

Estuaries Live

Charlotte Harbor, Florida

Sea Grasses are Special!

This activity uses the Pattern Puzzles strategy. Students are given sentences from paragraphs that are cut into strips. The students must then use their reading skills and understanding of paragraph construction to put the sentences and paragraphs in order.

Procedure: Part A - Putting it all Together

1. Copy pages 32 - 36.
2. Make enough copies so you will have one per 4 students.
3. Cut the paragraphs into strips with one sentence per strip.
4. Be sure to keep the sentences from each paragraph organized together.
5. Organize the sentence strips into envelopes, one paragraph per envelope.
6. Give each group of students, 4 - 5 students per group, one envelope.
7. Give each group a roll of scotch tape.
8. Have each group read their sentences and organize those into one paragraph and tape their final paragraph together on a piece of paper.
9. As a class, sequence the paragraphs into one passage. Ask students to suggest where their paragraph should be placed and why.
10. Although there is a copy of the passage as originally written provided on the following pages, students may suggest paragraph placement that will create an alternate that is just as effective.
11. Once all the text is assembled read it aloud and have student read it aloud with you.
12. Pause every couple of sentence and ask students if the text brings any questions to mind. For instance, students might wish to compare oceanic salinity levels after reading about salinity in seagrass areas.
13. Assign freshly generated questions to groups of students or individual students to investigate or refer to the list of web sites and resources provided and share the information later with your students.

Procedures: Part B - Seagrass Vocabulary

1. Provide each student with a copy of the seagrass passage as written for this unit and a copy of the list of vocabulary words from the same text (page 37).
2. Tell the students that by reading the paragraphs and giving thought to what they have read they will be able to define each of the words. Students should not use a dictionary. Tell them they may need to read more than one paragraph to define a word, sometimes they will be able to define the word from their own prior knowledge and sometimes the definition will be found or inferred within the paragraph.

3. When students have finished working on the vocabulary individually, have them work with one other person to compare their definitions. If their definitions are not similar they should read the paragraph together and decide on a definition.

Student Reading Text

Section 1. Types of Sea Grasses and Where They Grow



Seagrasses are similar to **terrestrial** grasses that grow on land. Seagrasses live **submerged** under water held to the bottom by their roots. Their leaves grow up from the stems through the soil. Under the water the blades of grass move gently buoyed about by waves and currents. Sometimes, a low tide leaves the blades of grasses exposed to the air.

There are 52 species of **marine** seagrasses in the world. Four species of seagrasses are commonly found in the **estuaries** of southwest Florida. These are widgeon grass, shoal grass, turtle grass and manatee grass. These grasses grow in certain places in estuaries depending on salinity, turbidity and water depth.

Salinity affects where different species of seagrasses will grow. Salinity levels vary in different places within an estuary. Widgeon grass grows in fresh or salt water. Shoal grass is usually found where there is fairly low salinity. Turtle grass and manatee grass thrive in areas with salinities similar to the levels of seawater. In fact, turtle grass and manatee grass grow well in the Gulf of Mexico and Atlantic Ocean.

Some seagrasses grow where they are often exposed to air. This happens on very low tides. Other grasses cannot be exposed to air for very long periods of time. Shoal grass grows where the water is shallower. Therefore, shoal grass is more often exposed to air than turtle grass, manatee grass or widgeon grass.

All seagrasses require fairly clear water. They need clear water because they are dependent on sunlight to carry on **photosynthesis**. **Turbid** water, water that is not very clear, blocks the sunlight. Turbid water occurs when there are high amounts of suspended sediments, dissolved chemicals or too much plant growth in the water.

II. Importance of Seagrasses

Seagrasses are very important in Florida's estuaries. First, they improve the **water quality**, or conditions of estuaries. Second, they **stabilize** the bottom with their stems and roots that help to keep the sand and sediments from washing away. Third, seagrasses provide homes or living areas, **habitats**, for many kinds of animals.

Seagrasses improve water quality by trapping sediments that make the water more turbid. The leaves of seagrasses slow down water flowing through it. As the clouded or unclear water slows down, sediment that the water is carrying drops to the bottom among the seagrass leaves. Seagrasses also improve water quality by **filtering** some **pollutants**, as well as the sediments out, of the water.

The roots and stems of seagrasses keep the muddy estuary soil in place. Without seagrasses the bottom would shift and move constantly. This would leave many **juvenile** animals without protection.

