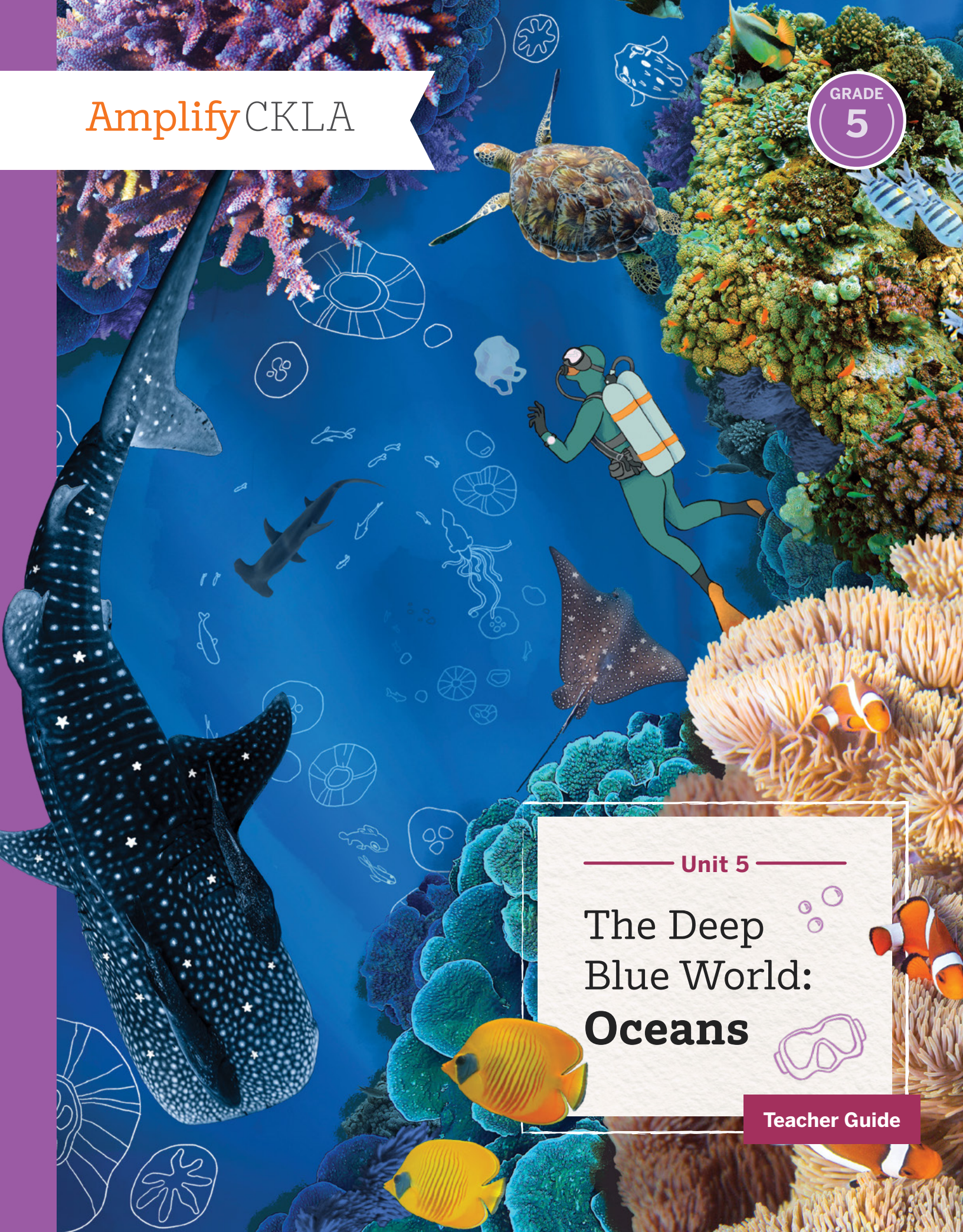
Amplify CKLA

GRADE 5



Unit 5

The Deep Blue World: **Oceans**

Teacher Guide

Grade 5 | Unit 5

The Deep Blue World: Oceans

Teacher Guide

Amplify CKLA | Core Knowledge®

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Welcome to Amplify CKLA

Dear Educator,

I am thrilled to welcome you to your Amplify CKLA 3rd Edition Teacher Guide.

At Amplify, we are dedicated to collaborating with educators like you to create learning experiences that support literacy development for all students. Amplify CKLA was designed to help you bring effective Science of Reading practices to life in your classroom, and we have been thrilled to see the impact it has had on students across the country.

The 3rd Edition builds on the robust principles and instruction of previous editions of Amplify CKLA to provide better-than-ever support for teaching and learning.

We've made significant improvements to Amplify CKLA in the areas you told us mattered most. In 3rd Edition, you will find more opportunities for differentiation to meet the needs of all learners—including multilingual/English learners—streamlined pacing, and bolstered writing instruction based on the science of reading and writing.

At its foundation, Amplify CKLA is built on the finding that word recognition and language comprehension are both critical to reading comprehension and writing composition.

In Grades 3–5, Amplify CKLA lessons combine skills and knowledge in content-driven units with increasingly complex texts, close reading, and a greater writing emphasis. Students start to use their skills to go on their own independent reading and writing adventures.

I know how overwhelming it can feel to start a new curriculum, but you are not alone! As you embark on this literacy journey with Amplify CKLA, we are here to support. We offer comprehensive professional development resources, including videos, podcasts, webinars, and virtual and in-person training, to help you make the shift to the Science of Reading.

We share the common belief that every child deserves to become a proficient, enthusiastic reader and writer, and I am confident that we can realize this goal together. Thank you for your unwavering commitment to your students' success and for your role in shaping the future of literacy instruction.

Sincerely,

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The Core Knowledge Foundation, which developed the first edition of CKLA over many years. This includes Core Knowledge Foundation staff as well as countless contributors, educators, and students who field-tested CKLA and provided invaluable feedback in its development.

Educators across the country who have provided essential feedback on previous editions of CKLA, helping us to make the program better for teachers and students.

Grade 5 | Unit 5

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Grade 5 | Unit 5

Introduction

THE DEEP BLUE WORLD: OCEANS

This introduction provides information and context for teaching *The Deep Blue World: Oceans*. The Teacher Guide contains sixteen daily lessons and two Pausing Point days. Each lesson will require a total of 90 minutes. Lesson 16 contains the Unit Assessment based on reading comprehension, literary understanding, and writing instruction.

As noted, two days are intended to be used as Pausing Point days. These Pausing Points are found at the end of the unit, before the Unit Assessment. A Pausing Point can be used to focus on content understanding, writing, and reading.

TEACHER COMPONENTS

- Teacher Guide

DIGITAL TEACHER COMPONENTS

These resources can be found at learning.amplify.com

- Teacher Presentation Screens
- Visual Supports for Teaching
- General English Learners
- Assessment Guide: Unit Assessment
- Caregiver Letter
- Fluency Supplement
- Decoding and Encoding Remediation Guide
- Intervention Toolkit

STUDENT COMPONENTS

- Reader
- Activity Book

Note: Students may need computer access if you choose to have them publish their writing digitally.

In the back of this Teacher Guide, you will find a section titled "Teacher Resources." In this section you will find the following:

- Glossary
- Activity Book Answer Key

WHY THIS UNIT IS IMPORTANT

The Deep Blue World: Oceans is an informational unit that draws upon the knowledge and skills acquired in earlier grades and units. The Reader explores the diversity of animal and plant life found in six ocean ecosystems. Students read rigorous informational texts and consider big questions that explore how characteristics of ocean environments support thriving ecosystems. The unit culminates with sharing informational student writing with peers, developed using collaborative research and the writing process.

WHAT STUDENTS HAVE ALREADY LEARNED

The following domains, and the specific core content that was targeted in those domains, are particularly relevant to the unit. This background knowledge will greatly enhance students' understanding of the unit:

- Grade 1, *A World of Homes: Animals and Habitats*
- Grade 3, *Furs, Fins, and Feathers: Animal Classification*
- Grade 4, *Our Planet: Geology*

CORE VOCABULARY

The following list contains core vocabulary words from the Reader. They can be found in the Vocabulary section at the beginning of each lesson. Boldfaced words in the list have an associated Word Work activity. The inclusion of the words on this list does not mean that students are immediately expected to be able to use all these words on their own. However, through repeated exposure throughout the lessons, they should acquire a good understanding of most of these words and begin to use some of them in conversation.

Lesson 1 ecosystem organisms biotic factors abiotic factors zones migration **characteristics** estuary mangrove trees remote hydrothermal vents	**Lesson 2** aquatic absorbing trophic level **primary** secondary tertiary quaternary detritus detritivore symbiotic food web	**Lesson 3** sunlight zone fluctuate **effect** **affect** twilight zone midnight zone abyssal zone hadal zone euphotic constant
Lesson 4 agile **adaptation** bioluminescence microbe	**Lesson 5** marine biologists extinct conservation genus **conservation**	**Lesson 6** expedition amphipod **clusters** polyp
Lesson 7 aquatic organism terrestrial organism microorganisms mollusks **erosion**	**Lesson 8** **regenerates** chemosynthesis chemosynthetic bacteria	**Lesson 9** water scooter hypoxia **clarity** Secchi disk pH
Lesson 10 gyre North Pacific Subtropical Convergence Zone marine debris biodegradable digest microplastics toxins **entangled**	**Lesson 11** ability **foundations** particles crevices specimens	**Lesson 12** flourish unison **contradict** fluke
Lesson 13 **detach** embark		

WRITING

In this unit, students will be planning, drafting, revising, editing, publishing, and presenting informational text. Students will read about a marine animal and write to inform about its relationship to the ecosystem it lives in, including its role in the food web.

