

LESSON 3 What's Missing from this Picture?

Lesson at a Glance

In this lesson, students view underwater images, showing fish and squid in the open ocean, and compare these images with images of animals on land. They discover that visible plants are conspicuously absent from the open ocean images. This discovery provides the opportunity to introduce and explore the role of plankton. Students add zooplankton and phytoplankton to their food chains and explore the role of a decomposer in a marine food web.

Lesson Duration

One 45-minute period

Essential Question(s)

What is plankton?

How does plankton support food webs in terms of the flow of energy?

Key Concepts

- The photic zone is the upper layer of the ocean where sunlight penetrates sufficiently to support the growth of phytoplankton.
- Phytoplankton are the primary producers in the ocean and sustain the open ocean food chains.
- An energy pyramid depicts how energy transfers from one level of organisms to the next.
- Decomposers play a vital role in cycling matter through the marine ecosystem.

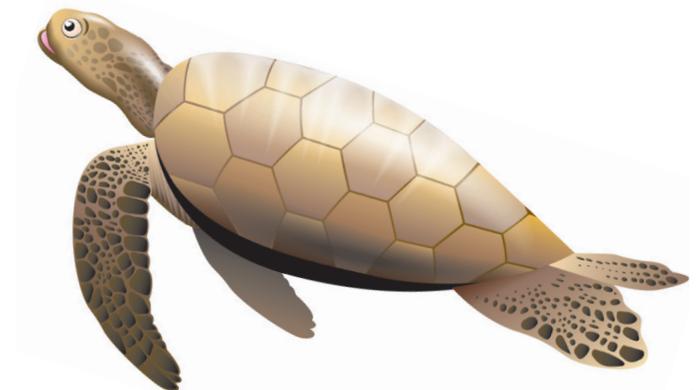
Instructional Objectives

- I can describe the difference between phytoplankton and zooplankton, and the role they play in the marine food chain.
- I can explain how phytoplankton and zooplankton function in an ecosystem in terms of the flow of energy.

Related HCPSIII Benchmark(s):

Science SC.5.3.1
Describe the flow of energy among producers, consumers, and decomposers.

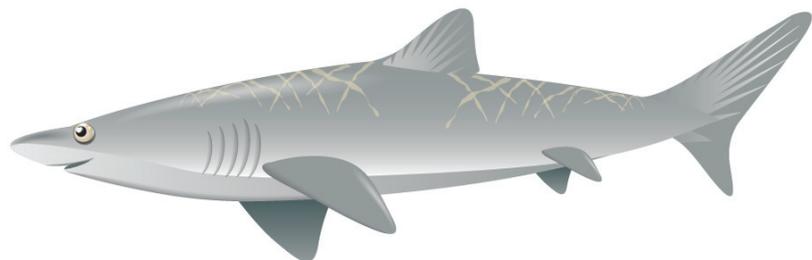
Science SC.5.3.2
Describe the interdependent relationships among producers, consumers, and decomposers in an ecosystem in terms of cycles of matter.



Assessment Tools

Benchmark Rubric:

Topic		Cycles of Matter and Energy	
Benchmark SC.5.3.1		Describe the cycle of energy among producers, consumers, and decomposers	
Rubric			
Advanced	Proficient	Partially Proficient	Novice
Explain and give detailed examples of the cycle of energy among producers, consumers, and decomposers	Describe the cycle of energy among producers, consumers, and decomposers	Describe a part of the energy cycle with an example (e.g., describe one or two parts of a food chain)	Recognize an example of part of an energy cycle
Topic		Interdependence	
Benchmark SC.5.3.2		Describe the interdependent relationships among producers, consumers, and decomposers in an ecosystem in terms of the cycles of matter	
Rubric			
Advanced	Proficient	Partially Proficient	Novice
Explain and give examples of how specific relationships among producers, consumers, and decomposers in an ecosystem affect the cycling of matter	Describe the interdependent relationships among producers, consumers, and decomposers in an ecosystem in terms of the cycling of matter	Identify a few relationships between producers, consumers, or decomposers in an ecosystem in terms of the cycling of matter	Recall, with assistance, that matter cycles in an ecosystem among producers, consumers, and decomposers



