Lesson 2.7
from

OCEAN SCIENCES SEQUENCE FOR GRADES 3–5

Teacher's Guide

Unit 2:
What Is Life Like in the Ocean?

Great Explorations in Math and Science (GEMS®)

Lawrence Hall of Science
University of California, Berkeley

National Oceanic and Atmospheric Administration

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UNIT OVERVIEW

In this unit, students learn about the diversity of habitats and organisms in the ocean. Through videos, photographs, and readings, students investigate a range of ocean habitats, including coral reefs, arctic waters, and rocky shores. They investigate differences in conditions between habitats and discover that some ocean habitats support more life than others. Through videos, photographs, readings, organism models, and data, students investigate ocean organisms, including plankton. Students learn what an adaptation is and about adaptations that ocean organisms have that help them survive in specific ocean habitats. Particular focus is placed on adaptations related to movement and eating. Students create ocean food webs and build an understanding of how different organisms within a habitat can be connected. Students learn how habitats can be connected by organisms that use different habitats at different stages in their life cycles. Throughout the unit, students learn about the practices of science, with a focus on scientific explanations and the role of evidence. They also learn about the role of technology in providing new evidence.

SESSION SUMMARIES

2.1 Introducing Ocean Organisms
Students complete a First Ideas writing activity, then view a selection of photographs of ocean organisms. The class discusses what ocean organisms need to survive.

2.2 Comparing Habitats
The class views the first two habitat DVD clips. Next, students compare nine types of ocean habitats and look for evidence about which habitats might support more organisms.

2.3 Using Evidence to Protect Habitats
The class views two more habitat DVD clips. Students then consider a variety of evidence in order to choose one area in the ocean for designation as a protected area.

2.4 Observing Plankton
Students view a DVD clip of plankton, distinguish zooplankton from phytoplankton, and match the young plankton form of animals with their nonplankton adult forms.

2.5 Adaptations for Movement
Students examine photographs and plastic models of ocean animals in order to investigate possible adaptations related to movement.

2.6 Adaptations for Feeding
Students examine photographs and plastic models of ocean animals and information about food sources in order to investigate possible adaptations related to feeding.

2.7 Open Ocean Food Web
The class views a DVD clip of the open ocean habitat, then works together to create a food web for this habitat.

2.8 Estuary Food Web
The class views a DVD clip of the temperate estuary habitat, then works together to create a food web for this habitat.

2.9 Traveling Young
Students chart the paths that eight ocean organisms travel as they grow from young to adult.

2.10 Habitat Connections
Using photographs and short readings, students research the different habitats that a range of ocean organisms use at different points in their lives.

2.11 Tools for Investigating Ocean Life
Each student reads one of three short readings about how a new technology has helped scientists answer a question about ocean organisms. Students write a Revised Ideas paragraph showing what they have learned in the unit.

Open Ocean Food Web

How are different types of organisms in a habitat connected with one another? How do scientists investigate what eats what in a habitat? Students learn more about answers to these questions by exploring the open ocean habitat. First, the class views a DVD clip of this habitat and observes possible adaptations that organisms have for living there. Next, the class reviews the concepts of predator and prey, and the teacher introduces food chains and food webs. Students research open ocean organisms. On the board, students record connections between predators and prey, creating an open ocean food web. The class uses food webs to discuss relationships among organisms in this habitat and to make predictions about what might happen if there were more or fewer of certain types of organisms. The key concept for this session is:

- If one type of organism is removed from a habitat, many other organisms could be affected.

Students also learn:

- A food web is a model that shows what eats what in a habitat.
- Scientists use models to make predictions.
- Plankton are very important food sources in open ocean habitats.
- Food webs in ocean habitats are often quite complex, with many organisms having multiple food sources and many competing for the same food.

Open Ocean Food Web	Estimated Time
Exploring Open Ocean Habitat	10 minutes
Introducing Food-Web Activity	15 minutes
Creating the Class' Open Ocean Food Web	15 minutes
Debriefing the Open Ocean Food Web	20 minutes
Total	**60 minutes**

UNIT GOALS

SCIENCE CONTENT
- Habitats
- Adaptations
- Food webs

SCIENCE INQUIRY
- Making explanations from evidence
- Researching using secondhand sources

NATURE OF SCIENCE
- Scientific explanations are based on evidence
- Technology plays a role in gathering new evidence

SCIENCE LANGUAGE
- Using science vocabulary
- Having evidence-based discussions

Ocean Literacy Scope and Sequence Correlations for Session 2.7

Principle 5.A The ocean supports a great diversity of interconnected and interdependent ecosystems. (Also Principles 5.A.5 and 5.A.6)

TEACHER CONSIDERATIONS

WHAT YOU NEED

For the class:

- ❑ overhead projector or computer and LCD projector*
- ❑ DVD player*
- ❑ DVD clip #7: Open Ocean Habitats: Surface and Deep
- ❑ (optional) DVD clip #8: Deep-Sea Floor
- ❑ marker
- ❑ Color Sheets Packet
- ❑ (optional) whiteboard*
- ❑ masking tape
- ❑ sentence strips
- ❑ (optional) whiteboard markers*
- ❑ (optional) butcher paper (3' x 5')*
- ❑ 24 Open Ocean Organism Sheets (12 color sheets with blue border, two images/sheet, from the Color Sheets Packet)
- ❑ 1 set of 24 Open Ocean Organism Cards
- ❑ key concept from Unit 1, Session 1.1 (Scientists use models to help understand and explain things.)