The following activities may be added to students' writing portfolios to showcase student writing within and across domains:

- Multi-paragraph descriptions of marine ecosystems (Lessons 6, 7 and 8)
- Informational text exploring a solution to the Pacific Garbage Patch (Lesson 10)
- Final copy of the culminating writing task about a chosen marine animal (Lesson 12)

UNIT ASSESSMENT

Digital Assessment

This unit includes a Unit Assessment for students to complete digitally. The digital assessment evaluates students in the skills and concepts covered in the unit, including vocabulary, grammar and morphology, comprehension skills, and content knowledge. The assessment will provide you with meaningful student data and reporting that offers insights into each student's learning progress and recommendations on ways to support your students based on their learning needs. The assessment is a variation of the Unit Assessment found in the Teacher Guide. To access the digital assessment, please log onto the Amplify platform and assign the assessment to your students.

If your students are unable to access the assessment digitally, you may wish to use the Unit Assessment provided in the Teacher Guide and direct your students to complete the corresponding Student Assessment pages.

Print

The Unit Assessment in Lesson 16 evaluates each student's learning of content, reading skills, and language skills taught during the unit. This assessment can be found in the Teacher Guide. The student pages are in the Assessment Guide: Unit Assessment booklet to print or make copies for each student.

Student Performance Assessment

This unit concludes with Student Performance Assessment 2 to help you determine how students are progressing at this point in the year. This assessment is not available digitally. The directions for administering the assessment, student assessment pages, and answer keys can be found in the Assessment Guide: Student Performance Assessments component. Please make copies of the student pages to distribute to students.

You should spend no more than two days total on the Student Performance Assessment. There are three main group components of the assessment: a written assessment of silent reading comprehension, a written assessment of grammar, and a written assessment of morphology. Two other components, the oral reading of words in isolation and the fluency assessments, are administered one-on-one with students.

The written assessment of silent reading comprehension is meant to be completed in one 90-minute block of time and will be administered on Student Performance Assessment 2 Day 1. The grammar and morphology assessments are meant to be completed during one 50-minute block and one 40-minute block of time on Student Performance Assessment 2 Day 2.

In addition you will pull students aside, one at a time, and administer the Word Reading in Isolation Assessment to students who scored 13 or fewer on the Reading Comprehension Assessment. As time allows you may also administer the Word Reading in Isolation Assessment to students who scored between 14 and 17 on the Reading Comprehension Assessment. Administer the Fluency Assessment to all students.

After administering Student Performance Assessment 2, you will complete an analysis summary of individual student performance using the Grade 5 Student Performance Assessment Summary Sheet, found in the Assessment Guide: Student Performance Assessment component.

LESSON

1

Introducing Ocean Ecosystems and Their Inhabitants

PRIMARY FOCUS OF LESSON

Speaking and Listening

Students will brainstorm characteristics of ocean ecosystems, using images and agreed-upon discussion guidelines to share their ideas in a whole group. **[SL.5.1c, SL.5.1d]**

Reading

Students will read an informational text and use quotations and paraphrased text details to identify similar and unique characteristics of ocean ecosystems. **[RI.5.1]**

Students will demonstrate an understanding of the Tier 2 word *characteristics*. **[L.5.4]**

Language

Students will analyze the meanings of words using their knowledge of the word part *bio–*. **[L.5.4b]**

FORMATIVE ASSESSMENT

Activity Page 1.1	**Characteristics of Ocean Ecosystems** Analyze the characteristics of ocean ecosystems using a graphic organizer. **[RI.5.1]**

Teacher Presentation Screens:
all lessons include slides

LESSON AT A GLANCE

	Grouping Recommendations	Time	Materials
Speaking and Listening (35 min.)			
Core Connections: Introduce The Unit	Whole Group	10 min.	❑ Visual Supports 1.1–1.7 ❑ Sentence Types Poster from Unit 1, *In My Own Words: Personal Narratives* (optional)
Ocean Ecosystem Tour	Small Group / Whole Group	25 min.	
Reading (45 min.)			
Read-Aloud: Chapter 1	Whole Group	25 min.	❑ *Life in the Fathoms* ❑ Activity Page 1.1
Word Work: *Characteristics*	Whole Group	5 min.	
Comparing Ecosystems	Small Group	15 min.	
Language (10 min.)			
Morphology: *bio–*	Whole Group	10 min.	❑ Visual Support 1.8
Take-Home Material			
Take-Home Letter			❑ Caregiver Letter

ADVANCED PREPARATION

Speaking and Listening

Visual Support 1.1

- Prepare to display Visual Support 1.1.
- Divide the class into six groups and designate areas of the classroom for each group to meet..
- Prepare to display Visual Supports 1.1-1.7
- For each of the six groups, prepare a large piece of chart paper, an area of whiteboard divided into six parts, or six blank sheets of paper for student observations.
- Provide additional paper for the sentence writing activity.

Reading

- You may choose to display the Reader text during modeling and discussion activities in Lessons 1–10 of this unit.

Language

Visual Support 1.8

- Prepare to display Visual Support 1.8 during the morphology segment.

Universal Access

Speaking and Listening

- Rearrange furniture as needed to accommodate any student mobility needs during the ecosystem tour.
- Post the area for student observations where all students can reach it.

Reading

- Generate a word bank integrating vocabulary and additional descriptive vocabulary from the Reader to support text-based responses during the reading discussion. Display the word bank or distribute it to individual students, as needed. Suggestions include:
    - bright pink and purple **coral**
    - floating green specks called **algae**
    - living things

- non-living things
- **brackish** water
- swaying ribbons of **kelp**
- lack of sunlight

Language

- Prepare individual copies of Visual Support 1.8 for students to refer to at their seats, as needed.
- To ensure all students have the opportunity to contribute during Turn and Talk and Think-Pair-Share exchanges, provide students with a signal such as folding their hands or raising a hand to indicate when both partners have added to the conversation.

VOCABULARY PREVIEW

- You may choose to preview the vocabulary words before reading the text.

ecosystems, n. systems formed by the interaction of communities of organisms with their environments

organisms, n. living structures made up of systems working together

biotic factors, n. characteristics connected to living things

abiotic factors, n. characteristics of an ecosystem that are not connected to living things

zones, n. areas

migration, n. the act of traveling from one location to another

characteristics, n. traits or properties that describe something

estuary, n. an area where salt water and fresh water meet

mangrove trees, n. types of tree or shrubs with roots that provide a place for underwater ecosystems

remote, adj. far away from civilization, isolated

hydrothermal vents, n. cracks in the ocean floor that release hot water

Vocabulary Chart for Chapter 1 "Introducing Ocean Ecosystems and Their Inhabitants"

Vocabulary Type	**Tier 3 Domain-Specific Words**	**Tier 2 General Academic Words**	**Tier 1 Everyday Speech Words**
Core Vocabulary	ecosystem organisms biotic factors abiotic factors migration estuary mangrove trees hydrothermal vents	zones characteristics remote	
Spanish Cognates	ecosistema organismos factores bióticos factores abióticos migración estuario	zonas características remoto	
Multiple-Meaning			
Sayings and Phrases			

Start Lesson

Lesson 1: Introducing Ocean Ecosystems and Their Inhabitants

Speaking and Listening

35M

Primary Focus: Students will brainstorm characteristics of ocean ecosystems, using images and agreed-upon discussion guidelines in a whole group. **[SL.5.1c, SL.5.1d]**

CORE CONNECTIONS: INTRODUCE *THE DEEP BLUE WORLD: OCEANS* (10 MIN.)

- Remind students that in the Grade 1 domain *A World of Homes: Animals and Habitats* they learned about habitats.
- Ask students, "What is a habitat?"
  - » A habitat is a home for a living thing that has everything it needs to survive, such as food, water, and shelter.
- Tell students that humans have built places to live.
- Have students brainstorm the types of habitats that humans have built and how these places differ from each other.
- Explain that animals live in different kinds of places, too. In nature, many different plants and animals live together in one place.
- Tell students that a system of living things that interact with each other is called an ecosystem and the ocean is filled with many different ecosystems.

Explain that in *The Deep Blue World: Oceans* they will learn about six of the ocean ecosystems.

- Remind students that in *A World of Homes: Animals and Habitats* they learned about food chains.
- Ask students, "What is a food chain?"
  - » A food chain is the relationship between living things as food sources for other living things.
- Tell students that in *The Deep Blue World: Oceans* they will learn about food webs.

Differentiation

Challenge

Ask students to name other systems in nature in which the different parts are connected or depend on each other. Suggestions may include the water cycle, the rock cycle, or lunar tides.

Support

Display the following sentence stems and frames in a central location for students to apply as needed as they add their observations to each stop.