Seagrasses provide habitat for many animals, including certain kinds of birds, reptiles, mammals and fish. Many **crustaceans**, like shrimp with their hard outer coverings, and **molluscs**, like snails and clams with their soft bodies protected by shells, live among the seagrasses. Some animals, like sea turtles and manatees eat the leaves of seagrasses. Other small animals and some small plants, like **algae**, grow right on the blades of the seagrasses. Some animals get both food and a place to live from seagrasses. Some live their entire life in seagrasses and depend on them for all their food and shelter. Others may move in and out of sea grass areas as they search for food while certain kinds may live in seagrasses only when they are a juvenile.

The snook is one kind of fish that is sometimes, but not always, found in seagrasses. Snook eat other fish. Some of the fish that snook eat hide among seagrasses to avoid capture. Other fish also use the seagrasses as hunting grounds. Long-legged birds like herons and egrets also look for food in seagrass areas.

III. How People Affect Sea Grasses

Seagrasses are fragile and can be harmed by things people do. Boat propellers can cut the blades and roots of the seagrasses. It may take years for the grasses to grow back after being damaged by propeller cuts. People often build docks that block sunlight to seagrasses. The chemicals and dirt that end up in water that runs off roads and yards after a rain are also harmful to seagrasses.

In some places huge areas of seagrasses have been destroyed. Once they are gone, so are the animals that live among them. In Charlotte Harbor 30% of the area where seagrasses once grew now has no seagrasses.

People can help protect seagrasses in several ways. First, when boating always be aware of where seagrasses are and avoid them. Second, everyone should be careful when applying **pesticides** to kill insects since water runoff from the lawn eventually ends up in estuaries. It is also important to keep **litter** out of seagrass areas. Any kind of throwaway item can damage seagrasses. Everyone can do his or her part to protect seagrasses.

Directions to the Student

The words listed below come from the reading material on seagrasses that your teacher will provide you. By using knowledge you already have or by reading the paragraph and giving thought to what you have read, you will be able to define each of the words. You may need to read more than one paragraph to be able to define a word. Do not use a dictionary. When you are finished, your teacher will ask you to compare your definitions with another persons. If your definitions are not similar, read the paragraph together and decide on a definition.

algae

crustaceans

estuaries

filtering

habitat

juvenile

litter

marine

mollusks

pesticides

photosynthesis

pollutants

submerged

salinity

stabilize

terrestrial

turbid

water quality

Seagrass Loss

Students will re-write sentences about seagrass loss with data from seagrass studies. Pictures of seagrass damage can be viewed at <http://floridamarine.org>.

Procedure

1. Give each group a Florida map (can be obtained from AAA) and have them locate each of the following areas on the map:

Tampa Bay

St. Joseph Sound north of Clearwater

Biscayne Bay near Miami

Indian River Lagoon

Charlotte Harbor

Ponce Inlet near Daytona Beach



2. Instruct students to rewrite the following statements about seagrass declines in Florida. They should rewrite them to reflect the percent of sea grasses that remain in the areas identified.

Example

- Tampa Bay: 40% of the seagrass has been lost since 1950s
Rewritten: In Tampa Bay, 60% of the sea grass beds remain intact.
- St. Joseph Sound north of Clearwater: 72% loss of seagrass since 1950
- Biscayne Bay near Miami: 43% of seagrass beds in the northern section no longer exist
- Indian River Lagoon: 30% of the seagrass from Stuart north to Titusville has been lost
- Charlotte Harbor between Naples and Sarasota: 29% of seagrass lost since 1950
- Ponce Inlet near Daytona Beach: 100% of seagrasses lost

3. Develop a hypothesis about why some areas have sustained greater loss (or retention of) the seagrasses than other areas.
4. Have students work with a partner to create a graph that compares the loss of seagrass habitats for each of the areas above.
5. As a class, develop a hypothesis about why some areas have sustained greater loss (or retention) of the seagrasses than other areas.



Noodling with Sea Grasses



Material

- Spaghetti noodles (representing manatee grass)
- Fettuccini noodles (representing shoal grass and widgeon grass)
- Linguini noodles (representing turtle grass)
- Scissors
- glue
- Green food coloring
- Poster board



Procedure

1. Boil the noodles ahead of time at home and add food coloring to the softened noodles.
2. Describe the four different types of local seagrasses and their characteristics.
3. Divide the students into groups. Give each group a copy of the following page showing the different seagrasses and a piece of poster board or stiff paper. Also provide each group some of each type of noodle, scissors and glue.
4. Tell students to draw a sloping line on their board to represent changes in bottom depths in estuaries.
5. Direct the students to use their noodles to create a display of seagrasses being certain to place the appropriate grass types at the correct depths and measuring their leaf blades carefully. Once the noodles are glued in place, students can add drawings or pictures of animals that live in seagrass beds.