For group of 3–4 students:

- ❑ 1 Open Ocean: Surface Habitat Card (from Session 2.3)

For each student:

- ❑ Investigation Notebook (optional: page 24)

*provided by the teacher

GETTING READY

1. **Arrange for the appropriate projector format.** Use a computer with a large-screen monitor, an LCD projector, or an overhead projector to display images to the class.
2. **Preview DVD.** Watch clip #7: Open Ocean Habitats: Surface and Deep (and, if you will use it, clip #8: Deep-Sea Floor) to familiarize yourself with the footage.
3. **Organize Open Ocean Organism Cards.** Organize the set of Open Ocean Organism Cards into the following two groups. Each card has its group number listed on the upper-left corner on the front of the card.
   - Group #1: Anchovy; Copepod; Flying Fish; Herring; Jellyfish; Krill; Phytoplankton; Salp; Sargassum Weed; Shrimp; Sunlight, Gases, and Nutrients in Water; Zooplankton
   - Group #2: Albatross, Blue Whale, Dolphin, Great White Shark, Humpback Whale, Leatherback Sea Turtle, Sea Lion, Sperm Whale, Squid, Sunfish, Swordfish, Tuna
4. **Place Open Ocean Organism Sheets around room.** Cut each of the 12 Open Ocean Organism Sheets in half along the cut mark. (**Note:** These are different from the Open Ocean Organism Cards; they are larger than the cards and have a blue border.) Place the 24 sheets around the room so students can travel with a partner from sheet to sheet. Have the Great White Shark sheet at the front of the room. **Teacher tip:** You might want to laminate the sheets after cutting them apart so they last longer.
5. **Cover part of wall with butcher paper.** Tape butcher paper to the wall. (Students will tape Open Ocean Organism Cards to the butcher paper and draw lines connecting them.) Instead of butcher paper, you could have students tape the cards directly to the whiteboard and then have them draw lines connecting the cards. Butcher paper is nice because you can roll it up and bring it out for reference during the next session.
6. **Write key concept.** Write out the following key concept for this session in large, bold letters on sentence strips and underline the words *organism* and *habitat*.

   _ If one type of organism is removed from a habitat, many other organisms could be affected.

LANGUAGE OF SCIENCE

VOCABULARY

adaptation
evidence
habitat
model
organism
plankton
predator
predict
prey

LANGUAGE OF ARGUMENTATION

What do you think?
Why do you think that?
What is your evidence?
Do you agree? Why?
Do you disagree? Why?
How sure are we?
How could we be more sure?

Science Standards for Session 2.7
Inquiry: use models, research using secondhand sources, make inferences
Science Concepts: food webs, diversity of ocean organisms

Exploring Open Ocean Habitat

1. **Introduce activity.** In this session, the class will make a food web for the habitat in the ocean that is near the surface and far away from land.

2. **Review meaning of *habitat*.** Say, **"We've been learning a lot about how habitats are different from one another."** Ask, **"What are some things that are the same for all habitats?" "What makes up a habitat?"** Call on several students to share their ideas. Be sure that students mention the idea that habitats include the environment and other organisms.

3. **Review Open Ocean: Surface Habitat Card.** Pass each group the Open Ocean: Surface Habitat Card that students used in Session 2.3. Have students look at the picture on the front and review the information on the back.

4. **Discuss habitats and adaptations.** Tell students that they're about to watch a DVD clip of the open ocean habitat. As they watch the clip, they should look for adaptations that help organisms survive in the open water. Ask students to also look for an adaptation for finding and capturing prey or for escaping predators that helps an organism survive in the open ocean habitat.

5. **View DVD.** Show students clip #7: Open Ocean Habitats: Surface and Deep.

6. **Discuss possible adaptations.** Ask students what kinds of behaviors and structures of organisms they noticed in the clip that may be possible adaptations. As students respond, make sure to ask them how these behaviors or structures would help an organism survive in this habitat. [Skinny, smooth bodies and fins for gliding through water to help them catch food and get away from predators; travel in large groups, with lots of the same type of organism, maybe to avoid being eaten; suckers on tentacles to catch prey.]

Introducing Food-Web Activity

1. **Review *predator/prey*.** Ask students what the word *predator* means. [An animal that eats another animal.] Then, ask students what the word *prey* means. [An animal that gets eaten.] Tell students that the rest of the session will focus on predators and prey in an open ocean habitat.

TEACHER CONSIDERATIONS

DAILY WRITTEN REFLECTION

What evidence can help scientists learn about organisms' adaptations? This prompt, on page 24 of the Investigation Notebook, invites students to consider how scientists figure out what an organism's adaptations might be. This allows students to review both what they've learned about adaptations and what they've learned about evidence in science. Encourage students to use examples from the ocean organisms they investigated in the past two sessions.

SCIENCE NOTES

About Open Ocean: Surface and Open Ocean: Deep Habitats. The open ocean habitat consists of the portion of the ocean that is away from the influence of the ocean floor—a purely watery environment. The open ocean surface waters include water both near and far from land. Its organisms are adapted to live in a habitat with nothing hard to attach to and nothing to hide behind or under. The base of the food web in the open ocean is phytoplankton, which lives near the surface where photosynthesis can occur. Plankton have adaptations to stay near the surface, and organisms that eat plankton come to the surface to feed on the plankton. In the ocean surface waters far from land, there are so few nutrients that phytoplankton can't survive. Therefore, this portion of the open ocean has far fewer organisms living in it than coastal waters have. The bulk of open ocean organisms live concentrated in zones along the coasts of continents. Within these areas, there are a handful of even more intensely productive areas in which deep, cold, nutrient-rich waters are brought up to the surface in a process called upwelling. The deeper open ocean zones, below the sunlit surface, are the realm of squid and large fish, such as tuna and marlin. Many of these organisms are camouflaged to blend into the watery environment. Organisms living in the dark, deep open ocean are often bioluminescent, red, or transparent, which helps them lure prey and hide from predators.

About Food Webs. Ecosystems are complex, and scientists have developed many organizational systems to understand them. For example, the categories of carnivore, herbivore, and omnivore are ways of sorting organisms based on how they get their energy. Scientists make diagrams to map out what eats what, or how energy moves through the system. Food chains and food webs are models that help ecologists organize information about the ecosystems they study. Charting what eats what can help scientists notice how species depend on one another and can guide scientists' investigations as they analyze data and make explanations. Scientists also use food chains and food webs as tools for communicating what they've learned about ecosystems to other scientists and to the public.