- I noticed that _____.
- I find it interesting that _____.
- I was surprised by _____.
- _____ reminds me of _____.
- In the _____ ecosystem I noticed _____, but in the _____ ecosystem I noticed _____.

Visual Support 1.1

- Display Visual Support 1.1.
- Ask students to point out what they notice about the food web.
- Ensure that students understand that a food web is a complex system of food chains that all rely on each other.
- Tell students that they will be learning about food webs and the living things that are in them across several ocean ecosystems.

Check for Understanding

Ask students, "What is the difference between a food chain and a food web?"

» Answers may vary but could include that food chains are one line of connection between producers and consumers and a food web contains several interconnected food chains.

OCEAN ECOSYSTEM TOUR (25 MIN.)

Small Group

- Tell students they will now take a tour of some of the ocean's ecosystems.
- Divide students into the six groups you have prepared and direct them to where they will write their observations. You may choose to provide six blank pieces of paper or one large piece of paper (or section of whiteboard), divided into six areas.
- Explain that they will observe six ecosystem images. When an image is displayed, they will record the name of the ecosystem and their observations on one of the pages or page areas. There will be six ecosystems altogether.

Visual Support 1.2

- Display Visual Support 1.2 and allow a few minutes for students to discuss and record their observations.
- Remind students to record the ecosystem name before you display the next image.
- Repeat this process until you have displayed Visual Supports 1.3-1.7

ML/EL **MULTILINGUAL/ENGLISH LEARNERS**

Interacting in Meaningful Ways

Exchanging Ideas

Entering/Emerging	Provide description prompts to support responses such as: What colors do you see? What animals do you see? What plants do you see?
Transitioning/ Expanding	Have students work with a partner in the group to write and discuss observations.
Bridging	Prompt students to contribute adjectives and adverbs that describe what they see in the image.

- Tell each group to debrief about their tour using the following discussion questions:
  - What made each ecosystem unique?
  - What did all, or some, of the ecosystems have in common?
  - What did you observe in the images that relates to food webs?
  - What other important observations did you make that we haven't discussed?
- Call on different groups to share their discussion around one of the discussion questions.
- Have students write a sentence in each sentence type (declarative, interrogative, exclamatory, imperative) to describe what they observed about ecosystems. Display the Sentence Types Poster from Unit 1, *In My Own Words: Personal Narratives*, as needed.
  - » Answers may vary but could include examples such as:
    Declarative: The open water ecosystem covers a large area.
    Imperative: Keep mangrove trees in the mangrove forests.
    Interrogative: How do organisms interact in the dark deep sea ecosystem?
    Exclamatory: Kelp forest ecosystems look like upside down forests!

Student Reader:
Life in the Fathoms

Lesson 1: Introducing Ocean Ecosystems and Their Inhabitants

Reading

45M

Primary Focus

Students will read an informational text and use quotations and paraphrased text details to identify similar and unique characteristics of ocean ecosystems. **[RI.5.1]**

Students will demonstrate an understanding of the Tier 2 word *characteristics.* **[L.5.4]**

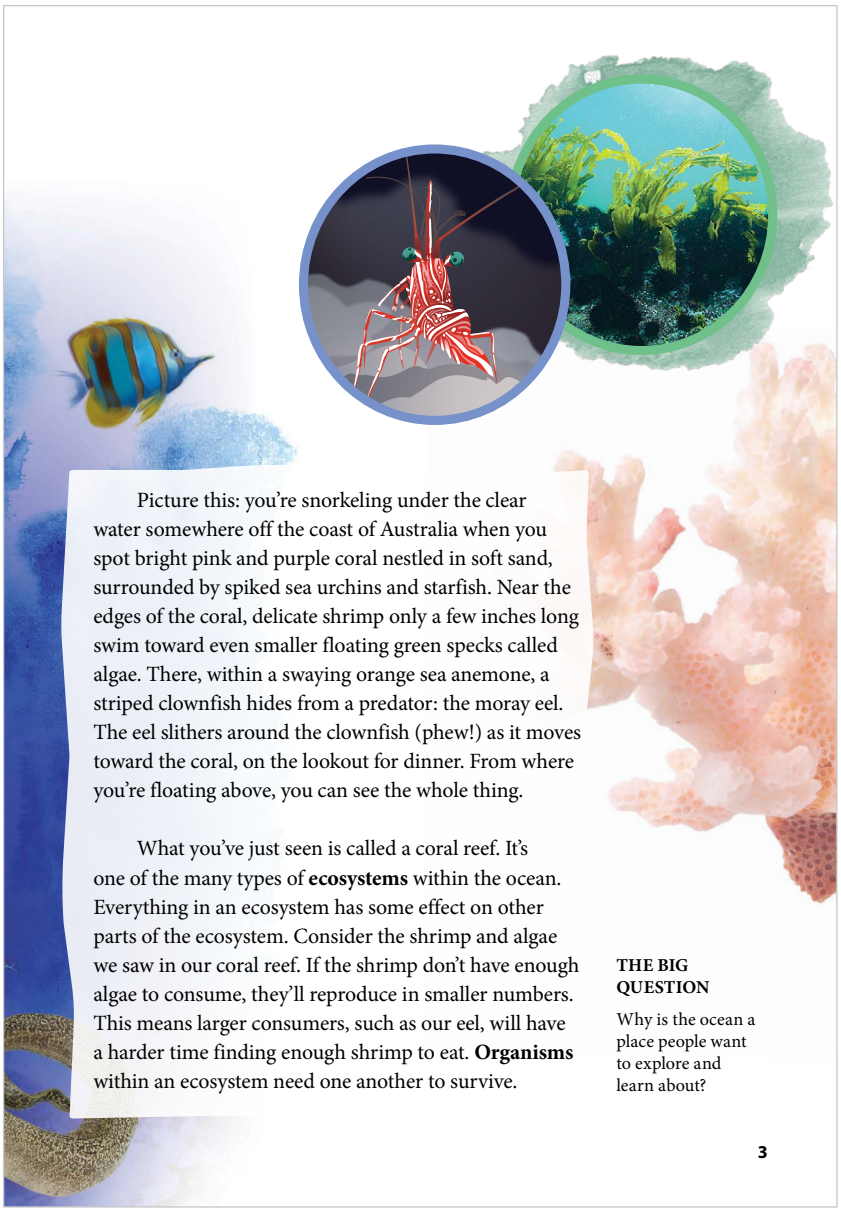
READ-ALOUD: CHAPTER 1 (25 MIN.)

Introduce the Reader

- Ensure each student has a copy of the Reader *Life in the Fathoms*.
- Explain that *Life in the Fathoms* is an informative text that provides facts about the oceans organized into chapters.
- Give students a few moments to flip through the Reader and comment on the chapter titles and images they see.
- Ask students to share any comments they have about the Reader.

Introduce the Chapter

- Tell students you will read aloud chapter 1, "Introducing Ocean Ecosystems and Their Inhabitants." They should follow along in their Reader as you read.
- Have students turn to the table of contents, locate the chapter, and then turn to the first page of the chapter.
- Preview the vocabulary words before reading the chapter.
- Have them find the word *ecosystem* in the chapter. Explain that each vocabulary word is bolded the first time it appears in the chapter.
- Explain that the glossary contains definitions of all the vocabulary words in this Reader. Have students refer to the glossary at the back of the Reader to locate *ecosystem.*
- Have a student read the definition.
- Remind students that they can refer to this glossary as needed.



Picture this: you're snorkeling under the clear water somewhere off the coast of Australia when you spot bright pink and purple coral nestled in soft sand, surrounded by spiked sea urchins and starfish. Near the edges of the coral, delicate shrimp only a few inches long swim toward even smaller floating green specks called algae. There, within a swaying orange sea anemone, a striped clownfish hides from a predator: the moray eel. The eel slithers around the clownfish (phew!) as it moves toward the coral, on the lookout for dinner. From where you're floating above, you can see the whole thing.

What you've just seen is called a coral reef. It's one of the many types of **ecosystems** within the ocean. Everything in an ecosystem has some effect on other parts of the ecosystem. Consider the shrimp and algae we saw in our coral reef. If the shrimp don't have enough algae to consume, they'll reproduce in smaller numbers. This means larger consumers, such as our eel, will have a harder time finding enough shrimp to eat. **Organisms** within an ecosystem need one another to survive.

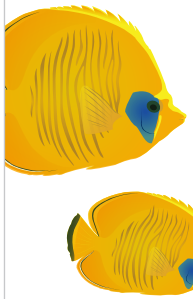
THE BIG QUESTION

Why is the ocean a place people want to explore and learn about?

3

Read Chapter 1, "Introducing Ocean Ecosystems and Their Inhabitants"

- Have one student read The Big Question at the beginning of the chapter. Ensure students understand the meaning of The Big Question before reading the chapter.
  - Why is the ocean a place people want to explore and learn about?
- Ask students, "What do you already know about the ocean?"
  - » Answers may vary but could include facts about tides and habitats from earlier units, information about marine plants and animals, firsthand knowledge and anecdotes from visiting beaches and other marine locations.
- Read chapter 1 aloud, beginning on page three.



