

Lesson 12: Food Webs in the Estuary

Focus Question:

How is each plant and animal in an estuarine food web important?

Objectives:

- To identify roles of estuarine plants and animals
- To build a realistic food web containing estuarine plants and animals

SC Science Standards:

6-2.7 Summarize the processes required for plant survival (including photosynthesis, respiration, and transpiration.

6-3-2 Summarize the basic functions of the structures of animals that allow them to defend themselves, to move, and to obtain resources.

6-3.4 Explain how environmental stimuli cause physical responses in animals (including shedding, blinking, shivering, sweating, panting, and food gathering).

6-3.5 Illustrate animal behavioral responses (including hibernation, migration, defense, and courtship to environmental stimuli.

Purpose:

An interactive gaming activity that illustrates the complexity of the estuarine food webs

Time Duration: 1 hour

Materials:

Each Student

- SCDNR Poster: Life in a Salt Marsh (Appendix 1)
- 4-5 index cards
- Crayons or coloring pencils

Each Group of Students

- 8-10 50 Ft sections of string/yarn
- Scissors

Vocabulary:

Food Chain: a linear relation of producer to consumers based on a one food diet.

Food Web: interwoven, complex food chains that more accurately depict the varied diets of organisms within an ecosystem.

Producer: organisms with chlorophyll, such as diatoms, grasses, seaweeds that make their own food through photosynthesis, Carbon Dioxide and nutrients.

Consumer: organisms that cannot make their own food and feed on other levels of the food web.

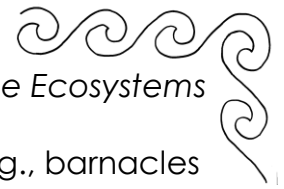
Decomposer: organisms, such as bacteria and fungi, that break down dead plants and animals into basic components, such nutrients that can be used by plants.

Detritus: decayed plant material, such as salt marsh grass, broken into small pieces and covered with bacteria.

Herbivore: an animal that mainly feeds on plants, ex. periwinkles graze on algae growing on marsh grass.

Carnivore: an animal that mainly feeds on animals, e.g., flounder or great blue heron preying on small fish.

Scavenger: an animal that more often feeds of dead and decaying animals and detritus, such as a blue crab.



Omnivore: an animal that could eat plants, detritus and animals, e.g., barnacles filter out diatoms, detritus and oyster larvae, or a raccoon that eats oysters and seeds.

Engaging Students:

With the SC DNR poster either on the wall or projected on a screen, have each class member identify animals and plants and define their role in a food web (producer, herbivore, carnivore, scavenger, decomposer). List the plants and animals on the board for all to see throughout this lesson. Ask the student for additional estuarine plants and animals that they may have seen in an estuary. Review the vocabulary words.

Build an Estuarine Food Web

With the SC DNR poster still displayed, have students draw or construct a food web on paper showing the animals that they have identified from the poster. Teacher should walk around the individual and group activities to make sure the students are getting the food web concept.

Individual: Each Student gets 4-5 index cards

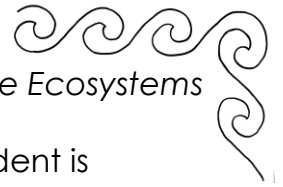
1. Draw and label one estuarine plant or animal on each card from the list of they made from the poster.
2. Using cards, create a food chain by placing the cards in order on their desk.
3. On your Student Worksheet, describe this food chain in Box 1, be sure to label the role of the organisms (“producer” “herbivores”, “carnivores”, “omnivores” or “scavengers”)

Group: Merge students into groups of 3-4 students:

1. Using all of the index cards from each member of your group, organize the cards into a food web on a table.
2. On your Student Worksheet, write this food web in Box 2, be sure to identify the role of the organism and connect with arrows.

Class: Students form a large circle

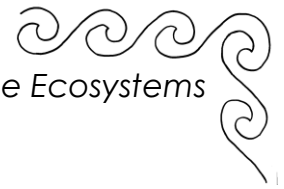
1. The teacher having collected all of the cards, now passes out one card to each student (try not to duplicate species) and tape/pin the card to their shirt.
2. Standing in the middle of the circle with string and scissors, the teacher represents the “SUN.” The teacher holds the end of several strings that are then given to each “producer” student.
3. Starting with one producer at a time, determine who would eat that producer and connect that producer with the appropriate consumer with a piece of string. If multiple animals can eat the producer, then cut pieces of strings for each consumer connection. Repeat process for all other producers.



4. Continue to connect the consumers with string until each student is connected in the circle. (Note: most students will be holding multiple pieces of string which shows the interconnectedness of a food web.)
5. Remind students that they have now created a FOOD WEB. Discuss the importance of member of the web. Is this a complex system?
6. Alter links in the food web by removing one of the organisms. The eliminated student drops all strings he/she is holding. How many students are impacted by this change in the food web? Who is left holding strings and what link in this food web have been broken?

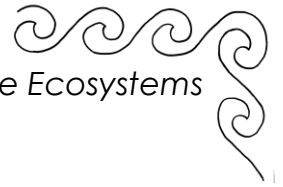
Student Reflection:

From this activity, what is the advantage of an ecosystem, such as an estuary, having a complex food web, rather than a simple food chain?



Appendix 1: SC DNR Salt Marsh Poster





Appendix 2: Student Worksheet (Teacher's copy)

1. Draw your **food chain** in Box 1:

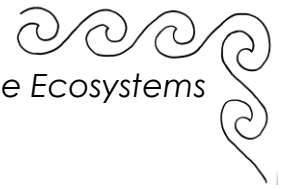
Will vary

A large, empty rectangular box with a black border, intended for a student to draw a food chain. The text "Will vary" is written in the top-left corner of the box.

2. Draw your **food web** in Box 2:

Will vary

A large, empty rectangular box with a black border, intended for a student to draw a food web. The text "Will vary" is written in the top-left corner of the box.



3. What is the difference between a food chain and a food Web?
Sample answer: A food chain reflect simple linear feeding relationships while food webs reflect how food chains are interconnected.

4. How are humans connected to the estuarine food web?
Sample answer: Humans use some species for food and harvest them. Humans influence the water quality and shoreline alterations that impact the health of some estuarine animals.

5. What events could remove PRODUCERS in an estuarine food web?
Sample answer: Drought could kill some marsh plants Heavy rains can also reduce salinities for some marine phytoplankton.

6. What events could remove CONSUMERS in an estuarine food web?
Sample answer: Many fish are popular sport fish and could be overfished and reduced in numbers.

Focus Question: How is each plant and animal in an estuarine food web important?

Organisms from the Posters

Estuarine Plants: salt marsh cord grass, seaweed/algae, single celled algae (diatoms).

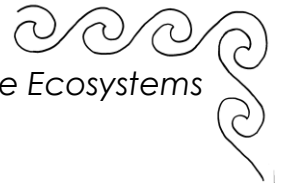
Estuarine Animals:

Herbivores: Clams, oysters, periwinkle snails, barnacles

Carnivores: Oyster catcher, great blue heron, red-winged blackbird, snowy egret, marsh wren, pelicans

Shark, red drum fish, black bass, spots, tarpon, stingray, whelk, flounder, croaker, fishermen

Scavengers: Stone crab, shrimp, blue crab, hermit crab, mud snails



Student Worksheet

1. Draw your **food chain** in Box 1:

A large, empty rectangular box with a black border, intended for the student to draw a food chain.

2. Draw your **food web** in Box 2:

A large, empty rectangular box with a black border, intended for the student to draw a food web.