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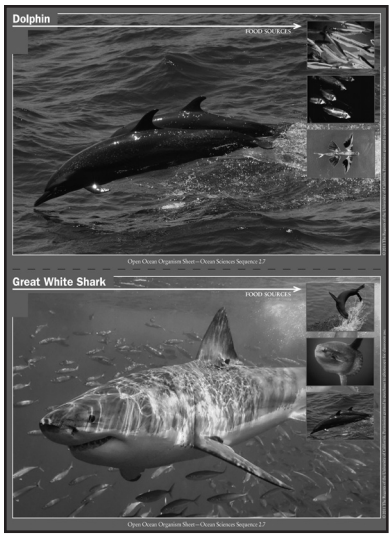
Why do you think that?
What is your evidence?
Do you agree? Why?
Do you disagree? Why?
How sure are we?
How could we be more sure?



1 of 12 Open Ocean Organism Sheets (before cutting apart)

2. **Introduce Open Ocean Organism Sheets.** Hold up the Great White Shark Open Ocean Organism sheet and point out that the sheets students will use in this session are very similar to those used in the last two sessions. Point out the "Stomach Contents" section of the sheet. Say, **"The evidence here shows us some of the organisms that the Great White Shark ate. That doesn't mean that these are the only types of organisms that a great white shark ever eats—these are just some of them."**

3. **Review plankton.** Tape the Phytoplankton card from card group #1 to the board (see Figure 2–3 on page 185). Say that this is one of the organisms that lives in the open ocean habitat. Ask students to recall what it is and what they know about it. Call on a few volunteers to share their ideas. [Phytoplankton. Make their own food from sunlight, gases, water, and nutrients.]

4. **Add nonliving parts of habitat.** Tape the Sunlight, Gases, and Nutrients in Water card from group #1 to the board. Remind students that phytoplankton use sunlight to make their food from water, nutrients, and gases. Draw an arrow from the Sunlight, Gases, and Nutrients in Water card pointing toward the Phytoplankton card.

5. **Explain activity.** Tell the class that each pair of students will receive an Open Ocean Organism card. Their goal will be to add it to the board when they can connect it with its prey (or other food source, such as phytoplankton or seaweed) or with its predators (when they have been posted to the board by students). They will use the Open Ocean Organism sheets (which are placed around the room) to figure out what their organism eats and which organisms eat their organism. You will demonstrate with two organisms.

6. **Model with Copepod card.** Hold up the Copepod card (from group #1).

   a. **Find Open Ocean Organism sheet.** Demonstrate how to look around the room for the Copepod Open Ocean Organism sheet. Read aloud from the sheet, and point out that what the copepod eats (phytoplankton) is already on the board.
   b. **Add card to board.** Say, **"Since something my organism eats is on the board, I can add my organism card to the board, too."** Tape the Copepod card to the board and draw an arrow from the phytoplankton to the copepod. Tell students that they can only add their card to the board if they can connect it to another organism that is already on the board. They may need to wait for organisms to be posted by other students.

TEACHER CONSIDERATIONS

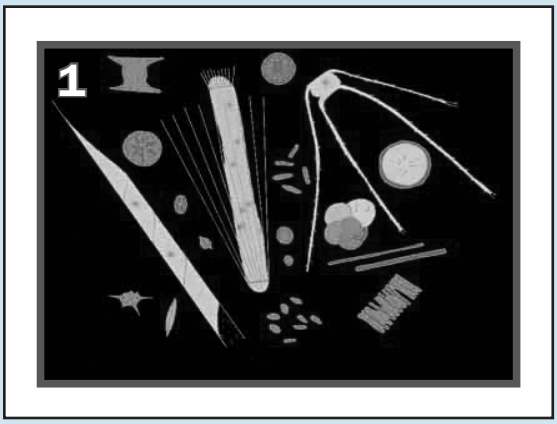


Figure 2–3. Phytoplankton card, one of 24 Open Ocean Organism Cards.

INSTRUCTIONAL ROUTINES

Research Routine. The food-web activity is meant to build on the research routine students used in earlier sessions. Reminding students of that routine may help them follow instructions for this activity. The procedure used in this session (having the class build a food web) will be used again in the next session. In this session, it may take quite a bit of guidance to have students understand the procedure. In the next session, students should be more comfortable with this process.

PROVIDING MORE EXPERIENCE

Prepare: More With Food Chains. Experience with food chains can be excellent preparation for students' work with food webs. Write and draw arrows on the board to show an open ocean food chain. For example: phytoplankton → anchovy → sea lion → great white shark. Explain the direction of the arrows (they always point from the eaten toward the eater), and then discuss the food chain with students. Have students point out what they notice about the food chain. Point out that the great white shark depends not only on sea lions, but also on the sea lion's food (anchovy) and on the anchovy's food (phytoplankton). You might show students additional food chains, such as phytoplankton → copepod → herring → squid → sperm whale or phytoplankton → copepod → anchovy → humpback whale.

Extend: View DVD Clip #8: Deep-Sea Floor. Show students this video to give them a chance to observe this habitat and the organisms that live on the deep-sea floor.

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LANGUAGE OF ARGUMENTATION

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How could we be more sure?

7. **Model with Anchovy card.** Hold up the Anchovy card (from group #1).

   a. **Find Open Ocean Organism sheet.** Walk to the Dolphin Open Ocean Organism sheet and point out that dolphins eat anchovies. Say, **"If the dolphin card were up on the board, I could add my anchovy card to the board because it is the dolphin's prey."** Find the Anchovy Open Ocean Organism sheet and point out that the anchovy eats copepods.
   b. **Add card to board.** Add the Anchovy card to the board and draw an arrow pointing from the copepod toward the anchovy. Say, **"The anchovy is a predator, and the copepod is its prey."** Explain that the arrows should always point from the eaten toward the eater.

8. **Point out food chain.** Tell students that the board now shows a food chain. A food chain is a model that scientists make to show what eats what in a habitat.

9. **Introduce food webs.** Explain to students that a food web is a more complicated model than a food chain. A food web shows many connected food chains in an ecosystem. As students add cards and arrows to the board, the class will make a food web. Their food web will be more complicated than a food chain because it will show how more than one type of organism can eat the same thing, and that one organism can eat many different things.

Creating the Class' Open Ocean Food Web

1. **Prepare for activity.** Remove all the cards from the board, except the Sunlight, Gases, and Nutrients in Water card. Tell students that they'll start out with this one card on the board, so anyone with an organism that makes its own food will have the first cards that are posted. After students add organism cards to the board, they will need to keep paying attention to other organisms that get added. If a new organism eats an organism that is already on the board, or if an organism that is already on the board eats an organism that is being added to the board, students may need to add more arrows.