Abiotic Factors of the Ocean

How do we tell ocean ecosystems apart? Each ecosystem includes producers, consumers, and decomposers. These are the **biotic factors** in an ecosystem—living things like fish, algae, and bacteria. These biotic factors also coexist with **abiotic factors**, such as sunlight, salt levels, and soil. (You can think of biotic as living and abiotic as nonliving.) Each ecosystem has its own unique abiotic factors. On land, a desert has very different abiotic factors than ecosystems in the forest, or in the tundra. The abiotic factors in these ecosystems determine what kinds of life can thrive there. The same is true with ocean ecosystems.

One important abiotic factor in the ocean is the amount of salt in the water. Some organisms can survive in water that contains a lot of salt. Others need water with a very low salt content. Some ocean ecosystems contain very salty water, and others have much less salty water. Some ecosystems even contain a mixture of fresh water and salt water, which is called brackish water. Each type of water supports different organisms.

The spines of a sea urchin both protect it and help it spear food in the water.

4

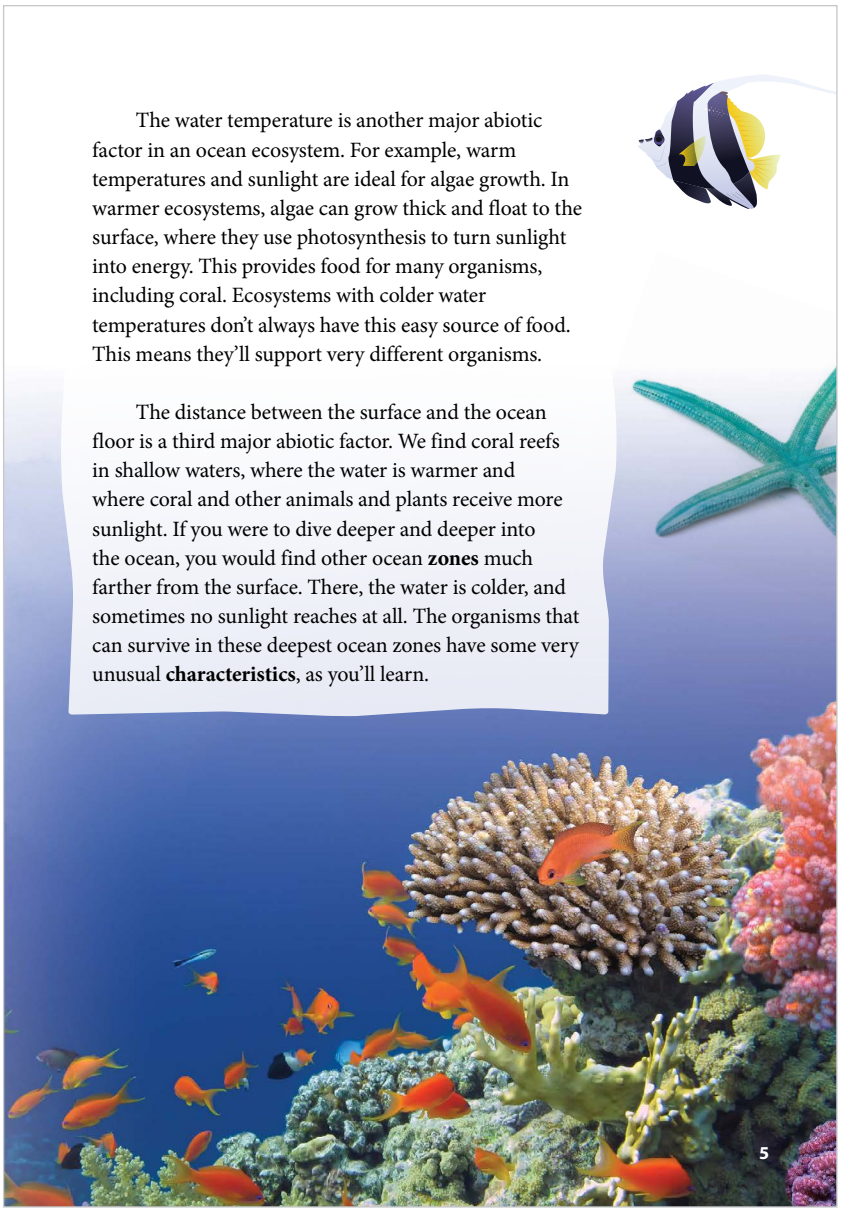
Literal. Name some examples of animals that live in the coral reef ecosystem.

» coral, sea urchins, starfish, shrimp, sea anemone, clownfish, moray eel

Inferential. How do these organisms rely on each other in this ecosystem?

» Answers may vary but could include that the shrimp rely on the algae for food or the moray eel relies on prey like the clownfish for food. Without enough of a particular organism, the animal that eats it cannot survive.

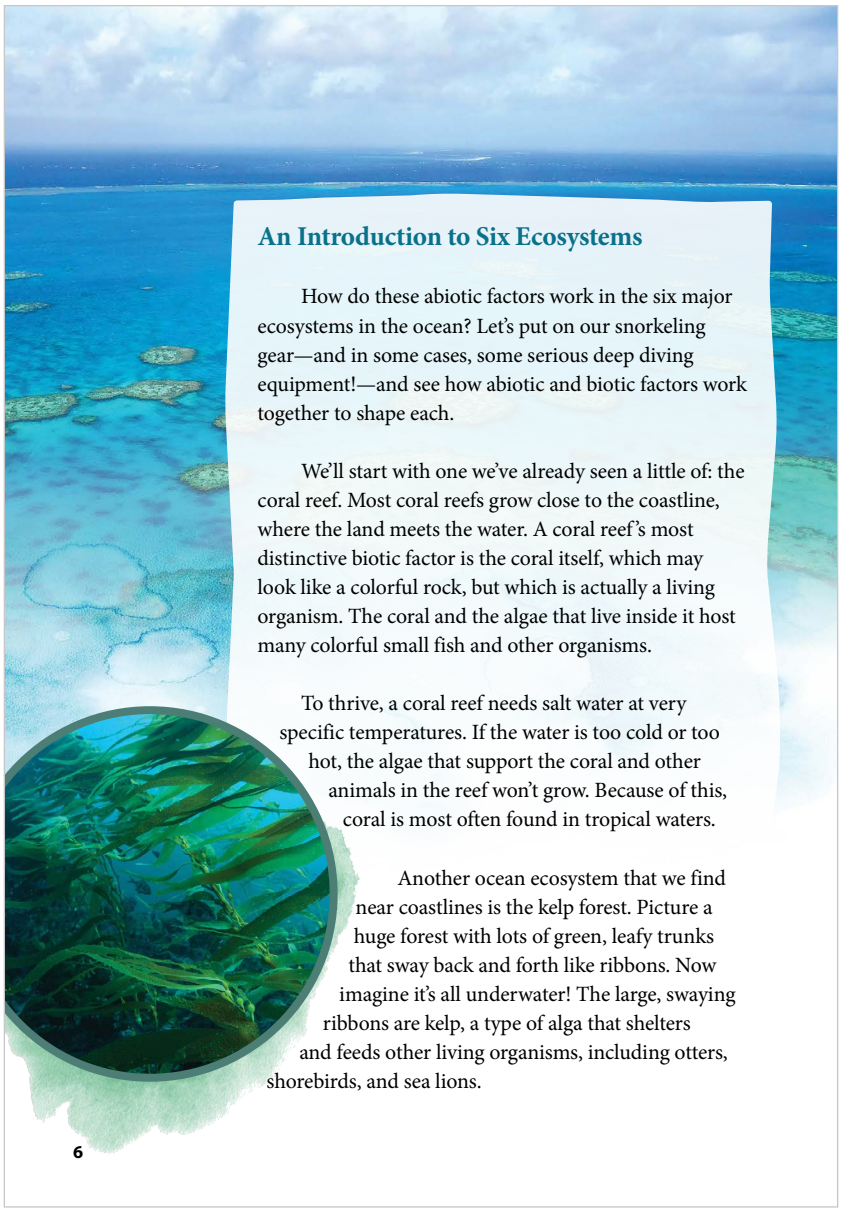
- Continue reading chapter 1 pages four and five.



Literal. What abiotic factors play a role in what kinds of organisms can live in an ecosystem?

» salt, temperature, distance from the surface of the water.

- Continue reading page 6, stopping before the last paragraph.



An Introduction to Six Ecosystems

How do these abiotic factors work in the six major ecosystems in the ocean? Let's put on our snorkeling gear—and in some cases, some serious deep diving equipment!—and see how abiotic and biotic factors work together to shape each.

We'll start with one we've already seen a little of: the coral reef. Most coral reefs grow close to the coastline, where the land meets the water. A coral reef's most distinctive biotic factor is the coral itself, which may look like a colorful rock, but which is actually a living organism. The coral and the algae that live inside it host many colorful small fish and other organisms.

To thrive, a coral reef needs salt water at very specific temperatures. If the water is too cold or too hot, the algae that support the coral and other animals in the reef won't grow. Because of this, coral is most often found in tropical waters.

Another ocean ecosystem that we find near coastlines is the kelp forest. Picture a huge forest with lots of green, leafy trunks that sway back and forth like ribbons. Now imagine it's all underwater! The large, swaying ribbons are kelp, a type of alga that shelters and feeds other living organisms, including otters, shorebirds, and sea lions.

