



# It's a plankton eat plankton world

Ask A Biologist activity for classroom and home  
By Colleen Miks

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## Learn more

This is a companion PDF for these online articles:

### **It's a Plankton Eat Plankton World**

<http://askabiologist.asu.edu/experiments/plankton>

### **An Invisible Watery World**

<http://askabiologist.asu.edu/explore/plankton>

## About the Author

Colleen Miks received her Bachelors of Science in Fisheries Biology from Humboldt State University. She received her Masters of Education from Plymouth State University and teaches Earth and Space Science at Sossaman Middle School in Gilbert Arizona.

# Experiment Overview

Inside a drop of water that you might collect from a stream, river, lake or ocean are tiny organisms. These tiny and sometimes not so small living things are called plankton.

What role do plankton play in aquatic food webs? What do plankton eat, and what uses plankton as a food source? As you learned in Invisible Watery World, there are two different types of plankton, phytoplankton and zooplankton.



All other life in the ocean needs phytoplankton to survive. Phytoplankton get their energy directly from the sun using photosynthesis, just like plants. Zooplankton then feed on phytoplankton, and are then eaten by larger zooplankton, fish, larger fish, and so on. Plankton are at the base of a complex aquatic food web.

During this activity you will learn how to create your own food web. You will also analyze the feeding relationships between marine organisms and describe plankton's importance to the ecosystem.

## What you need

- Marine Food Web worksheets
- Colored Pencils
- Scissors
- Yarn
- Glue

## Before you begin

- Print out the Marine Food Web worksheets (pages 3-5).
- Color and cut out the marine organisms on the "Marine Organisms" page.
- Read "Invisible Watery World" and look at the "What do I eat?" table.

## Procedure

**Step 1:** You will use the yarn to show how organisms are connected in your food web. Start with the phytoplankton that you colored and cut out. You will glue the phytoplankton to your "Marine Food Web" worksheet. The sun provides phytoplankton the energy needed to survive. Represent the relationship between the sun and phytoplankton with a piece of string.

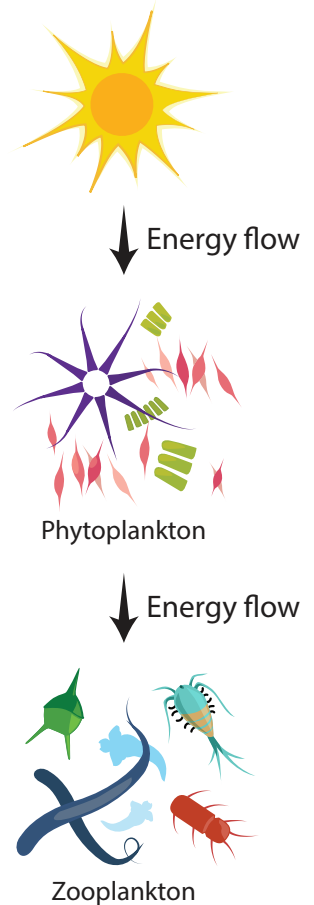
**Step 2:** Draw an arrow to show the direction the energy moves. Arrows represent energy flow from one organism to the next so make sure that your arrow faces the right direction. The sun gives energy to phytoplankton, so the arrow faces phytoplankton, as shown in the figure.

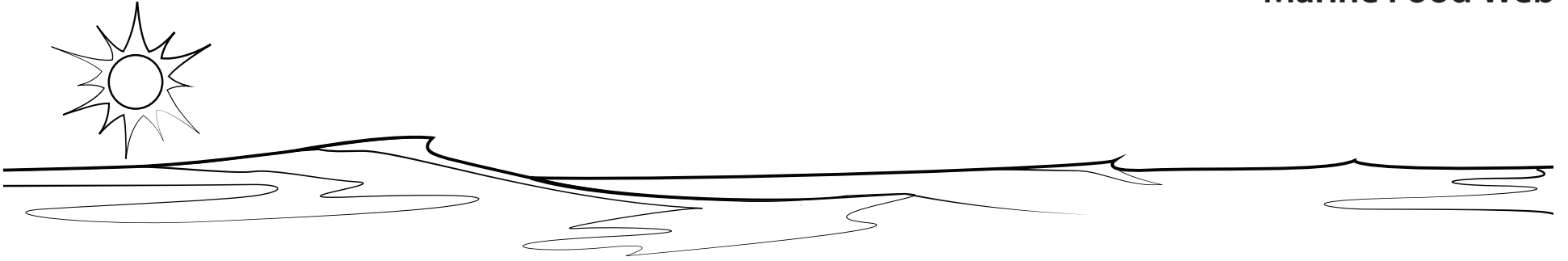
**Step 3:** Which organisms consume phytoplankton to gain energy for survival? Zooplankton. Just like in steps 1 and 2, you will represent this relationship by connecting the phytoplankton and zooplankton with a piece of string, and draw an arrow to show the energy flow. Make sure your arrow is pointing in the right direction.