2. **Distribute cards.** Distribute one Open Ocean Organism card from group #1 to each pair of students. (Group numbers are on the fronts of each card, as described in the Getting Ready section on page 181.) If you have more than 11 pairs of students, and you have not divided your class in half to make two food webs, you will need to give some pairs of students a card from group #2.)

TEACHER CONSIDERATIONS

INSTRUCTIONAL SUGGESTIONS

Managing Crowding at Board. The food-web activity will start with just a few cards on the board, with most students moving around the room trying to figure out connections. Eventually, it will get more crowded at the board as more students post their cards. If the board area starts to get too crowded, instruct students who have already added their cards and drawn an arrow or two to return to their seats.

Early Finishers. If a pair has finished posting their card(s) well before the rest of the class, have them continue researching their organism, searching for more arrows they can draw between their organism and other organisms on the board.

ENGLISH LANGUAGE LEARNERS

Adjust Teacher Talk. Adjusting your speech according to English language learners' proficiency levels will help students understand oral instructions and discussions about concepts. This session requires students to follow several directions. To help students understand the expectations, have them paraphrase the instructions for researching and building the food web. You could have students paraphrase in both English and their native languages. Other helpful adjustments are to write instructions on the board as you explain the procedures; to indicate visual references as you explain procedures; and to speak slowly, but not so slowly that it sounds unnatural.

SCIENCE NOTES

About Groups of Species Represented on Cards. Some cards in this activity represent a group of related species rather than just one species. For example, there are many different kinds of squid. We have included just one general squid card in order to simplify the activity. In reality, different kinds of squid eat somewhat different prey and are eaten by different predators.

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LANGUAGE OF ARGUMENTATION

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Why do you think that?
What is your evidence?
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Do you disagree? Why?
How sure are we?
How could we be more sure?

3. **Give instructions.** Tell each pair of students to take their card and find the sheet that goes with their organism. Emphasize that they will also need to look at all the other organism sheets to find out what animals eat their organism. Also emphasize that students need to keep an eye on the board so that when they see an organism that eats the organism on their card—or an organism that their organism eats—they can post their card on the board and draw arrows. Students can add more than one arrow to or from their organism.

4. **Students research and add to food web.** Have students begin. As the first cards get posted on the board, make an announcement, such as, **"There is now a copepod card on the board. Anyone with an organism connected with the copepod should post their card on the board and draw an arrow between it and the copepod."**

5. **Early finishers add to web with cards from group #2.** When a pair has posted their first card and drawn a few arrows showing the organism's connections, they can request a second card. Pairs follow the same procedure with their second card as they did with the first card. (**Note:** Depending on your class size, there may not be enough cards for all students to place a second card.)

Debriefing the Open Ocean Food Web

1. **Review food web.** When all students have placed their first cards on the board, have students return to their seats. Spend some time tracing the arrows in a few different food chains to show that there are many different food chains on the board. Ask students to point out one organism that is eaten by many animals. [Phytoplankton, krill, anchovy.]

2. **Review key concept.** Write "model" on the board and remind students that a model is a diagram, object, or computer program that helps scientists understand something by making it simpler or easier to see. This food web is a model of what eats what in the open ocean. It's simpler than what happens in a real ecosystem. In this food web, there are fewer organisms, and it only shows what eats what, not all the other things happening in the habitat, such as finding shelter and having young. Review the key concept you posted in Unit 1, Session 1.1. (If you did not teach Unit 1, see the Instructional Suggestions note on page 189.)

KEY CONCEPT

Scientists use models to help understand and explain things.

Point out the important word you underlined.

TEACHER CONSIDERATIONS

INSTRUCTIONAL RATIONALE

Why Not More Organisms? If you have a class of 24 students or less, there are enough organism cards for each pair to research one organism and for some early finishers to research a second organism. In the next session, all students will research two organisms, and some early finishers will research a third organism. The food web in this session is smaller because students will be unfamiliar with the process of making the web. In Session 2.8, students can apply what they've learned to a somewhat more complicated food web.

INSTRUCTIONAL SUGGESTIONS

If You Did Not Teach Unit 1. The key concept about models is included in Unit 1, Session 1.1. If you did not teach Unit 1, then you can write out this key concept in large, bold letters on a sentence strip and underline the word *models*. Yo may need to spend extra time discussing the importance of models.

PROVIDING MORE EXPERIENCE

Prepare: Refer to Models from Unit 1. If you taught Unit 1, you might spend a few moments reviewing some of the models that students used during that unit. Call on students to briefly describe models, such as the Globe Model, the Ocean Layers Model, and the Ocean Currents Model. Encourage students to explain what each model showed and why, in each case, it was useful to study a model rather than the actual thing.

Prepare: Discuss Predictions. If you taught Unit 1, you might briefly review some of the kinds of predictions that students made in that unit. For example: What would happen when different temperatures of colored water were added to the tank? What happens to water from the Mediterranean Sea when it goes into the Atlantic? If you did not teach Unit 1, you may need to spend a little more time explaining what predictions are and why scientists make them. Emphasize that predictions are not just guesses—they are based on evidence. Scientists make predictions because predictions help them clarify their developing understanding of how something works. If the results are different than the scientist's predictions, she knows she needs to change her ideas in some way and may need to do more investigations.

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Why do you think that?
What is your evidence?
Do you agree? Why?
Do you disagree? Why?
How sure are we?
How could we be more sure?

3. **Discuss Open Ocean Food Web.** As a class, discuss some of the following prompts:

   - Which organism shown here seems to be eaten by the most other organisms? [Phytoplankton.]
   - What might happen if there were a decrease in phytoplankton in the habitat? [There would be fewer of most of the organisms shown here.]
   - Why are sunlight, gases, and nutrients in water very important for the open ocean habitat? [Phytoplankton need these things, most other organisms rely on phytoplankton.]
   - What might happen if there were no more (choose an organism) in the habitat? [There might be more (organism that is eaten by the chosen organism).]
   - Find two organisms that might compete for the same food. [Blue whale and flying fish both eat krill.]
   - What might happen if there were many more sea lions? [They might eat all the squid in the habitat, and then the tuna might not get enough to eat.]