6

Inferential. How do abiotic factors determine what kinds of organisms can live in an ecosystem?

» Salt, temperature, and distance from the surface create certain conditions that different organisms are able to survive in. For example, some organisms, such as algae, need water at the correct temperature.

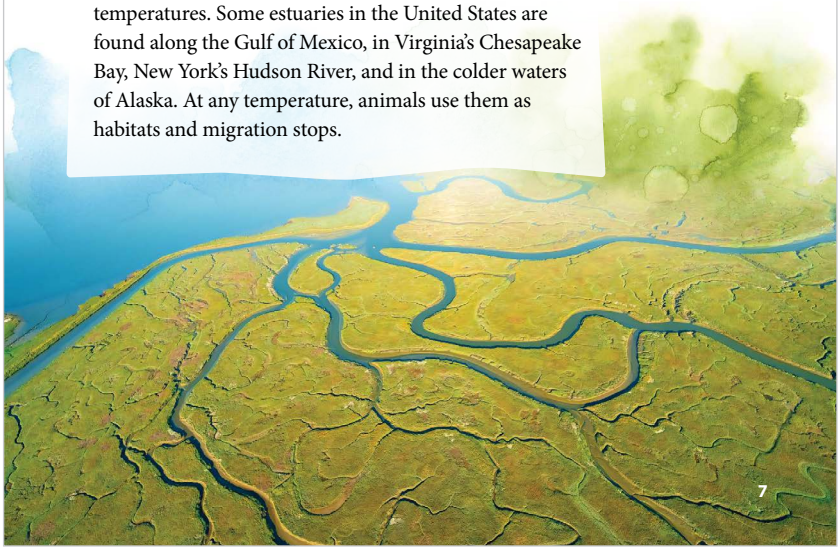
- Continue reading, beginning at the last paragraph on page 6 through the first two paragraphs on page 8.

Kelp grows best in cooler waters, such as the water just off the Pacific coast of North America. Sunlight is one of the most important abiotic factors that helps to shape a kelp forest. Sunlight allows kelp to photosynthesize, which lets it grow enough to support other consumers in this ecosystem.

An **estuary** is an ecosystem found in places where fresh water from rivers and lakes meets salt water from the ocean. The level of salt in the brackish water of an estuary is one of its major abiotic factors. Because the salt balance of an estuary changes as the ocean tides change, the animals in an estuary behave differently as the tides change. For example, female blue crabs only lay their eggs during the spring high tides, when the salt level is high enough to support them.

The black-tailed godwit is one of many land animals that share the estuary ecosystem with organisms who live in the brackish water.

Estuaries can form in a wide variety of temperatures. Some estuaries in the United States are found along the Gulf of Mexico, in Virginia's Chesapeake Bay, New York's Hudson River, and in the colder waters of Alaska. At any temperature, animals use them as habitats and migration stops.



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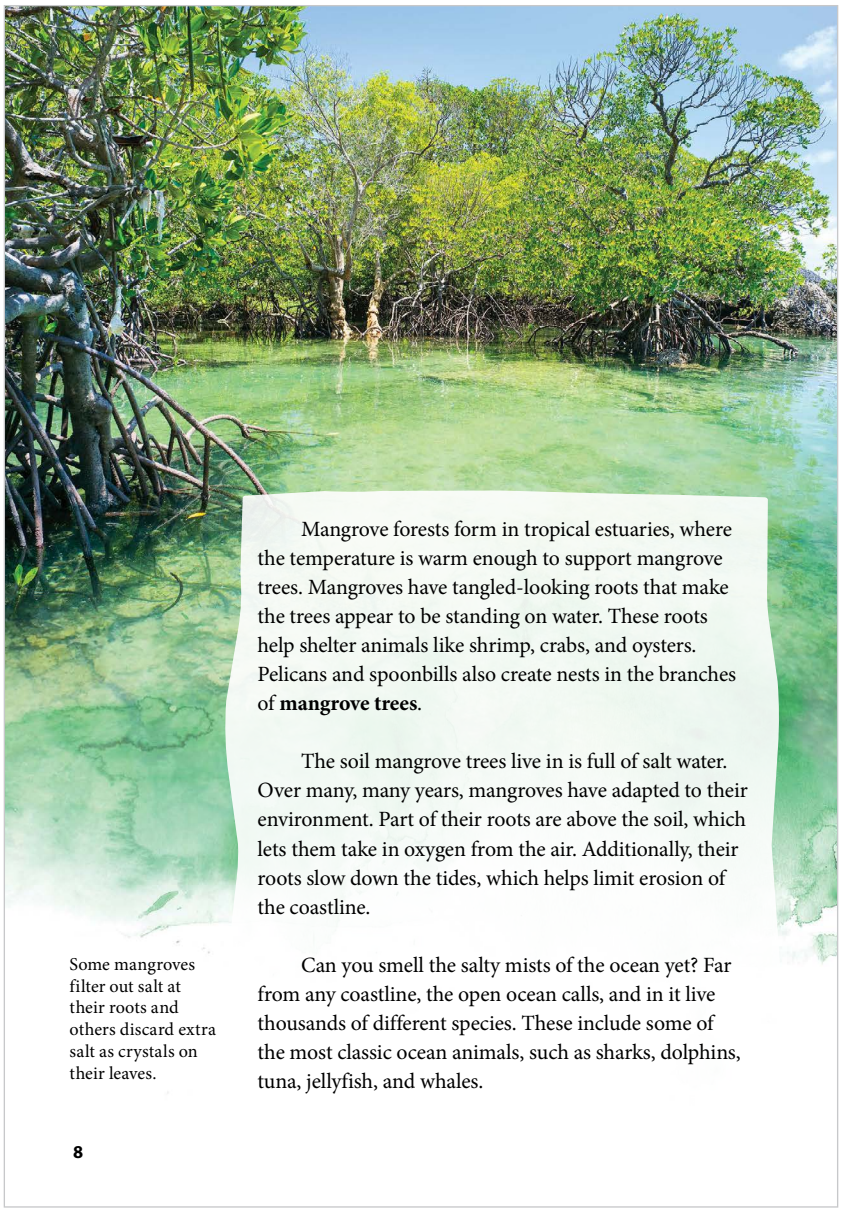


Mangrove forests form in tropical estuaries, where the temperature is warm enough to support mangrove trees. Mangroves have tangled-looking roots that make the trees appear to be standing on water. These roots help shelter animals like shrimp, crabs, and oysters. Pelicans and spoonbills also create nests in the branches of **mangrove trees**.

The soil mangrove trees live in is full of salt water. Over many, many years, mangroves have adapted to their environment. Part of their roots are above the soil, which lets them take in oxygen from the air. Additionally, their roots slow down the tides, which helps limit erosion of the coastline.

Some mangroves filter out salt at their roots and others discard extra salt as crystals on their leaves.

Can you smell the salty mists of the ocean yet? Far from any coastline, the open ocean calls, and in it live thousands of different species. These include some of the most classic ocean animals, such as sharks, dolphins, tuna, jellyfish, and whales.

8

Literal. What abiotic factor changes in estuaries?

» the amount of salt in the water

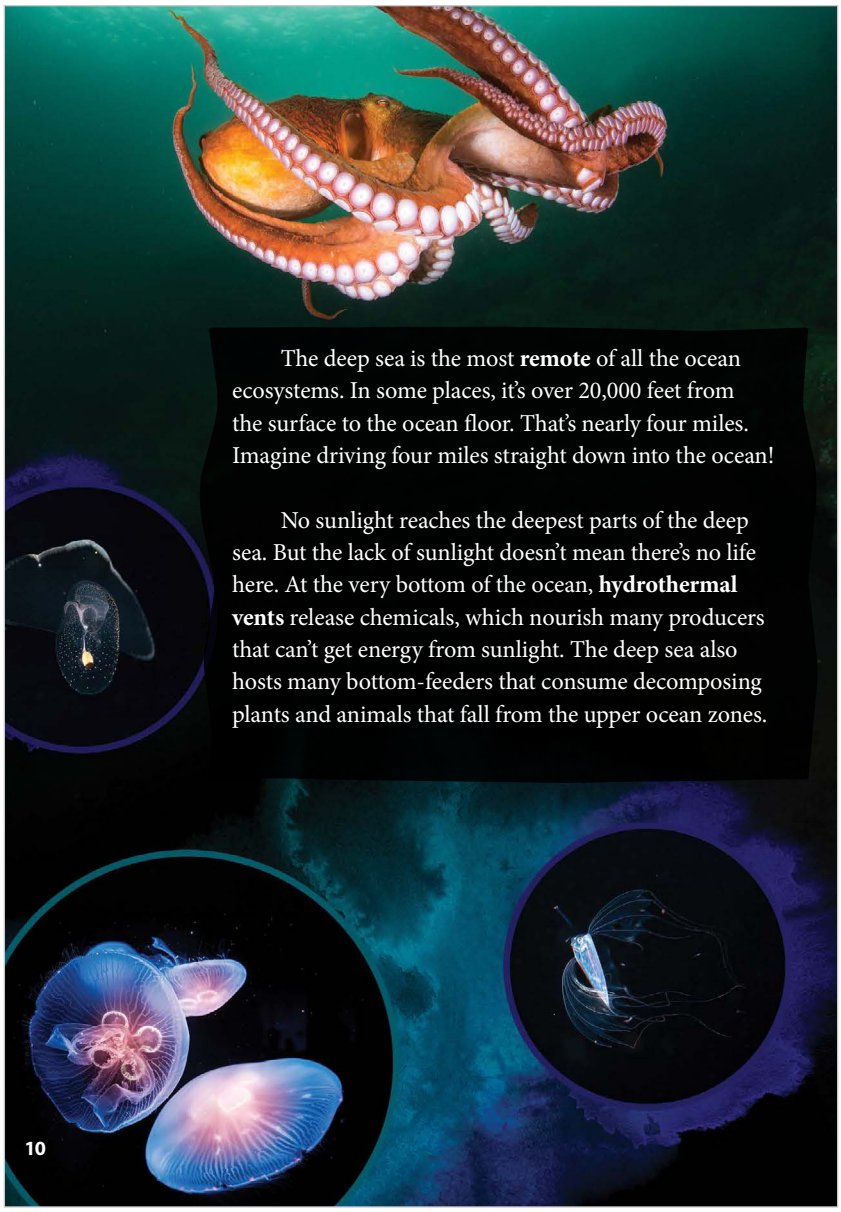
Inferential. Why does this happen?

