

Post-visit Activity: Mangrove Connections

Objective

Students will understand the feeding relationships among organisms found in mangrove ecosystems. Students will also identify the flow of energy within the mangrove food web.

Next Generation Sunshine State Benchmarks: SC.4.N.1.1, SC.4.N.1.2, SC.4.N.1.4, SC.4.N.1.5, SC.4.N.1.6, SC.4.E.6.6, SC.4.L.16.2, SC.4.L.17.2, SC.4.L.17.3, SC.4.L.17.4, LA.4.1.6.1, LA.4.1.6.5, LA.4.5.2.1

Vocabulary

organism	herbivore	carnivore	
omnivore	decomposer	mangrove	
primary producer	primary consumer	secondary consumer	tertiary consumer

Materials

Large sheet of unlined white paper	Pencils	Crayons/markers
Construction/unlined paper	Tape or glue	Scissors
"Food Web Questionnaire" handout (page 3)		

Three species of mangrove are found in Florida: the Red Mangrove, Black Mangrove and White Mangrove. Typically, Red Mangroves grow along the water's edge, Black Mangroves grow on slightly higher elevations than the Red Mangrove and White Mangroves grow upland from the red and black species. Mangrove litter such as leaves, wood, flowers, propagules and leaf scales fall into the water and are decomposed by fungi and other microorganisms, forming detritus, which forms the basis of an elaborate food web.

Energy flow can be traced through this food web by using a Trophic Level Pyramid. Plants are at the bottom of the pyramid as producers, they are the most energy efficient. The upper levels include the herbivores (primary consumers), the omnivores (secondary consumers), and at the top of the pyramid are the carnivores (the tertiary consumers). As you move up the pyramid, a large amount of energy is lost to the environment. Animals use this energy for activities such as keeping warm and moving. Plants and other organisms that get their energy directly from the sun are the most energy efficient. Carnivores are the least energy efficient.



Procedure

1. Ask the students, "What is a mangrove?", and encourage discussion.
2. Draw a sample food chain on the board (sun -> leaf -> snail -> fish -> bird).
3. Introduce the concept of energy flow through this chain from primary producers through carnivores using a Trophic Level Pyramid.
4. Divide the class into groups of 4-5 students.
5. Using the list below, ask the students to write the name of each organism on a sheet of construction or unlined paper.
6. Cut the names out and arrange them into a food web on the larger piece of white paper.
7. Encourage the students to discuss the connections between the organisms: Who eats whom? Can more than one animal eat the same plant? Can more than one predator eat the same animal? Note that the producers should be near the bottom, followed by the herbivores and then the carnivores near the top. Do not expect each group to have the exact same arrangement.
8. After each group has finished potential connections, attach the labels to the larger piece of white paper using glue or tape.
9. Draw arrows to connect the organisms and represent the food links. Note that the direction of each arrow should show the direction of energy being transferred through the food web.
10. After students have completed this activity, distribute the "Food Web Questionnaire". Students may continue to work in groups using the food web they have created to answer the questions. In a full class discussion, review the differences between groups and how all natural systems are connected.

Using the following organisms, develop a food web that might be found in a mangrove ecosystem.

Plant Species	Red Mangrove, White Mangrove, Black Mangrove
Animal Species	Mangrove Butterfly, Ant, Worm, Spiny Lobster, Blue Land Crab, Shrimp, Killifish, Mosquito, Great Blue Heron, Red-Shouldered Hawk, King Fisher, Mangrove Snapper, Crocodile, Raccoon, Tarpon, Human, Green Anole
Fungi & Bacteria	Fungi & Bacteria (decomposers)

Name _____

Date _____

Where We Live

Food Web Questionnaire

1. Name 2 primary producers found in your food web.

2. Name 2 herbivores found in your food web.

3. Name 2 consumers found in your food web.

4. Which trophic level has the most energy? Which level has the least energy?

5. Why is energy lost at each trophic level?

6. What might happen to the food web if the fish disappeared?

7. Suppose a parasite destroyed most of the mangrove trees. What would happen to the rest of the community?

