THE WANDERING PLANKTON

Topic
Plankton, Marine Food Web

Duration
One session

Vocabulary
energy
food chain
food web
phytoplankton
plankton
zooplankton

STANDARDS

Practices
Developing and Using Models

Core Ideas
Interdependent Relationships in Ecosystems

Crosscutting Concepts
Systems and System Models

OCEAN LITERACY PRINCIPLES

OLP 3, OLP 4, OLP 5, OLP 6

Focus Question

Why is plankton important?

Overview

Students recall rocky shore organisms and make inferences about their diets. Students outline a rocky shore food chain. Students identify the first link in the rocky shore (and marine) food chain—plankton. Students recognize the difference between a food chain and a food web. Students discover the importance of plankton to marine life and all life on Earth. Students create a rocky shore food chain model that begins with the sun, followed by phytoplankton, zooplankton, barnacle, dog whelk, rock crab, and herring gull.

Objectives

Students will be able to:

- Define the terms "plankton," "phytoplankton," and "zooplankton"
- Recognize the difference between food chains and food webs
- Discover the importance of plankton to marine life and life on Earth
- Create a model of a rocky shore food chain which conveys that energy in animals' food was once energy from the sun

Materials Needed

- Rocky Shore Food Chain activity sheets (page 162)
- Paper, plastic or Styrofoam cups (7 per student)
- Permanent or washable markers
- Glue or tape
- A whiteboard or SMART Board to record student feedback

Teacher Preparation

1. Make copies of Rocky Shore Food Chain activity sheet (page 162).
2. Prepare groups of seven cups for each student.
3. Prepare permanent or washable markers for each student.

Teacher Tips

- ★ Consider having students draw their own illustrations of the items on the food chain.
- ★ Show a recommended website video on food chains and food webs, as well as on plankton during the lesson.
- ★ Make sure the cups for the activity are of a sufficient size, and that the markers being used are adequate (i.e. won't wipe off cup easily).

Extension Suggestions

- ★ Have students participate in the Ask a Biologist lesson titled, "It's a plankton eat plankton world," found on the Arizona State University's Ask a Biologist website.
- ★ Have students create a food chain or food web of organisms that reside in their local environment.

Teacher Preparation (continued)

4. Prepare glue or tape for each student.
5. Have a whiteboard or SMART Board available to record student feedback.

Background

Plankton are microscopic organisms drifting in the ocean. The term plankton comes from the Greek word meaning "wanderer" or "drifter." There are two types of plankton: phytoplankton and zooplankton. Phytoplankton stands for "plant plankton" and zooplankton stands for "animal plankton."

Phytoplankton are small plants that are the base of the marine food chain. Small organisms (and large organisms such as whales) eat phytoplankton. Larger organisms eat the smaller organisms that have consumed phytoplankton. The food chain continues, and sometimes humans enter the food chain as people around the world eat large quantities of fish.

Phytoplankton include different types of algae and bacteria. Phytoplankton are mainly comprised of diatoms and dinoflagellates. Phytoplankton live near the surface of the ocean because they need sunlight to grow. They also need nutrients to grow that can be found in the ocean waters. They are very important to the ocean and all life on Earth. They are the first link in the marine food web. Around a quarter of the oxygen we breathe comes from the Earth's rainforests. More than two-thirds of the oxygen we breathe comes from oxygen produced by phytoplankton!

Zooplankton are microscopic organisms that eat other plankton. Zooplankton consist of larval stages of larger animals such as mollusks, crustaceans, fish and jellyfish. Some zooplankton are single-celled animals. Other zooplankton are tiny crustaceans such as krill and copepods. Krill and copepods are two of the most abundant animals on Earth.

Procedure

Part One

1. Ask students to recall a species of shorebird. Ask students what the specific shorebird eats. Take one of their answers (such as crab) and ask students what that species of animal eats. Continue this pattern of questioning until student answers come to a filter feeder such as a barnacle.
2. Ask students what a barnacle (or other filter feeder) might eat.
3. Inform students that filter feeders such as barnacles or blue mussels eat plankton.

Books

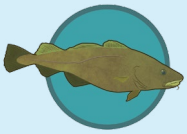
- ★ *The Magic School Bus Gets Eaten: A Book About Food Chains* by Pat Relf
- ★ *Who Eats What? Food Chains and Food Webs* by Patricia Lauber
- ★ *Plankton: Wonders of the Drifting World* by Christian Sardet
- ★ *Ocean Sunlight: How Tiny Plants Feed the Seas* by Molly Bang

Procedure (continued)

4. Ask students to attempt to define plankton.
5. Inform students that plankton are microscopic organisms drifting in the ocean. Some plankton are algae or bacteria (phytoplankton) and some plankton are animals (zooplankton).
6. Inform students that plankton comes from a Greek word meaning "wanderer" or "drifter."
7. Ask students where they believe most of their oxygen comes from. Inform students that over two-thirds of the oxygen we breathe comes from phytoplankton.
8. Inform students that plankton is often the base of most marine food chains, which means it is the smallest organism of a food chain. Ask students what they believe plankton eats. Inform students that zooplankton eats other zooplankton or phytoplankton. Inform students that phytoplankton gets its energy from the sun and nutrients found in ocean waters.
9. Ask students to define a food chain. Inform students that a food chain is a single path of how organisms get their food. A food chain begins with the sun providing energy to plants, and plants being eaten by animals.
10. Ask students what the difference is between a food chain and a food web. A food chain is a single path, whereas a food web shows how several paths of plants and animals are interconnected.
11. Show students examples of a food chain and a food web, such as an image from the sciencebob.com website.

Part Two

12. Inform students that they are going to create a marine food chain using cups, markers and a Rocky Shore Food Chain activity sheet.
13. Have students cut out the images on the Rocky Shore Food Chain activity sheet, adhere one to each cup, then label each image on the bottom of the cup using a marker.
14. When students have completed their marine food chain, have students get into pairs. Advise students to take turns mixing up their partner's cups, and then to challenge their partner by timing them to see how fast they can place their food chain in order (from the sun first to the herring gull last).



Websites

- ★ Check out "The Secret Life of Plankton," a video on the life of a fish that started out as plankton, on TED-Ed's YouTube Channel.
- ★ Check out an image of a rocky shore food web on the Young People's Trust For the Environment's website under their "Videos, Fact Sheets and Downloads" tab.
- ★ Have students play the "c.o.o.l. projects food web game" on coolclassroom.org to learn facts about marine organisms and place them in the correct feeding levels. You can print out the food web when complete.

Scientist Notebook

- ★ Students can record the definitions of plankton, phytoplankton, zooplankton, food chain, and food web.

Wrap-up

- ★ Ask students to define the terms "plankton," "phytoplankton," and "zooplankton."
- ★ Ask students to recall the difference between a food chain and a food web.
- ★ Ask students to recall the importance of plankton to marine life, and to all life on Earth.

ROCKY SHORE FOOD CHAIN