» As tides rise and fall the amount of water in the estuary changes the amount of salt in the water.

- Continue reading, starting with the last paragraph of page 8.

Most of the animals in the open ocean live close to the surface, where there's sunlight. Tiny producers, including plankton, nourish themselves from the sun. Consumers also live close to the surface, so they can feed on the plankton.

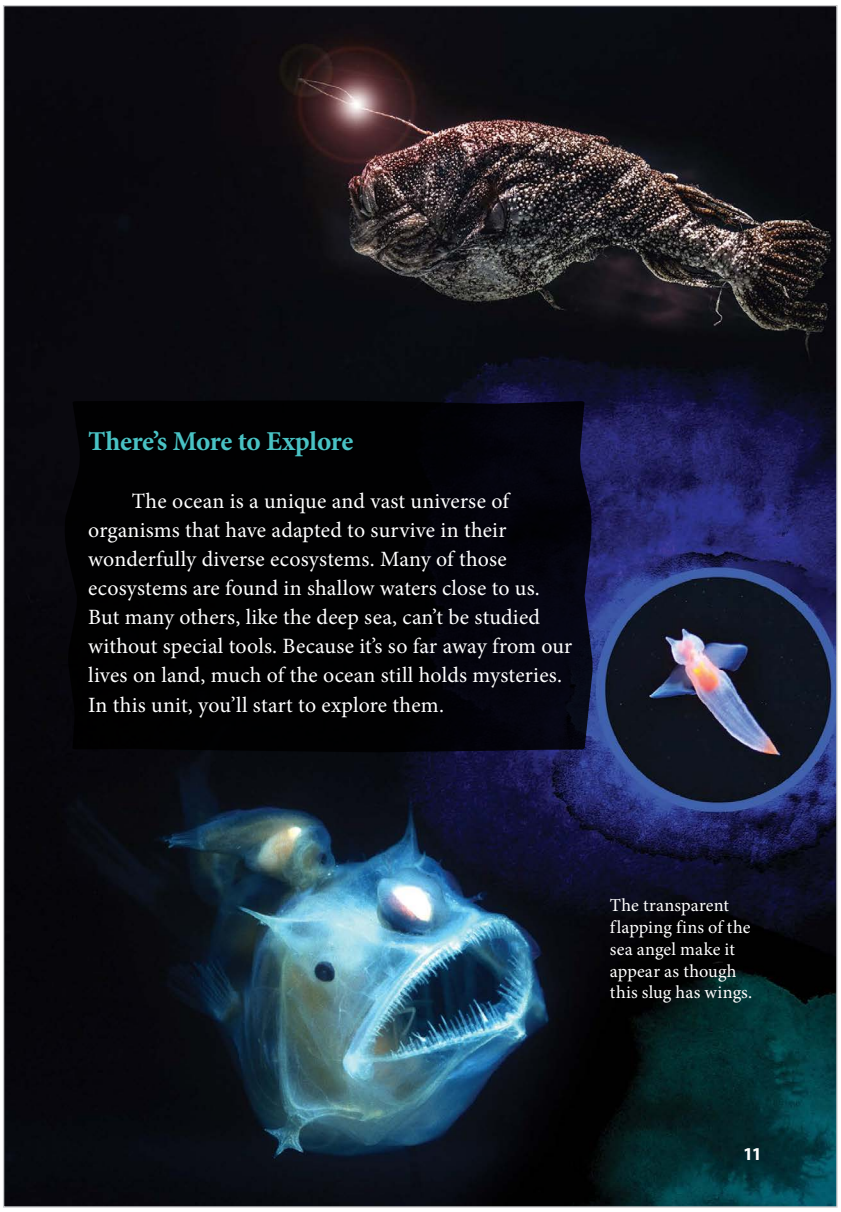
Adult white sharks can grow over 20 feet long!



Inferential. Why do some organisms live near the surface of the water?

» The surface of the water has more sunlight for photosynthesis which means more life can live there, including food sources.

- Finish reading chapter 1 aloud.



- After reading chapter 1, engage in a discussion using the following questions.

1. **Literal.** Describe some of the ocean ecosystems from the chapter. Include quotations from the text in your response.
    - » Answers may vary but could include text-based details about coral reefs, kelp forests, estuaries, mangrove forests, the open ocean, and the deep sea.
2. **Literal.** What is the difference between a biotic and an abiotic factor in an ecosystem? Use examples from the text to support your answer.
    - » Biotic factors are living things like fish, algae, and bacteria. Abiotic factors are nonliving things such as sunlight, salt levels, and soil.

D Differentiation

Support

Direct students to a portion of the text where they can find evidence to support their response.

3. **Inferential.** What makes life in the ocean so diverse? Use examples from the text to support your answer.
    - » Answers may vary but could include the variety of conditions in different ecosystems including temperature, ocean depth, amount of sunlight, and different plant and animal organisms in the food webs. For example, the kelp forest has sunlight that allows kelp to grow and provide food and shelter for other organisms in the ecosystem.
4. **Evaluative.** What ecosystems are more challenging to study than others and why? Use examples from the text to support your answer.
    - » Answers may vary but could include that some ecosystems are hard to reach, such as the deep sea, while some, such as estuaries, are easy to reach because they meet with the land.

ML/EL **MULTILINGUAL/ENGLISH LEARNERS**

Interacting in Meaningful Ways

Reading Closely

Entering/Emerging	Use images from the ecosystem tour or Reader to support responses during the reading discussion. For example, students may point to an image of an ecosystem to identify characteristics named in the text.
Transitioning/ Expanding	Display additional descriptive vocabulary from the text to support responses during the reading discussion. Include words directly from the Reader text to promote text-supported responses such as *colorful, hot, cold, leafy, brackish, tangled*.
Bridging	Provide the reading comprehension questions in advance to allow students to preview the expected discussion.

WORD WORK: *CHARACTERISTICS* (5 MIN.)

1. In the chapter you will read, "The organisms who can survive in these deepest ocean zones have some very unusual characteristics."
2. Say the word *characteristics* with me.
3. Characteristics are traits or properties that describe something.
4. My favorite characteristics of flowers are their lovely smells and bright colors.
5. What are some characteristics about the ocean or ocean life that you already know about? Be sure to use the word *characteristics* in your response.

- Ask two or three students to use *characteristics* in a sentence. If necessary, guide and/or rephrase students' responses to make complete sentences: "Some characteristics of the ocean (or ocean life) are _____."

6. What part of speech is the word *characteristics*?
    - » noun

Use a Making Connections activity for follow-up. Say, "I am going to read several groups of words. Decide which word is the object and which are the characteristics of that object. Then use the words in a sentence with the term *characteristics* to correctly link the words."

- furry, paws, dogs
    - » The characteristics of most dogs include being furry and having paws
- popsicle, icy, stick
    - » Being icy and on a stick are characteristics of popsicles.
- fire, heat, smoke
    - » Heat and smoke are characteristics of fire.

COMPARING ECOSYSTEMS (15 MIN.)

Small Group

- Direct students to the Characteristics of Ocean Ecosystems chart on Activity Page 1.1.
- Read the directions together and add one entry to the chart as a class.
- Model for students using the following think-aloud:
    - Ask, "What is a characteristic that all ocean ecosystems have?"
        - » Answers may vary, but could include examples such as fish, algae, bacteria, salt, sunlight, and soil.
    - Say, "Those are all excellent suggestions. I am going to record the first common characteristic that I read under the heading 'Abiotic Factors of the Ocean.' The text states that all ocean ecosystems have producers, consumers, and decomposers. I'm going to write producers, consumers, and decomposers in the Similar Characteristics of Ocean Ecosystems column."
    - Ask, "What is a characteristic that is unique to one ocean ecosystem?
        - » Answers may vary, but could include examples such as brackish water in estuaries.

