

Exploring Marine Food Webs

Guiding Question: How are species in a marine community dependent on other species?

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| Grades: 4-8 | Subjects: Science, STEAM, Art |
| Length: 2 hours for discussion, research and presentations | Site: Classroom |
| Summary: Students work in groups to create a food web of a specific marine community | |
| Objectives <ul style="list-style-type: none"> • Understand biotic and abiotic factors influence marine communities • Research and build their own food web that reflects the interdependence of organisms in a community • Understand how changes in biotic and abiotic factors as well as changes in a species population impacts the food web | |
| Materials Field notebooks Paper Large paper or poster board Art supplies (markers, pencils, etc) | |

Background

The relationships between species in each marine community are complex. Each community is made up of plants and animals that rely on many biotic and abiotic factors for survival. When these factors change, such as with warmer water temperatures, it impacts the entire food web.

A food web models the transfer of energy within a community with energy flow between producers, consumers and decomposers.

Procedure

1. Explain that students are going to be creating food webs of different marine communities. Each community is made up of many different plants and animals. Many of these animals depend on each other and a variety of biotic and abiotic factors for survival.
2. As a class, make a list of some of the biotic and abiotic factors that may influence these communities.



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- a. Abiotic factors (non-living factors) include: oxygen, temperature, tides, moisture, sunlight, salinity, space, etc
 - b. Biotic factors (living factors) include: competition, predation, migration, etc
3. Break students up into groups and explain that they are going to research one local marine community of their choice: salt marsh, marine, rocky shore, estuarine, or beach/dunes. Students can use books, websites listed in the resources page, or their own knowledge to list as many plant and animal species that can be found in each community. These can be listed in their field notebooks if they are keeping them.
4. Bring students together and ask what they know about food webs.
 - a. Food webs show the transfer of energy and have arrows pointing from the thing being eaten to the thing doing the eating
5. Give each group a large piece of paper and ask them to create a food web for their community. They should put on the species they listed, and arrows showing the transfer of energy. Students can either write or draw pictures of the different species.
6. Once they've finished their posters, student groups should prepare and present the poster of their community to the class.
7. Questions for discussion or written follow up
 - a. What happens when one species is removed from the food web?
 - b. Are some species more important than other species?
 - c. What happens when you change one of the abiotic factors? (what if a big storm comes in and the water is no longer salty)
 - d. Where do humans fit on your food web?
 - e. How are the different food webs related? Can you draw arrows between any species from different communities?
 - f. How does decomposition fit into your food web?
 - g. What would happen to your food web in the following scenarios?
 - i. A large fishing company comes in and catches all of one kind of fish in your community
 - ii. The land near your community is converted into a heavy use area with lots of runoff and nutrients
 - iii. A large factory puts their discharge into your community raising the water temperature by 5 degrees

Assessment

- food chain posters
- Follow up discussion and written assignment

Extensions



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1. Do this activity outside on tarmac with chalk
2. Create a food web with yarn and demonstrate what happens when you remove a species
3. Ask students to list which abiotic or biotic factors are most likely to change in their marine community (ie warmer temperatures, increase nutrients, etc)

Resources

Understanding Food Webs (short video) <https://www.sciencelearn.org.nz/videos/37-understanding-food-webs>

Examples of Food Webs in Chesapeake Bay: <http://www.mdsg.umd.edu/topics/food-webs/food-web>

Types of Species in NH communities: <http://www.wildlife.state.nh.us/habitat/types.html>

Standards

NGSS

5-LS2-1 Develop a model to describe the movement of matter among plants, animals, decomposers and the environment

5-ESS3-1 Obtain and combine information about ways individual communities use science ideas to protect the earth's resources and environment

MS-LS-1 Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem

MS-LS-1 Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems



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