**Step 4:** Keep adding organisms, using the "What do I eat?" table to figure out what each organism eats. Add organisms until you reach one that is not consumed by any other organism. That organism is called an Apex Predator.

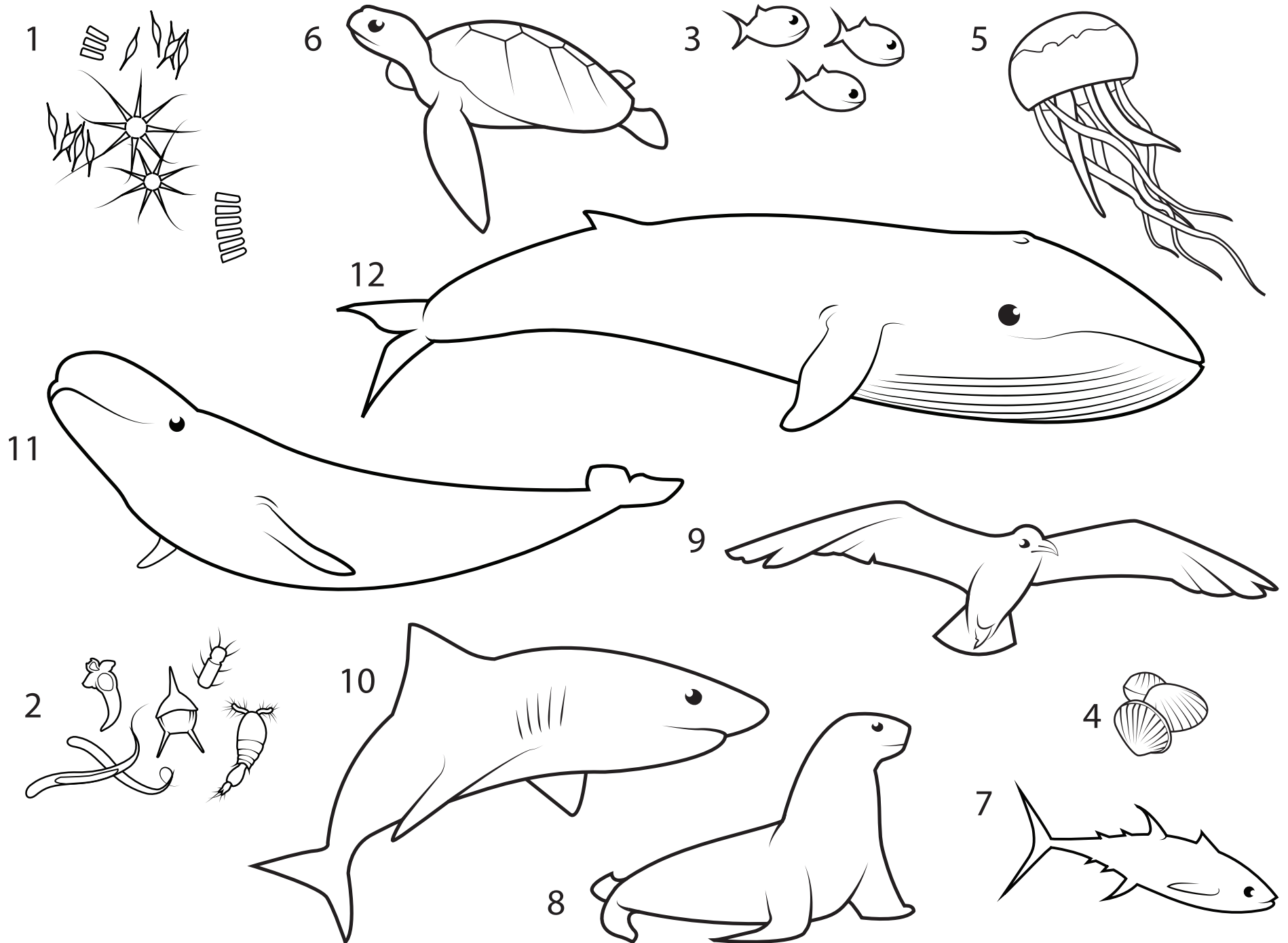
**Step 5:** You will have some cut-out organisms that are not part of your food web. That's okay! Start again with the sun and add on each organism just like you did before. Keep adding arrows to show which way the energy flows. When you run out of organisms, you are done.

