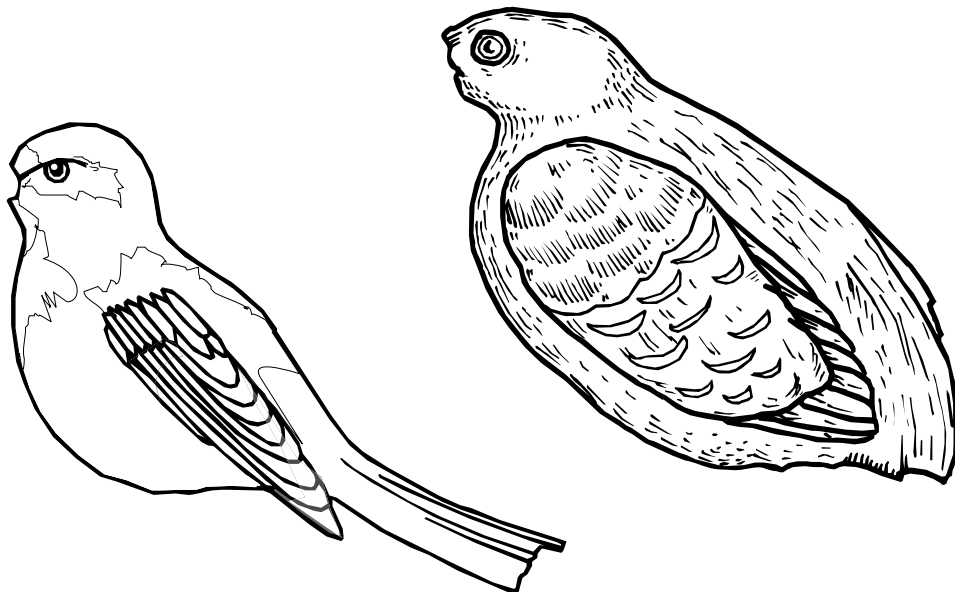
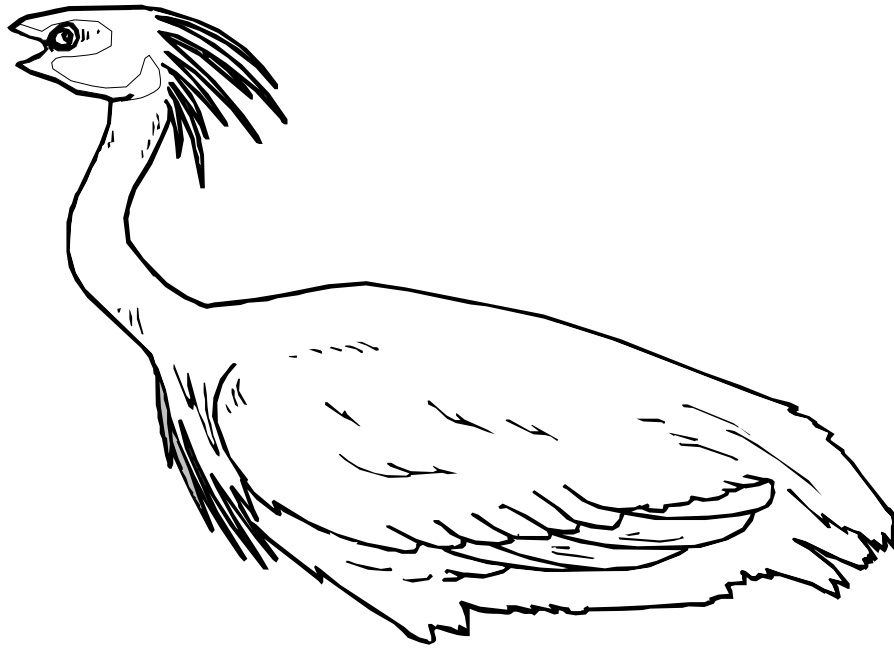
4. Describe the structure of the feet you selected for your marsh bird. _____

5. Why do you think a marsh bird would need the type of feet you selected for its environment? _____

6. Explain how salt marsh organisms are adapted to their habitat. _____

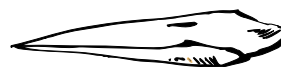
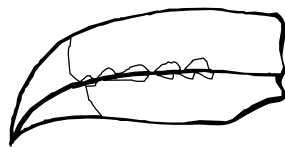
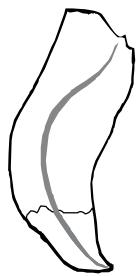


Bird bodies



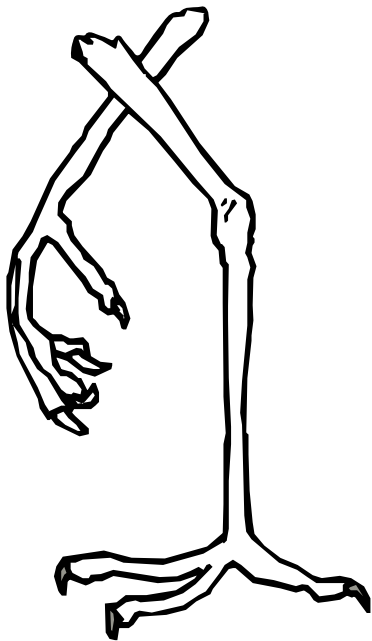
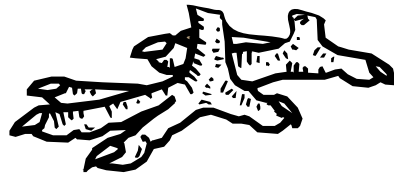


Bird beaks





Bird feet





Practice

Match each definition with the correct term. Write the letter on the line provided.

- | | |
|---|---------------|
| _____ 1. slightly sloping beach with dark, muddy sand, no marsh grasses, and very little wave action | A. coral reef |
| _____ 2. describes moderate climate zone between the tropics and the poles | B. detritus |
| _____ 3. low, coastal wetland covered by salt-tolerant grasses | C. estuary |
| _____ 4. the mouth of a river or bay where freshwater and saltwater mix; the part of the river where its current meets the ocean's tide | D. mudflat |
| _____ 5. decaying plant and animal material | E. salt marsh |
| _____ 6. underwater community of living and dead corals; supports life in warm tropical waters | F. temperate |
| _____ 7. an area that is a combination of water and land; may be exposed, partially submerged, or covered with water | G. wetlands |



Practice

Use the list below to write the correct term for each definition on the line provided.

atoll	hammock
barrier reef	lagoon
dredge	mangrove
Everglades	swamp
fringing reef	

- _____ 1. ring-shaped coral island usually located in deep water; developed from fringing reef formed around a volcanic island or landmass
- _____ 2. water separating land from a coral reef or sand bar
- _____ 3. coral formation that is separated from land by water (a *lagoon*)
- _____ 4. coral reef that grows around the edge of a volcanic island or landmass
- _____ 5. to remove underwater land or sediments by suction or digging
- _____ 6. large, mixed wetland area located in southern Florida
- _____ 7. tree found in muddy tropical wetlands whose twisted roots grow partly above ground
- _____ 8. wooded area surrounded by marsh
- _____ 9. wooded wetland located further inland than marshes