Seagrasses

Environmental Contributions

- food source
- nursery
- production of oxygen
- maintains water clarity
- stabilizes the bottom sediments
- provides a habitat for fish

Characteristics

- flowering plants
- contains true roots, stems, and leaves
- grow in shallow seas where sunlight is plentiful



Turtle Grass

- most common and largest of all seagrasses
- deep root systems
- leaves grow flat with parallel veins
- 12 inches tall, 1/2 inch wide

Manatee Grass

- leaves grow in the shape of cylinders
- grows in deeper water
- 12 inches tall



Shoal Grass

- Grows in shallow areas, may be uncovered during very low tides
- 5 inches tall

Widgeon Grass

- much branched, very fine
- grows in very fresh water
- maximum blade length 4 inches



Making Our Way

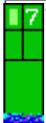
This activity can be used as a performance assessment or as a student activity.

Procedure

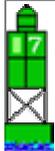
1. Tell the students that seagrasses grow clustered together. These seagrass areas are known as seagrass beds.
2. Remind students that each type of seagrass grows in specific regions of the estuary depending on depth, salinity, etc.
3. Tell them they will be designing a map of an estuary. Their map should contain all estuarine components. If using this as an assessment do not review these components. If this is used as an activity review the definition of an estuary, information about seagrass requirements, etc.
4. After students have drawn their imaginary estuary, they should place seagrass beds abundantly throughout as in an estuary with no seagrass loss.
5. Give the students the following challenge. They should design a way to navigate a boat from the mouth of a river through their estuary to the open water while avoiding seagrass beds.
6. Students should use the symbols for navigational aids found on the next page to label their course.
7. Check the maps for completeness and post in the classroom.

NAVIGATIONAL AIDS

Port Side (odd numbered) Aids



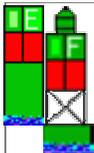
These cylindrical buoys are often referred to as can buoys. The can buoy is usually solid green in color. They may also contain an off-green colored reflector. The can buoy will mark the left side of the channel when proceeding from seaward. In the past the can buoy was painted black in color with a green reflector.



The green lighted buoy serves the same function as the non-lighted green can. They tell the mariner the margin of the port side of channels and mark wrecks or obstructions which must be past by keeping the aids to navigation on the port side of the vessel.



The square daymark is green in color. It will usually contain two colors of green. One shade of green for the square interior and another green as a reflective outline. This dayboard is used to mark the port (left) side of channels when proceeding from seaward. Daymarks are mounted on a pole, or other structure to hold them above the waterline. Some daymarks will also have a light above them.



When buoys are bi-colored they mark the start of two channel choices. The upper most color marks the preferred choice. Those markers with a top color of green signify a starboard preferred channel. Those markers with a top color of red signify a port preferred channel.

Starboard Side (even numbered) Aids



The conical shaped red buoys are known as nuns. Nun buoys mark the right side of the channel when proceeding from the seaward. These aids to navigation are commonly associated with a solid red color. They may also include an off-red color reflector.



The red lighted buoy serves the same function as the non-lighted red nun. They tell the mariner the margin of the starboard side of channels and mark wrecks or obstructions which must be past by keeping the aids to navigation on the starboard side of the vessel.



The triangular daymark is red in color. It will usually contain two colors of red. One shade of red for the triangle interior and another red for the reflective outline. This dayboard is used to mark the starboard (right) side of channels when proceeding from seaward. Daymarks are mounted on a pole, or other structure to hold them above the waterline. Some daymarks will also have a light above them.



When buoys are bi-colored they mark the start of two channel choices. The upper most color marks the preferred choice. Those markers with a top color of green signify a starboard preferred channel. Those markers with a top color of red signify a port preferred channel.

Evaluations - Sea Grasses

1. Provide the following to the students. Have them provide answers in sentence format.
2. Name the 4 major species of southwest Florida seagrasses.
3. How are these seagrasses alike?
4. How do these seagrasses differ with regards to:
 - Salinity levels of water
 - Exposure to air
5. How do these seagrasses react to damage?
6. What are the consequences of loss seagrass habitat?
7. What can you do to ensure that SW Florida seagrass areas remain healthy?