4. **Discuss predictions and models.** Say that one way scientists use models, such as food webs, is to make predictions. Point out that the class has been using the food web to make predictions about what would happen if there were more or less of one type of organism. Explain that scientists check predictions made from food webs by observing real habitats.

5. **Add key concept.** Display key concept, read it aloud, and then post it on the concept wall.

KEY CONCEPT

If one type of organism is removed from a habitat, many other organisms could be affected.

Point out the important words you underlined.

6. **Shared Listening.** Tell students that they will discuss the Open Ocean Food Web using the Shared Listening routine. Create pairs of students and designate one student in each pair as Partner #1 and the other student as Partner #2. Remind students of the Shared Listening steps, if necessary, and ask the following questions:

   - Pick one organism. What are some things that the food web tells you about this organism? Explain your answer.
   - What are some important things that the food web tells you about the open ocean habitat? Explain your answers.

TEACHER CONSIDERATIONS

INSTRUCTIONAL ROUTINES

Shared Listening Routine. At this point, students will likely be quite familiar with the Shared Listening routine. Using it here will help students, especially English language learners, by providing language modeling and a low-anxiety opportunity to practice interpreting the food web.

ASSESSMENT

Quick Check for Understanding: Shared Listening. Listen to students' discussions during the Shared Listening routine to assess their progress toward understanding and using food webs. Students should know that food webs show what eats what in a habitat. Students should also be able to read portions of the class-created food web and draw some conclusions from it.

PROVIDING MORE EXPERIENCE

Extend: Students Write Key Concepts. If you have time, you could have each student, or each pair of students, write a key concept for this session. Ask students to consider what the most important idea they learned from the session was. You might write the following words on the board as a scaffold for students: *food web*, *connected*, *phytoplankton*, *scientists*, *habitats*, *organisms*. Have each student record their key concepts on sentence strips, and then choose a few to post on the wall. Alternatively, have students write their key concepts in their Investigation Notebooks. Then, discuss as a class to agree on one or two key concepts to add to the board. You can use students' sentences as an assessment of their understanding of this session's key ideas.

Extend: Reflection Prompts for the Session. You may want to choose one or more of the prompts below for partner discussions after the session or during a final student sharing circle in which each student gets a turn to share. Or, the prompts could be used for science journal writing during class or as homework.

- What surprised you about the open ocean food web?
- What is one open ocean organism that you think affects many other organisms in the habitat? What is your evidence?
- Which of the open ocean organisms would you like to learn more about? What do you already know about this organism, and what would you like to find out?

LANGUAGE OF SCIENCE

VOCABULARY

adaptation
evidence
habitat
model
organism
plankton
predator
predict
prey

LANGUAGE OF ARGUMENTATION

What do you think?
Why do you think that?
What is your evidence?
Do you agree? Why?
Do you disagree? Why?
How sure are we?
How could we be more sure?

MATERIALS FOR SESSION 2.7:

OPEN OCEAN FOOD WEB

Table of Contents

DVD Clip #7: Open Ocean Habitats: Surface and Deep

(4 minutes, 14 seconds)

Click the box below to link to the video.

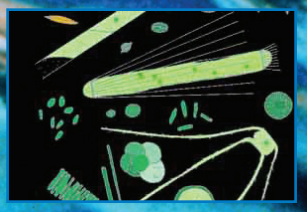
DVD Clip #8: Deep-Sea Floor (optional)

(2 minutes, 35 seconds)

Click the box below to link to the video.

Anchovy

FOOD SOURCES



Copepod

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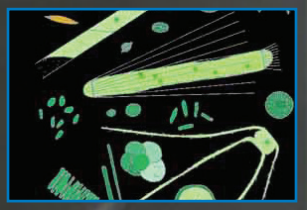
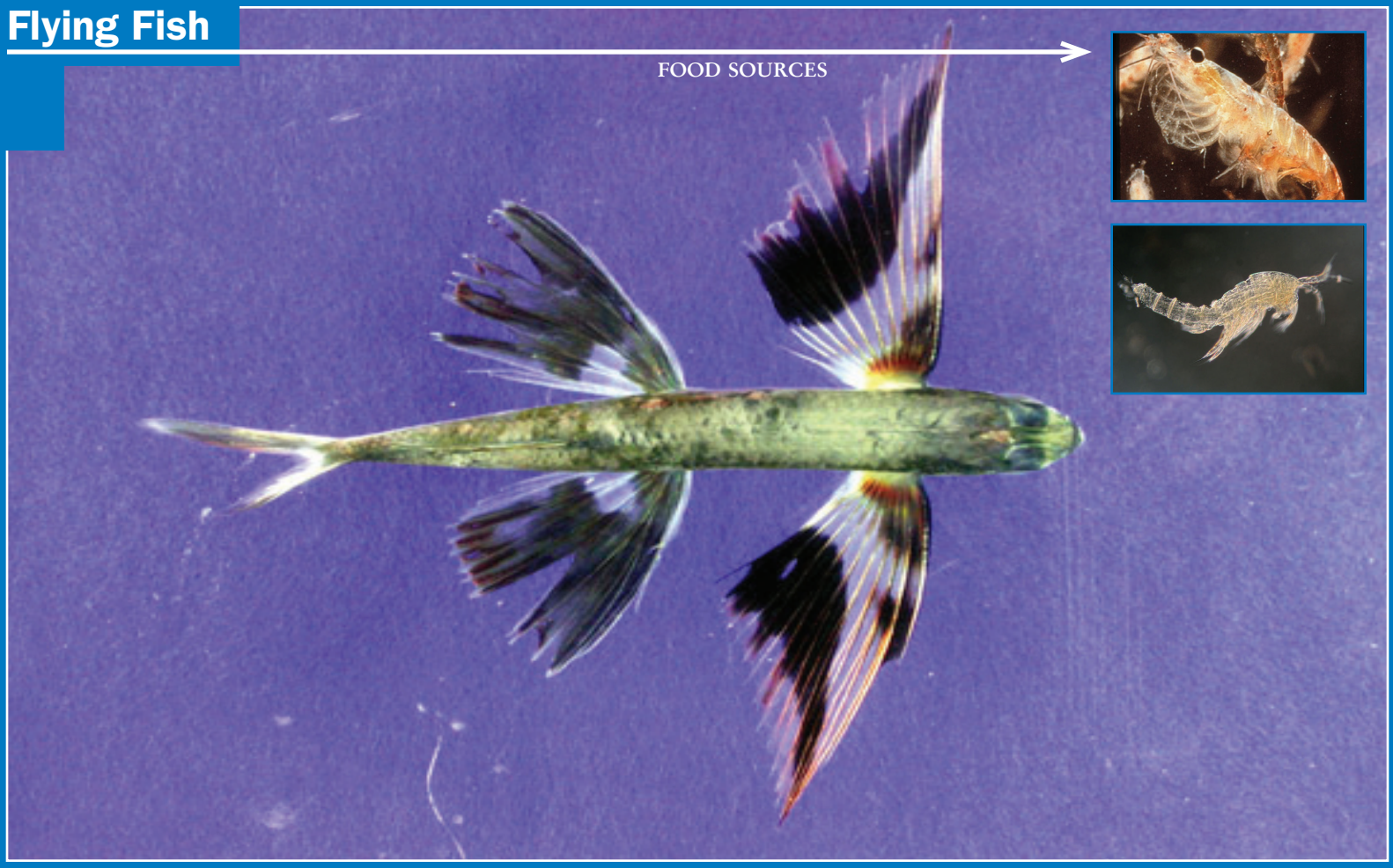