Assessment/Evidence Pieces

Lesson

- Construction paper food chains
- Information exchanged during the pair share

Materials Needed

Teacher	Class	Group	Student
<ul style="list-style-type: none"> • Method to present PowerPoint 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Construction paper strips • Glue • Crayons or markers

Instructional Resources

PowerPoint Presentation: *Plankton*



Student Vocabulary Words

abiotic environment: the part of the environment of the ecosystem that is not alive.

photic zone: the surface zone of the sea having sufficient light penetration for photosynthesis.

phytoplankton: the component of plankton consisting of microscopic photosynthetic algae and bacteria.

plankton: a diverse group of animals (zooplankton) and plants (phytoplankton) that freely drift in the water.

zooplankton: the heterotrophic animal component of the plankton.

Lesson Plan

Lesson Preparation



- Review the Science Background provided in the Unit Overview.
- Preview the PowerPoint slide show *Plankton* and make arrangements to project it.
- Make construction paper strips about 5 or 6 per student. These strips will be used to make what looks like a construction paper chain (Section II).

I. Where are Phytoplankton and Zooplankton in a food chain?

- Have students get out the food chains they created in Lesson 2. Discuss what types of organisms they have currently listed in their shark food chains (i.e., consumers, producers, and decomposers.). Students should be able to tell you that their food chains have consumers. Use the PowerPoint: *Plankton* with students, and the notes embedded in the PowerPoint.
- After showing the PowerPoint, ask students what phytoplankton need to live. They should identify light from the sun. Ask students what this tells them about where phytoplankton lives in the ocean. They should identify that phytoplankton live in areas where light can penetrate (the photic zone).
- Ask the students, “What is light?” “What does light do?” Accept various responses here, but try to get to the conclusion that light is energy. Producers are the only organisms that can use the sun’s energy to make their own food through photosynthesis. This is a great time to make the connection between the food chain and the flow of energy.

- D. Now, ask students what zooplankton eat. You may need to introduce that zooplankton eat phytoplankton as food. Ask students where the zooplankton would need to live. Students should identify that the zooplankton should live in the same area as the phytoplankton in order to have access to food.
- E. Plankton also needs nutrients. Where might these nutrients come from? This is a good time to introduce cycles of matter. Put up a sample food chain on the board. Ask some prompting questions like, “Where does the food chain start and end?” “What types of organisms do we see in this food chain?” Answer should be producers, consumers and decomposers. “What happens to the shark and other living things in the ocean, when they die?” Explain how these different types of organisms play a role in the cycling of matter and the transfer of energy.

II. Putting it all together – a complete open ocean food chain

- A. Based on what students have seen in the PowerPoint, tell the students that they are going to expand upon what they have learned and create a food chain with phytoplankton as the primary producer.
- B. Explain that you want the students to create a food chain out of construction paper strips. Hand out the strips to the students (5 or 6 per child). Tell the class that they should draw and label each organism in their food chain on one of their construction paper strips. Make sure that the students put the name and role of the organism in the food chain along with the drawing. For this part of the exercise, they will include producers and consumers only. Ask where would zooplankton go?
- C. To assemble their construction paper food chain the students will need to take the strip with the organism that comes first in their chain and glue the ends together so that it makes a circle. The next strip for the second organism will go through the middle of the first circle and then glue the ends together. The students will now have two linked pieces of construction paper strips that look similar to a figure eight. The next strip for the third organism should go through the middle of the second link on the chain. Glue the ends together. Continue this process until all of the strips are linked and glued in the proper order.
- D. Once the students complete the creation of their paper food chains have them do a pair share. Break the kids into pairs. Have them take turns using their paper food chains to explain to each other the names of the organisms, and identify if the organism is a producer, primary consumer, secondary consumer, or apex predator.
- E. Now give students an additional piece of construction paper and tell them to write “decomposer” on it. Have them add the decomposer to their own food chain. Give them time, but ultimately the decomposer will fit between the apex predator and the producer to create a circle. Ask the students what is the role of the decomposer? (It is to cycle matter.)
- F. Have several pairs volunteer to come up and share their food chains with the class. Lead short discussion after each group shares to clear up any confusion or misunderstandings.
- G. As an extension to this activity, give students pieces of string and have them connect their various food chains into food webs.

Extended Activities

1. Students may choose to research types of plankton, including phytoplankton and zooplankton.
2. Students may wish to research the size range of plankton and create models of plankton.

