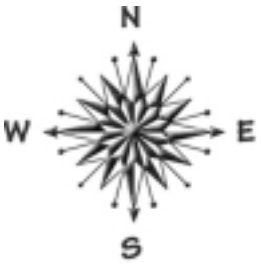

Title: Food Web: Energy Flow in a Marine Environment

(Biology)

Grade Level (s): 7

Introduction: Both plants and animals play vital roles in distributing energy among organism to maintain life. Food chains and food webs demonstrate the interdependence of organisms in order to accomplish this transfer of energy. Food chains are a straight-line connection from one organism to another. Food webs are all the food chains in a system and their complex interactions.

In this activity, students will create a three-dimensional food web of organisms found in a marine environment off the coasts of Florida.

Marine environments are not only the playgrounds for humans that enjoy water sports or cruises. Above and below the surfaces of our oceans and seas is a dynamic interaction of plants and animals producing and consuming energy to survive. Florida is a peninsula and uses its nearby marine environments for many activities such as tourism, fishing, boating and swimming.

Learner Objectives:

- Students will identify the interdependence of producers, consumers and decomposers in an environment.
- Students will demonstrate the impact of available food in a system when organisms are removed.
- Students understand that changes in one ecosystem can impact other ecosystems.

Sunshine State Standards Correlation: Science: SC.G.2.3.2, SC.G.1.3.4

Competency-Based Curriculum Correlation: Science: Sci.M/J2 II.2.A

Materials:

Activity Picture Sheets
Animal/Plant Description Sheets
Poster Board/Gift Boxes (large)
Markers
String
Glue
Tape
Scissors

Activity Procedures:

1. Ask students to describe some of the organisms found in the nearby oceans or seas.
2. Have students share their thoughts on how these organisms get energy to stay alive.
3. Have students discuss the relationships between the organisms that they described.
4. Divide students into work groups of three or four students to work cooperatively on the assignment.
5. Provide students with activity picture sheets, animal description sheets, poster board, markers and string.
6. Students are to use materials to create an ocean environment with the animals and plants found in it.

Fold the poster board in half so that it forms an L shape. This will represent the sky and the ocean,

ex. Sky

If using gift boxes, cut one of the long sides of the box so that students can see clearly into the box from the front view, following the same L shape as above.

Note: Remember to draw the sun in the sky.

7. Cut the animals out, leaving enough paper at the bottom to fold back so that the organism stands up, off the board. Tape or glue base to the appropriate habitat on the poster board.
8. Using the animal description sheets, tape string between organisms that feed on each other.
9. Cut out arrowheads from a sheet of paper. Attach an arrowhead at the end of the string in the direction towards the organism that is feeding or obtaining the energy.
10. Remove a species of plant or animal from the food web by cutting the string that leads to where the organism obtains its energy.
11. Lay flat the organisms that lose all their food source(s). This indicates that the organism is dead.

Assessment:

1. Students present food webs orally.
2. Describe the impact of the removal of one of the species in the ocean environment. What happens if several species are removed?
3. Research and create a terrestrial environment with animal and plants. Are there food web connections between the terrestrial environment and the marine environment?

Activity Extensions:

1. If humans were introduced to the food web, what percentage of marine species would be directly affected?

Vocabulary: autotrophs, consumers, herbivores, carnivores, omnivores, detritivores, heterotrophs, decomposers

References:

Johnson, G. B. (1995). Evolution and Natural Selection. In K. Harris, L. Jegerlehner, K. Timp, J. Leland (Eds.), The Living World (pp. 567-561) Dubuque, Iowa: Wm. C. Brown Publishers

Krempels, D. (1998). Go Figure Critical Thinking and Experimental Design in the Biology Laboratory. Unpublished, University of Miami Department of Biology

Food Web: Energy Flow in a Marine Environment

Reading Passage

Have you ever wondered where the food you eat comes from? What did the food you ate feed on? All living organisms need energy to survive. Energy comes from many sources. The sun is a great source of energy. Green plants use the sun's energy directly to make their own food through a process called photosynthesis. Because they do not need to feed on other organisms to obtain energy, they are called autotrophs or self-feeders. They are the producers in an ecosystem. Organisms that cannot make their own food like green plants do, are called consumers, since they have to feed or consume other organisms to survive. There are different types of consumers: herbivores, carnivores and omnivores. Herbivores only eat producers. Cows, rabbits and deer are examples of herbivores. Carnivores, from the Latin word *carne*, which means flesh, are the consumers of other consumers. In other words, carnivores are the meat-eaters. Omnivores are not picky eaters and consume both plants and animals for their energy. They are heterotrophs, or other-feeders. There are even heterotrophs responsible for cleaning up the remains of the dead. They are called decomposers. They consume dead, organic matter and convert it into inorganic nutrients that help to make soil fertile and healthy for other organisms to grow. Bacteria and fungi are some examples of microscopic decomposers. Vultures, worms and maggots also feed on decaying matter and are called detritivores. What would the world be like without these carcass eaters? Where do you fit into the hunt for energy…producer or consumer? …carnivore or omnivore?

All these organisms producing and consuming their energy are all dependent on each other, forming food chains that intertwine and connect with each other in an elaborate food web. Rabbits depend on the plants for food. The fox depends on the health of the plants to feed the rabbit, which in turn makes a good meal for the fox. The plants depend on the bacteria and worms to dispose of dead animals and plants. This provides plants with space on the ground to grow and fertilizer in the soil to maintain their health. All organisms are dependent on each other in this cycle of energy known as a food web.

Food Web: Energy Flow in a Marine Environment

FCAT Questions

Directions: Read the passage, then answer all the questions below. Answer multiple-choice questions by circling the letter of the answer that you select. Write your answer to the "Read, Think, and Explain" question on the lines provided.

1. In the text, what does organic mean?

   A. Dead and decaying
   B. Once living
   C. Meat eaters
   D. Self feeders

Answer: B

2. What is the main idea of this article?

   A. Plants are the most efficient organisms since they make their own food.
   B. People can be carnivores or herbivores.
   C. Soil must be kept healthy.
   D. Energy is constantly flowing through all organisms and is passed from one to another.

Answer: D

3. According to the article "Energy Flow," what describes the complicated relationship of between organisms and how they obtain energy?

   A. Food web
   B. Food chain
   C. Consumers
   D. Autotrophs

Answer: A

4. Using support from the article, describe the world if there were no decomposers in it.