Flying Fish

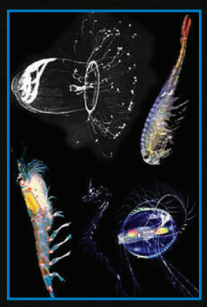
FOOD SOURCES



Open Ocean Organism Sheet—Ocean Sciences Sequence 2.7

Herring

FOOD SOURCES



Open Ocean Organism Sheet—Ocean Sciences Sequence 2.7

Jellyfish

FOOD SOURCES

Krill

FOOD SOURCES

Phytoplankton

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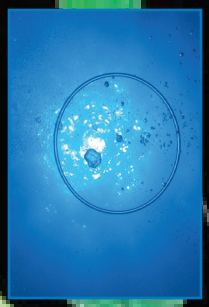

Salp

FOOD SOURCES

Zooplankton

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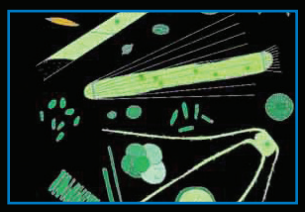

Open Ocean Organism Sheet—Ocean Sciences Sequence 2.7

Sargassum Weed

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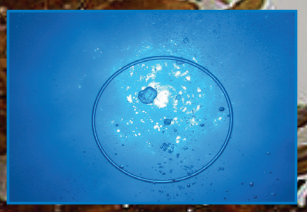

Open Ocean Organism Sheet—Ocean Sciences Sequence 2.7

Shrimp

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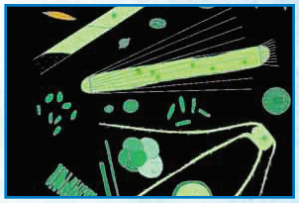
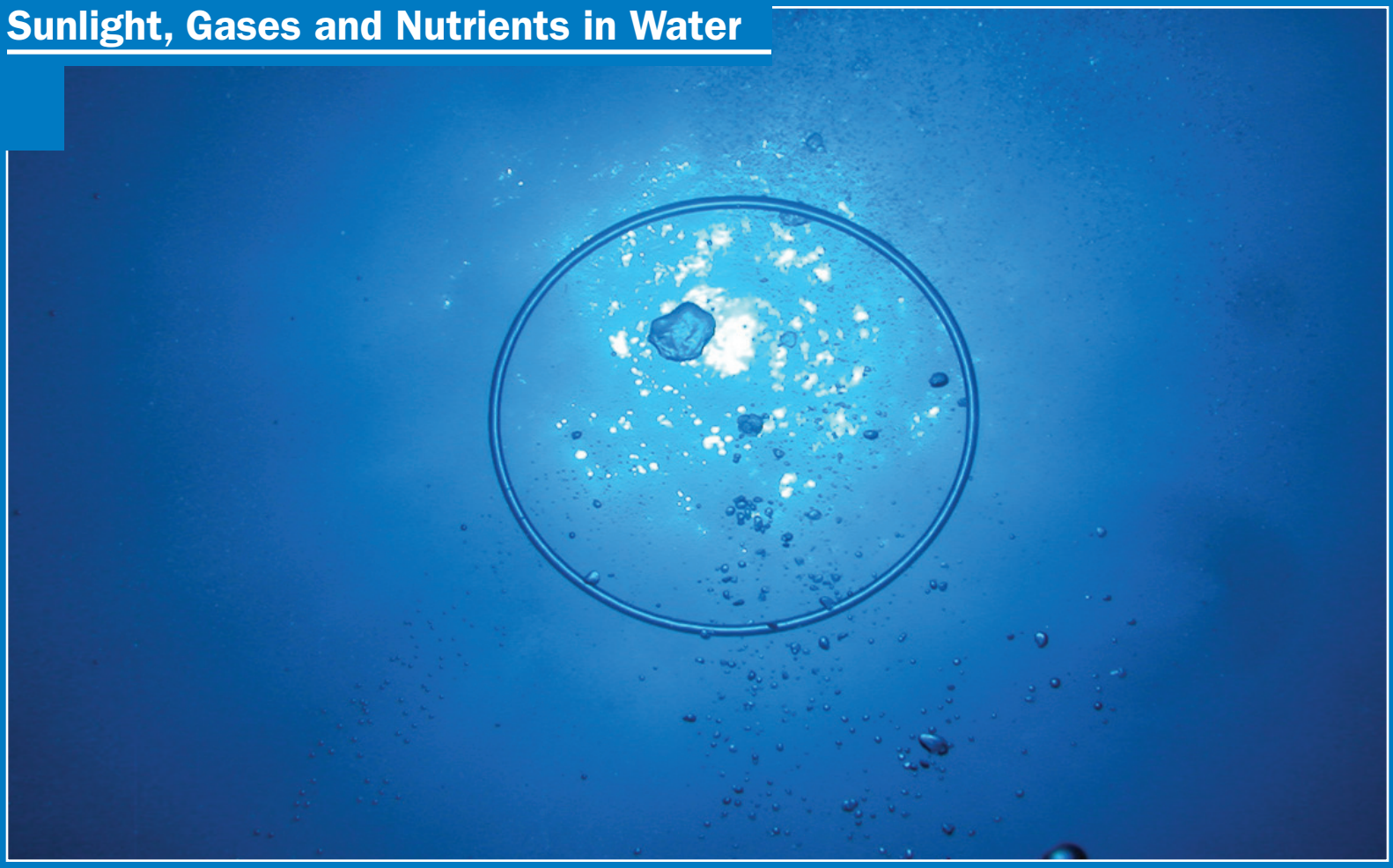