Estuaries Live Resources



Quick Facts: Selected Animals of Southwest Florida Mangrove Forests for Build a Mangrove Community Activity

▪ Brown Pelican

Food: small fish, shrimp

Feeding: pouch acts as a net as it dives; bill pointed up to drain water, then up to swallow the fish

Nest Site: in trees or on ground on coastal islands

Nesting Materials: sticks, reeds, grass

Other Facts: once threatened with extinction because DDT (insecticide) softened egg shells

▪ White Ibis

Food: crabs, crayfish, shrimp, snails, insects

Feeding: feed in shallow water in ditches, wetlands, on beaches

Nest Site: near water in low trees and shrubs

Nesting Materials: platform of sticks, twigs, live plant material, lined with leaves

Other Facts: nests in roosts of as many as 80,000 birds; the Fish Crow often eats its eggs

▪ Green Heron

Food: fish, insects, frogs, shrimp

Feeding: slowly stalks prey or crouches waiting for prey to come by

Nest Site: trees or shrubs near water

Nesting Materials: platform of interwoven twigs and sticks

Other Facts: young learn to climb round in trees, its long neck and legs and long sharp bill help for hunting

▪ Black Crowned Night Heron

Food: fish, insects, eggs, young birds, small mammals, amphibians

Feeding: feed at dawn, dusk, and at night along the shore or in the marsh

Nest Site: in trees, shrubs, cattails, or dense undergrowth

Nesting Materials: few sticks, twigs, reeds

Other Facts: nest has separate enter and exit paths

▪ Osprey

Food: mostly fish, some rodents, reptiles, amphibians, and crustaceans, hovers at 30 - 100 feet and dives for fish

Nest Site: in treetop or on pole near or over water

Nesting Materials: sticks, sod, cow dung, seaweed, and rubbish

Other Facts: broad wings for soaring and hovering over water; when nesting, male brings food for female and young, up to 6 pounds per day

- **Great Blue Heron**

Food: fish, shrimp, crabs, crayfish, frogs, mice

Feeding: stalks prey or waits for it to swim by

Nest Site: trees, shrubs, or on ground

Nesting Materials: large, made of interwoven sticks and twigs, lined with twigs and leaves

Other Facts: long neck and legs combined with speed and sharp bill, help get food

- **Bottlenose Dolphin**

Food: fish and squid

Feeding: feeds in groups; sometimes plays with food

Where Found: most oceans, bays, estuaries

- **Horseshoe Crab**

Food: marine worms, dead fish, young clams

Where Found: in shallow water in coastal areas from the Gulf to New England

Other Facts: lay thousands of eggs in the sand at water's edge; become food for many migrating birds; are not really crabs but are closer to spiders

- **Blue Crab**

Food: anything they can catch; will feed on dead animals

Where Found: around the coast from Texas to New England

Other Facts: widely used for food; are able to move quickly in the water

- **Encrusted Tunicate (Sea Squirt)**

Food: a filter feeder

Where Found: coastal waters from North Carolina to Florida

Other Facts: lives in clusters on marine surfaces

- **Periwinkle**

Food: algae and detritus (dead stuff) on the surface, at low tide

Where Found: in marshes along the east coast of the southeast

Other Facts: climb on stems and tree trunks when the tide comes in to avoid predators

- **Bay Barnacles**

Food: feed by screening plankton with feathery legs

Where Found: on any fairly hard surface that remains almost constantly in saltwater

Other Facts: outside shell is made up of six overlapping plates; has an operculum (cover) that helps retain moisture, this helps to survive a few hours at low tides

- **Red Drum (Redfish)**

Food: crustaceans, fish and mollusks

Where Found: juveniles (4 years) found inshore up to 30 inches, then join the spawning population near shore

Other Facts: can live for 20 years; a sudden cold snaps may kill it if in shallow water

- **Seahorse**

Food: feed using their mouth like a slurp-gun, eating tiny shrimp and fish

Where Found: in grasses in warm shallow water

Other Facts: their tail can curl around objects; their head bends down; they have bony rings around their body; females place eggs in male's pouch

- **Needlefish**

Food: small fish

Where Found: in warm water bays often on the surface

Other Facts: can grow up to 2 feet long; when startled, they may skip along the top of the water

- **Immature Gray Snapper (Mangrove Snapper)**

Food: crustaceans and small fish

Where Found: inshore in tidal creeks, mangroves, grass beds

- **Immature Black Grouper**

Food: fish and squid

Where Found: inshore in shallow water, in tidal flats and mangroves

Other Facts: adults weigh 40 - 100 pounds