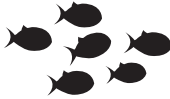
The end result will be a Marine Food Web!





# Marine Organisms



|                                                                                     | #  | Name          | What do I eat?                                                     |
|-------------------------------------------------------------------------------------|----|---------------|--------------------------------------------------------------------|
|    | 1  | Phytoplankton | I use energy from sunlight to turn carbon dioxide gas into sugars. |
|    | 2  | Zooplankton   | I eat phytoplankton.                                               |
|    | 3  | Small fish    | I eat zooplankton.                                                 |
|    | 4  | Shellfish     | I eat zooplankton.                                                 |
|    | 5  | Jellyfish     | I eat small fish and zooplankton.                                  |
|    | 6  | Sea turtle    | I eat jellyfish and small fish.                                    |
|    | 7  | Large fish    | I eat small fish.                                                  |
|   | 8  | Sea Lion      | I eat small fish.                                                  |
|  | 9  | Sea Bird      | I eat small fish, jellyfish, and shellfish.                        |
|  | 10 | Shark         | I eat small fish, large fish, and sea lions.                       |
|  | 11 | Toothed whale | I eat small fish, large fish, and sea lions.                       |
|  | 12 | Baleen whale  | I eat zooplankton.                                                 |

# For Teachers

This activity is a great way to show students how complex food webs are.

## Tips for Classroom Implementation

Time Required: 50 minutes

Classroom set-up: Supply each student or pair of students with the three worksheets ("Marine Food Web", "Marine Organisms", and "What do I eat?") in this PDF. Supply markers, scissors, yarn, and glue.

### Tips

- This activity can be done independently but I have found it works best in pairs.
- Read "Invisible Watery World" as a class before beginning this activity. It gives students background information about how plankton fit into the food web.
- This is a great activity to do after a lesson on feeding relationships. It allows students to use the information they just received to build a food web showing the feeding relationships found in an aquatic ecosystem.

### Extensions

- Have students answer the following questions using their completed marine food web.
  1. What would happen to your food web if the phytoplankton died out because of water pollution?
  2. How would the jellyfish population be affected if sea turtles were removed?
  3. How important are plankton in the marine food web? Explain your answer using evidence from your food web.
  4. Why do we use arrows when creating a food web? What do they represent?
  5. Using the food chain below, summarize the flow of energy from organism to organism.
  6. Sun → Phytoplankton → Zooplankton → Small fish → Jellyfish → Sea Turtle
- Create a food web using the organisms found in a sample of pond water (requires microscope).
- Create a food web using different biomes (rain forest, desert, grasslands).

### Objectives

1. Students will identify the relationships among organisms within and aquatic ecosystem
2. Students will diagram the energy flow in an ecosystem through a food chain.

# Standards

## Arizona Science Standards

### Strand 4: Life Science

#### Concept 3: Populations of Organisms in Ecosystems

- |             |                                                                                                                                                                                                                                                        |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Grade 6     | PO 1. Explain that sunlight is the major source of energy for most ecosystems.                                                                                                                                                                         |
| Grade 7     | PO 1. Compare food chains in a specified ecosystem and their corresponding food web.<br>PO 3. Analyze the interactions of living organisms with their ecosystems.<br>PO 6. Create a model of the interactions of living organisms within an ecosystem. |
| Grades 9-12 | PO 1. Identify the relationships among organisms within populations, communities, ecosystems, and biomes.                                                                                                                                              |

#### Concept 5: Matter, Energy, and Organization in Living Systems

- |             |                                                                     |
|-------------|---------------------------------------------------------------------|
| Grades 9-12 | PO 4. Diagram the energy flow in an ecosystem through a food chain. |
|-------------|---------------------------------------------------------------------|

## Common Core Standards

**6-8.RST.4.** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.

- Read about food chains and food webs, and then identify the linguistic roots and affixes to help them identify the meanings of terms related to trophic levels, such as carnivore, herbivore, omnivore, autotroph, and heterotrophy. (SC07-S4C3-01)
- Determine the meaning of the direction of the arrows in the food chains and food webs. (SC07-S4C3-01)

**6-8.RST.7.** Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

- Integrate written descriptions of a Marine food web with visual representations of the Marine food web

## Next Generation Science Standards

### MS-LS1-6.

- Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.