Activity Page 1.1

- Say, "Those are also excellent suggestions. I am going to write a unique characteristic for coral reef here on the right in the Unique Characteristics of Ocean Ecosystems column. In the text, under the heading, 'An Introduction to Six Ecosystems,' I read that a coral reef has coral that looks like colorful rock. I'm going to write coral, looks like colorful rock in the right column."
- Ask, "What questions do you have about recording characteristics on this graphic organizer?"

- Answer student questions, briefly, before proceeding.
- Direct students to gather in the groups they were in for the ecosystem tour and complete Activity Page 1.1 in their groups.
- Bring the class together to share their work.
- Collect Activity Page 1.1.

Lesson 1: Introducing Ocean Ecosystems and Their Inhabitants

Language

Primary Focus: Students will analyze the meanings of words using their knowledge of the word part *bio–*. **[L.5.4b]**

MORPHOLOGY: *BIO*— (10 MIN.)

- Tell students that they are going to start working with the prefix *bio–*. Explain that *bio–* means life.
- Write the word *biology* on the board.
- Ask, "Can a volunteer tell us what this means?"
  - » the study of life
- Circle *bio–*. Say, "This part means *life* and *–ology* means the study of something. Together this word means the study of life. Let's look at another *bio–* word."
- Write the word *biography* on the board.
- Ask, "Can a volunteer tell us what this means?"
  - » the story of someone's life
- Circle *bio–*. Say, "We just learned that *bio–* means life. *–graph–* means to write. Together this word means a story about someone's life.

- Ask students, "What is a prefix?"
  - » a syllable or syllables placed at the beginning of a root word to change the word's meaning
- Write *biotic* and *abiotic* on the board.
- **Turn and Talk:** Have students discuss with a neighbor the following questions.
  - Do either of these words use *bio–* as a prefix? How do you know?
    - » Neither use *bio–* as a prefix. *Bio–* appears at the beginning of biotic, but the ending 'tic' is not a root word on its own. *Bio–* appears in the middle of abiotic so it is not in the correct place to be a prefix.
- Have a few students share their partner's thoughts with the class.
- Remind students to signal when both partners have contributed to the conversation.
- Say, "Let's make some more *bio–* words."

Visual Support 1.8

- Display Visual Support 1.8.
- Explain that in this activity *bio–* will be used as a prefix.
- Read the directions: "Add the prefix *bio–* to the word parts listed on the left. Using what you just learned about the meaning of *bio–*, match the word to its definition."
- Tell students to write the *bio–* words independently and determine the matching definition.
- **Think-Pair-Share:** After finishing, have students think about the words they have made and discuss the definitions with a neighbor.
- Remind students to signal when both partners have contributed to the conversation.
- Review the correct responses.
  - *biochemist*
  - *biodegradable*
  - *biofuel*
- Point to the first definition on Visual Support 1.8 and ask a student to share the word their partner made to match the definition.
- Repeat this procedure for all three *bio–* words on Visual Support 1.8.

End Lesson

D Differentiation

Support

Provide a copy of Visual Support 1.8, as needed, for students to follow along at their seats. You may choose to mark up the copy to match the instruction on the board for additional support.

Lesson 1: Introducing Ocean Ecosystems and Their Inhabitants

Take-Home Material

TAKE-HOME LETTER

- Caregiver Letter: this overview can be found in the program's online resources.

LESSON

2

Underwater Food Web

PRIMARY FOCUS OF LESSON

Reading

Students will take notes while they read an informational text exploring an ecosystem's food web and the roles of producers, consumers, and decomposers. **[RI.5.1]**

Students will demonstrate an understanding of the Tier 2 word *primary*. **[L.5.4]**

Writing

Students will use their notes to write a paragraph explaining one example of a food web. **[W.5.2b, W.5.2d]**

Language

Students will apply grade-level phonics and word analysis skills to decode and encode targeted spelling words. **[RF.5.3a]**

FORMATIVE ASSESSMENT

Activity Page 2.1	**Writing About Food Webs** Write a paragraph explaining how energy moves through a specific food web using details and vocabulary from the text. **[W.5.2b]**

Teacher Presentation Screens:
all lessons include slides

LESSON AT A GLANCE

	Grouping Recommendations	Time	Materials
Reading (45 min.)			
Read-Aloud: Chapter 2	Whole Group/ Partner	40 min.	❑ *Life in the Fathoms*
Word Work: *Primary*	Whole Group	5 min.	
Writing (30 min.)			
Write a Paragraph	Whole Group/ Independent	30 min.	❑ Visual Supports 2.1, 2.2 ❑ Activity Pages 2.1, 2.2
Language (15 min.)			
Spelling: Introduce Spelling Words	Whole Group	15 min.	❑ Activity Pages 2.3, 2.4

ADVANCE PREPARATION

Reading

- Prepare partners for shared note-taking.

Writing

Visual Support 2.1

- Prepare to display Visual Support 2.1 on a surface that can be written on.
- Prepare three colored dry erase markers for annotating Visual Support 2.1.

Language

- Prepare an area to write and display the spelling words. The spelling word display should be easily visible from student work areas during spelling lessons. A portable surface, such as chart paper, is recommended.

Universal Access

Writing

- Provide individual copies of Visual Support 2.1. An annotated copy that matches the instruction may be used for additional support.

VOCABULARY PREVIEW

- You may choose to preview the vocabulary words before reading the text.

aquatic, adj. related to being in or on water

absorbing, v. taking in

trophic level, n. a level of food web where all the organisms are the same level away from the primary producers

primary, adj. first in order or importance

secondary, adj. second in order or importance

tertiary, adj. third in order or importance

quaternary, adj. fourth in order or importance

detritus, n. loose or broken down natural material

detritivore, n. an organism that feeds on dead matter

symbiotic, adj. having a close, cooperative relationship

food web, n. an interconnected system of food sources between producer, consumer, and decomposer organisms

"Vocabulary Chart for Chapter 2 "Underwater Food Web: Producers, Consumers, and Decomposers"			
Vocabulary Type	**Tier 3 Domain-Specific Words**	**Tier 2 General Academic Words**	**Tier 1 Everyday Speech Words**
Core Vocabulary	aquatic trophic level detritus detritivore symbiotic food web	absorbing primary secondary tertiary quaternary	
Spanish Cognates	acuático absorbiendo nivel trófico detrito simbiótico	primario secundario terciario	
Multiple-Meaning			
Sayings and Phrases			

Start Lesson

Lesson 2: Underwater Food Web

Reading

45M

Primary Focus

Students will take notes while they read an informational text exploring an ecosystem's food web and the roles of producers, consumers, and decomposers. **[RI.5.1]**

Students will demonstrate an understanding of the Tier 2 word *primary*. **[L.5.4]**

READ-ALOUD: CHAPTER 2 (40 MIN.)

Introduce the Chapter

- Tell students you will begin chapter 2, "Underwater Food Web: Producers, Consumers, and Decomposers," by reading aloud.
- Direct students to follow along in their Reader as you read.
- Have students turn to the table of contents, locate the chapter, and then turn to the first page of the chapter.
- Preview the vocabulary words before reading the chapter.
- Remind students that each vocabulary word is bolded the first time it appears in the chapter. These words are also in the glossary, which they may refer to at any time.

Read Chapter 2, "Underwater Food Web: Producers, Consumers, and Decomposers"

- Have one student read The Big Question at the beginning of the chapter. Ensure students understand the meaning of The Big Question before reading the chapter.
    - What role does energy play in food webs?
- Ask, "What is meant by "energy" in a food web?"
    - » Answers may vary but could include that energy in a food web refers to the energy from the sun for photosynthesis, chemicals from hydrothermal vents for chemosynthesis, or energy from other organisms when they are eaten.
- Tell students that throughout the unit they will be writing about the information they are learning in the Reader chapters.

- Direct students to Activity Page 2.1.
- Explain that they will use the graphic organizer on Activity Page 2.1 to record their notes.
- Ask students, "What do the headings on this T-chart tell you needs to be recorded?"
  - » main topics and supporting details
- Direct students to the first page of chapter 2.
- Ask students, "What text feature could be used to predict main topics you'll read about in this informational text?"
  - » headings
- Ask students, "Using the headings, what topics can we expect to read about in this chapter?"
  - » Answers may vary but could include the trophic pyramid, producers and consumers, decomposers and detritivores, food webs.
- Tell students that they will work with a partner to record notes on Activity Page 2.1 while reading the chapter.
- Arrange students in the partners that were prepared in advance.
- Read the first paragraph of chapter 2 aloud.

Activity Page 2.1

Chapter 2

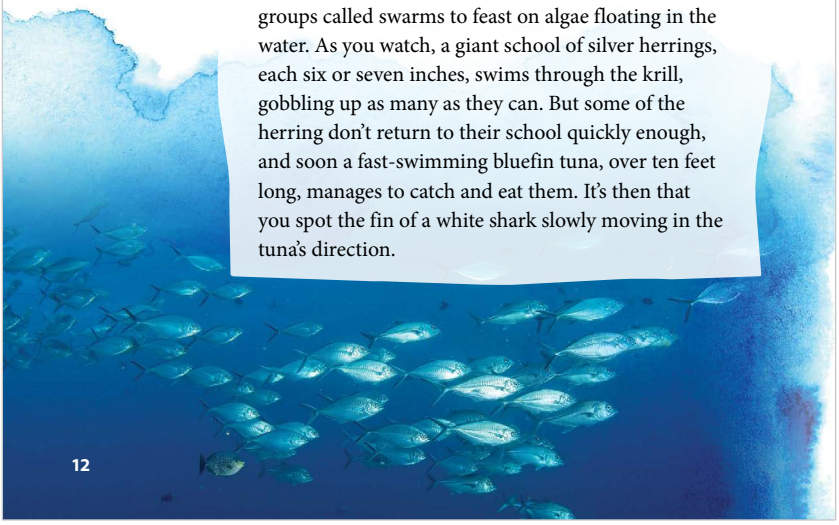
Underwater Food Web: Producers, Consumers, and Decomposers

THE BIG QUESTION

What role does energy play in food webs?