Sunlight, Gases and Nutrients in Water



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Albatross

FOOD SOURCES

Blue Whale

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Dolphin

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Great White Shark

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Humpback Whale

FOOD SOURCES

Leatherback Sea Turtle

FOOD SOURCES

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Sea Lion

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Sperm Whale

FOOD SOURCES

Squid

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Sunfish

FOOD SOURCES

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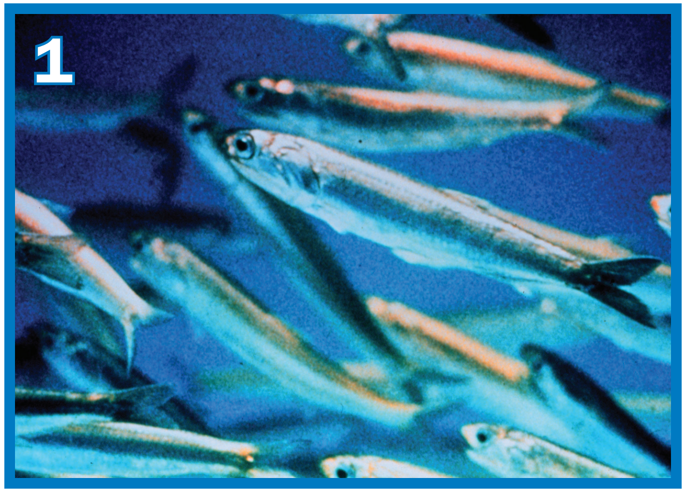
Swordfish

FOOD SOURCES

Tuna

FOOD SOURCES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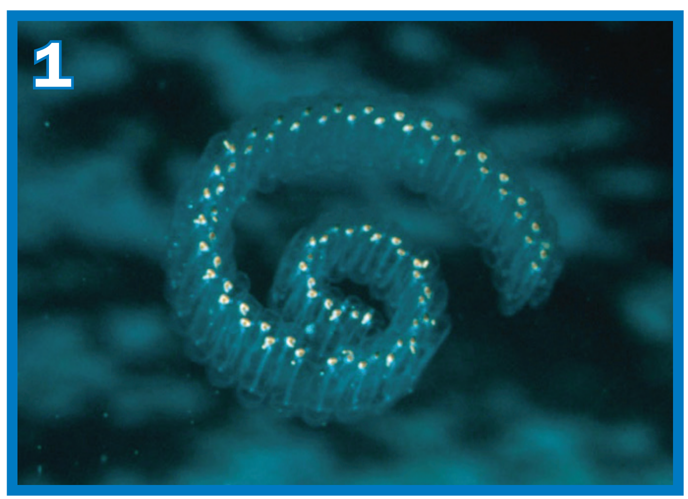
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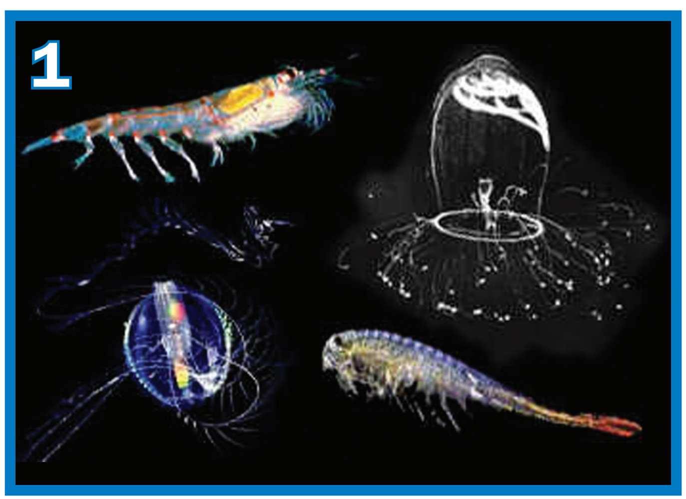
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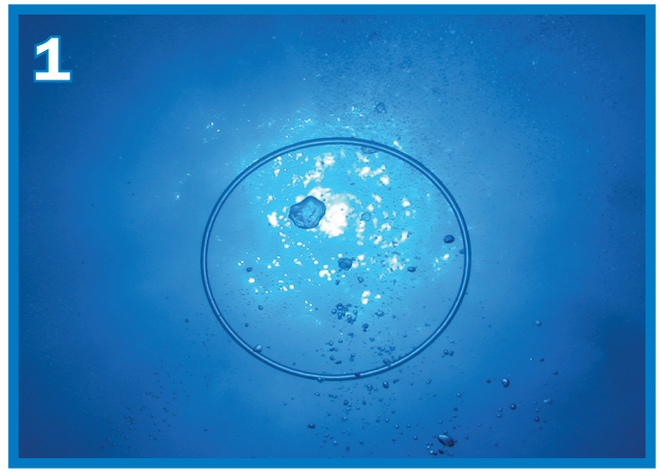
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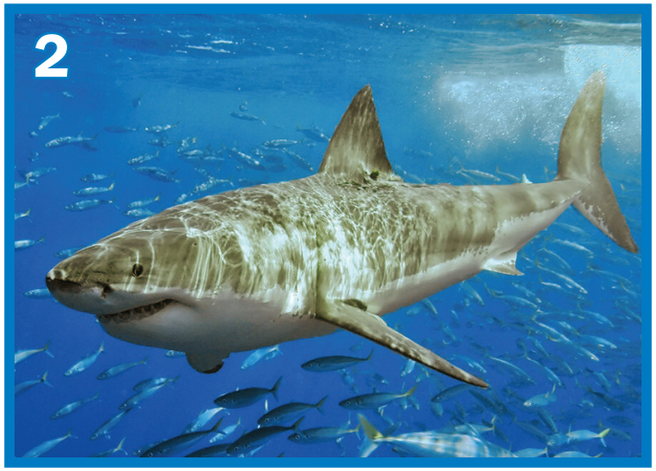
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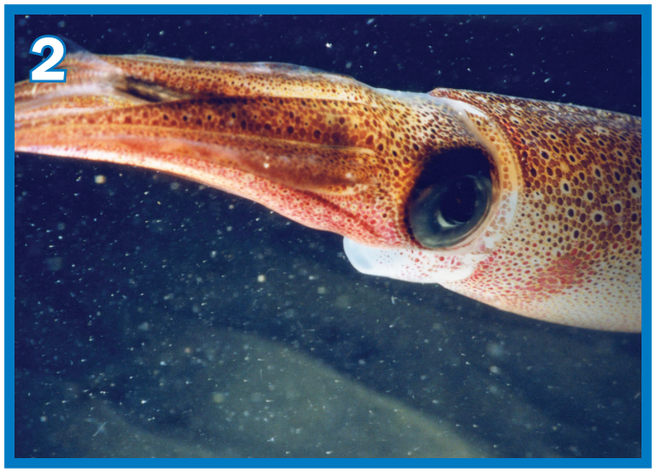
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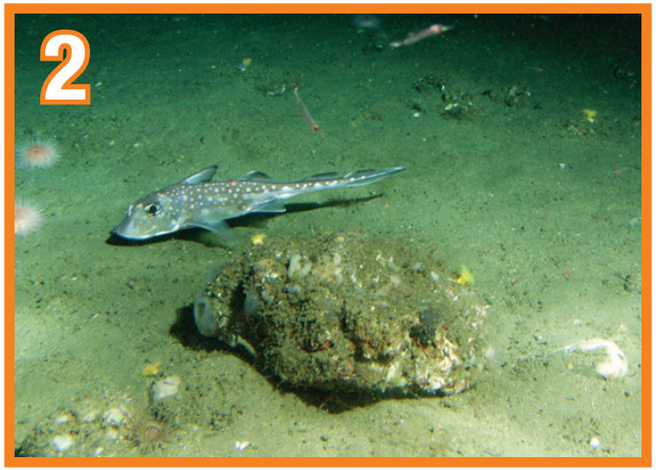

