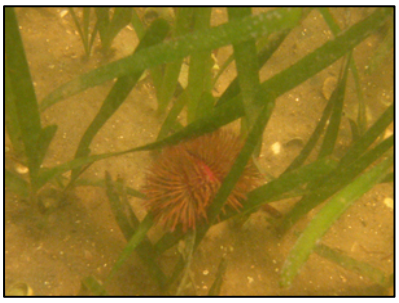
Exploring the Seagrass of Sarasota Bay



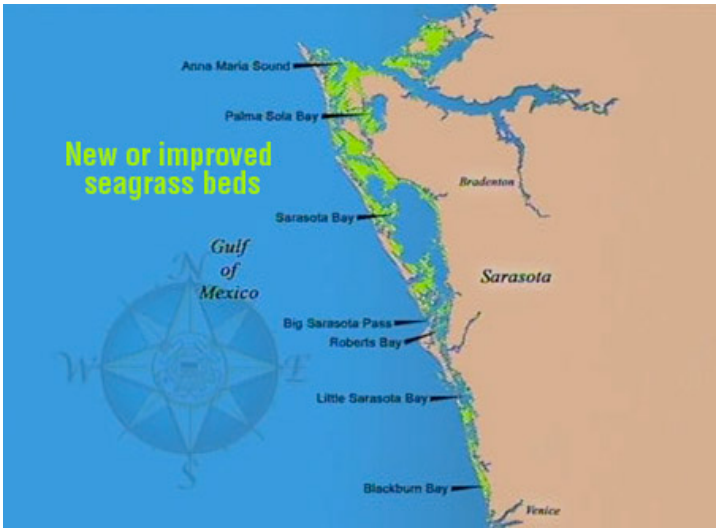
Grade Level: 6th – 12th
Subject: Science
Duration: 45 Minutes
Materials: Triple beam balance (not provided) bucket of fresh sea grasses(not provided), paper plates, Seagrass Information Brochure, Dichotomous Key for Seagrass, Discovering Seagrass of Florida Lab, graph paper.

New Generation Sunshine State Standards: SC.6.L.15.1, SC.7.L.17.3, SC.8.L.18.1, SC.912.L.17.1, SC.912.L.17.2, SC.912.L.17.5, SC.912.L.17.7, SC.912.L.17.8, SC.912.L.17.12, SC.912.L.17.13, SC.912.L.17.18
Common Core Benchmarks: LACC.68.RST.1.3, LACC.68.RST.1.2, LACC.68.RST.1.1, LACC.K12.R.1.1, LACC.K12.R.1.2, LACC.K12.R.1.3

Objectives: Students will:

- Identify the 3 main types of local seagrasses (turtle, shoal and manatee)
- Measure the frequency of each type of seagrasses in a given sample
- Graph the collected data
- Explain the economic importance of the seagrasses

Background:
Seagrasses are flowering plants that grow submerged in shallow estuarine (brackish) and marine environments. There are 5 species that are commonly found in Sarasota Bay. They are Turtle Grass, Manatee Grass, Shoal Grass, Star Grass, and Widgeon Grass.
Seagrass meadows are very important to the ecology of the estuary. They provide a habitat for a diverse group of marine organisms, including a myriad of recreational and commercial fish and shellfish such as redfish, sea trout, snapper, pink shrimp and blue crabs. They also serve as habitat and feeding grounds for endangered manatees and green sea turtles. Pelicans, terns, and wading birds also forage in the grassbeds, feeding on tiny crustaceans and young fish that find shelter and food there in the early stages of life. Florida's seagrassbeds also help provide water clarity. The plants' extensive system of roots and rhizomes, or runners, help stabilize bottom sediments, while their leaves trap fine particles and sediment from the water column. Seagrasses are limited to relatively clear, shallow waters where enough sunlight is available for the production of food and oxygen through the process of photosynthesis.



Seagrasses are not true grasses. However, the sixty or so species did evolve from more than one land-based ancestor that adapted to life in the aquatic environment.