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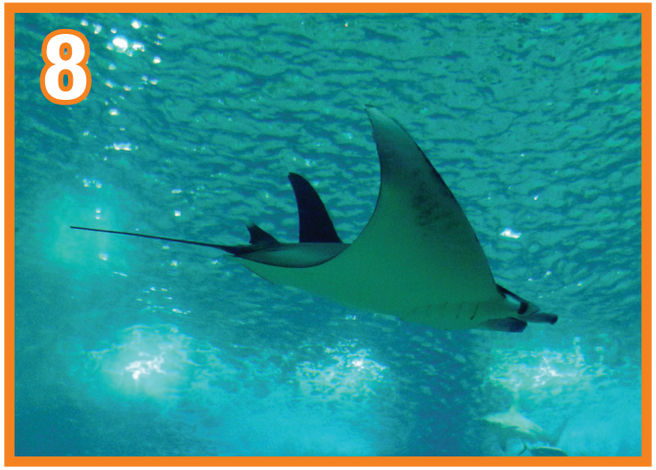

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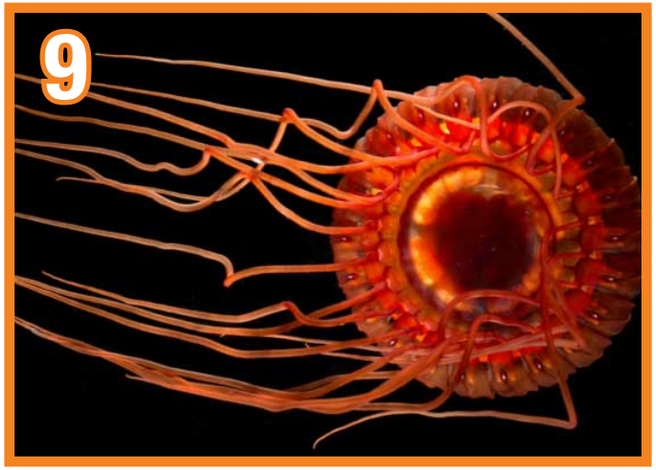

3
Sandy Shore

Water temperature: warm to cold

Near coast? yes

Bottom: sandy

Other: Many organisms get shelter by living buried in the sand.

2
Soft Bottom

Water temperature: warm to cold

Near coast? sometimes

Bottom: sandy, muddy

Other: Many organisms get shelter by living buried in the sand or mud.

1
Arctic Waters

Water temperature: cold

Near coast? yes

Bottom: rocky, sandy, muddy

Other: Many organisms come here to eat during summer. Endangered whales live here.

6
Coral Reef

Water temperature: warm

Near coast? yes

Bottom: rocky at reefs, sandy between reefs

Other: Coral reefs provide food and places to live for many different types of organisms.

5
Kelp Forest

Water temperature: cold

Near coast? yes

Bottom: rocky

Other: Kelp grows in areas that have a lot of nutrients and light.

4
Rocky Shore

Water temperature: cold

Near coast? yes

Bottom: rocky

Other: Many organisms get shelter among the rocks and live attached to the rocks.

9
Open Ocean: Deep

Water temperature: cold

Near coast? no

Bottom: none in habitat

Other: Plant-like organisms that need sunlight cannot grow here.

8
Open Ocean: Surface

Water temperature: medium

Near coast? no

Bottom: none in habitat

Other: Some organisms travel long distances through it.

7
Temperate Estuary

Water temperature: medium

Near coast? yes

Bottom: muddy

Other: Many organisms have their young here. Water has a lot of nutrients in it.