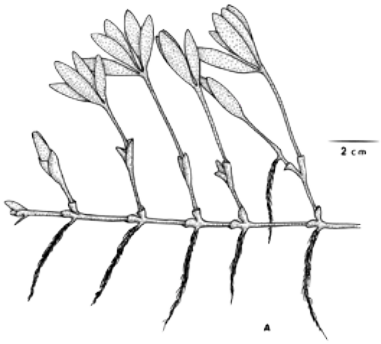
Thus, the term "seagrass" does not refer to a taxonomic group, but to a collection of species that fills an ecological niche and has five basic adaptations in common. They have the ability to grow submerged, they can survive in high and varying salinities, they have an anchoring (root/rhizome) system, they have a submerged pollination mechanism, and have the ability to compete with other plants in the marine environment.
Between 1950 and 1988 the Seagrass habitat decreased by 30 percent in Sarasota Bay due a decrease in water clarity and dredge-and-fill projects. Since that time there has been a steady increase in seagrass beds in Sarasota Bay. Approximately 4,058 acres of new or improved seagrass beds in have been mapped in Sarasota Bay since 1950. This suggests that the water quality in Sarasota Bay has improved.

Turtle Grass (*Thalassia testudinum*) the largest of the Florida seagrasses, has deeper root structures than any of the other seagrasses. It has large ribbon-like leaves that are 4-12 mm wide and 10-35 mm cm long. This seagrass is temperature limited and does not occur along the northeast Florida coast, but it forms extensive beds in Florida Bay.

Shoal grass (*Halodule wrightii*) is an early colonizer of vegetated areas, dominant in Sarasota Bay along with Turtle Grass and Manatee grass. Shoal grass usually grows in water too shallow for the other species. Leaf blades are very narrow, only up to 1mm wide.

Manatee grass (*Syringodium filiforme*) is easily recognizable because its leaves are cylindrical instead of ribbon-like and flat like many other seagrass species. The thin leaves are up to half a meter long. The northern limit of manatee-grass is the Indian River, near Cape Canaveral. Manatee grass is usually found in mixed seagrass beds or small, dense monospecific patches.

Widgeon grass (*Ruppia maritima*) has thread- like, alternate leaves with a pointed tip, less than 1 mm wide and less than 20 cm long. It is not as common as Shoal grass and is very tolerant of fresh water. Leaf tips vary and grow from a branched stem.



Star grass (Halophila englemannii) Leaves are long and elliptical and finely serrulate. Leaf blades are 1- 3 cm long and 3- 6 mm wide and have no basal sheath. Leaves are in a psuedowhorl of 4- 8 leaf blades with a small (2 mm) or no petiole. Widely distributed through the Gulf of Mexico and southern Florida.

Procedure:

1. Read or research Seagrass in FL.
2. On the balance, measure 200g of seagrasses from your sample
3. Using the dichotomous key identify and separate the seagrass into four labeled piles "Turtle" "Shoal" "Manatee" "Unknown"
4. Find the mass of each of the samples and record this on the data chart.
5. Calculate the percentage of each.
6. Compare your results with other groups in the class.

Assessment:

1. Draw and explain the flow of energy in the FL seagrass bed.
2. Write a persuasive essay using this scenario. "Your town is investigating giving approval to have a condominium built on the bay. The condominium would have docks for boats going out into the bay." Write a persuasive essay against this proposal. Use details and facts you have learned about the seagrass beds to convince the town council to vote it down.

Resources:

Seagrass http://sarasotabay.org/habitat-restoration/seagrasses
http://www.dep.state.fl.us/coastal/habitats/seagrass
http://www.sarasota.wateratlas.usf.edu/upload/documents/FMRI%20Seagrass%202.pdf
Seagrass Outreach Partnership, Ecology of Seagrasses, http://flseagrass.org/ecology.php
McCormick, Christine, Field Trips and Informal Education: An Analysis of Hands-On Science Curriculum , New College, Sarasota FL 2012.