In the last lesson, we imagined we were snorkeling in a coral reef. Now, imagine that you're snorkeling in a different ecosystem altogether: the open ocean. This time there's no coral to study. Instead, you're looking at five organisms: algae, krill, herring, bluefin tuna, and great white sharks.

Krill are small crustaceans—that is to say, **aquatic** animals with hard exoskeletons, like insects. Krill resemble tiny shrimp, and they gather in large groups called swarms to feast on algae floating in the water. As you watch, a giant school of silver herrings, each six or seven inches, swims through the krill, gobbling up as many as they can. But some of the herring don't return to their school quickly enough, and soon a fast-swimming bluefin tuna, over ten feet long, manages to catch and eat them. It's then that you spot the fin of a white shark slowly moving in the tuna's direction.



12

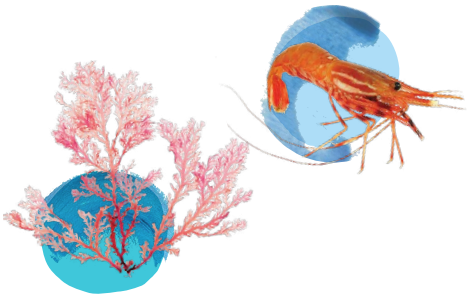
Literal. What food chain is energy moving through in this paragraph?

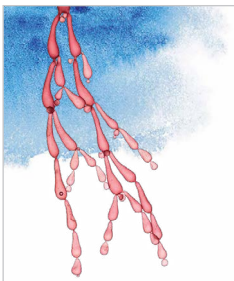
» Answers may vary but could include that energy moves from algae to tuna to shark in this food chain.

- Continue reading pages 12 and 13.

Eating is how animals gain energy to live. Plants may gain energy by **absorbing** nutrients from the sunlight and soil, but most animals can't live on dirt and sunshine. They need to feed on other organisms.

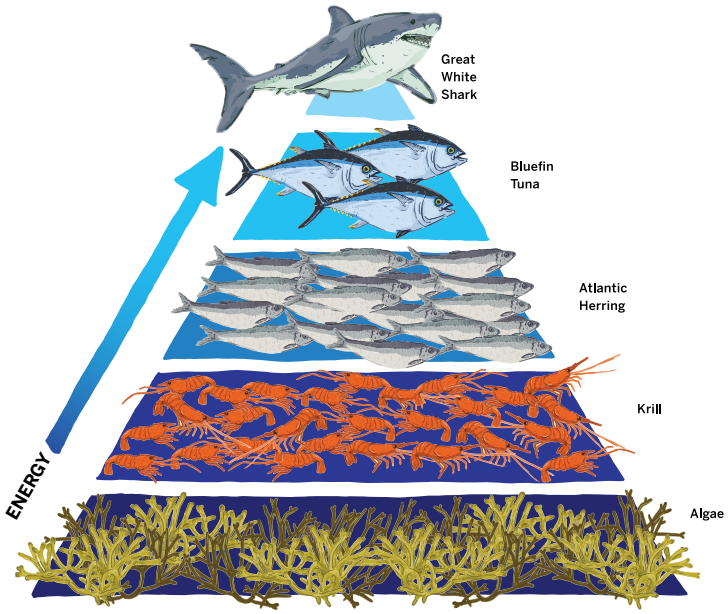
All animals need to eat. But over time, most animals have adapted to eat only certain kinds of organisms. The energy a great white shark gets from eating a tuna ultimately comes from algae, but algae are not something a great white likes to hunt. As it turns out, being a picky eater is completely natural.





What Is the Trophic Pyramid?

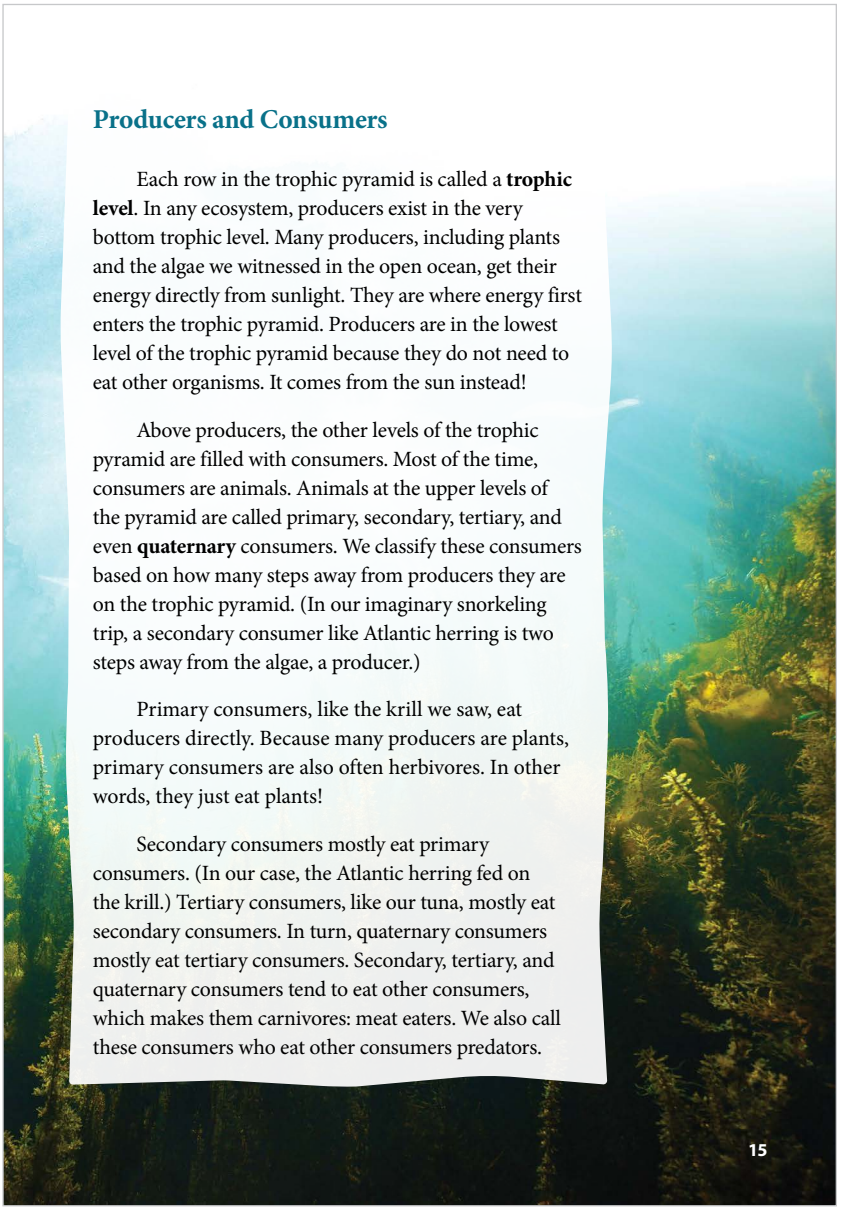
If you want to know who is eating who in the animal kingdom, whether on land or in the water, there is only one place to look: the trophic pyramid. Biologists use the trophic pyramid to model how animals get their energy. As you have learned, producers, consumers, and decomposers make up the key biotic factors in an ecosystem. The trophic pyramid lets us describe the relationships between these organisms in more detail. This gives us a better picture of just how the biotic factors in each ecosystem work.



14

- Direct students' attention to the heading of the next section on page 14, "What is the Trophic Pyramid".
- Ask a student to read the heading aloud.
- **Think-Pair-Share:** Have students discuss with their partner what they predict about the connection between food chains and the trophic pyramid.
- Remind students to signal when both partners have contributed to the conversation.
- Have students share one idea from their partner, and write these thoughts on the board.

- Ask students, "What do you and your partner predict is the main topic of this paragraph on page 14?"
  - » the trophic pyramid
- Explain that often the main topic matches the heading, but not always. As they listen, have students consider if the details they hear match the main idea "trophic pyramid."
- Continue reading chapter 2 aloud.
- Ask students, "Was your prediction correct?"
  - » yes
- Have students record the main topic, trophic pyramid, on Activity Page 2.1.



Producers and Consumers

Each row in the trophic pyramid is called a **trophic level**. In any ecosystem, producers exist in the very bottom trophic level. Many producers, including plants and the algae we witnessed in the open ocean, get their energy directly from sunlight. They are where energy first enters the trophic pyramid. Producers are in the lowest level of the trophic pyramid because they do not need to eat other organisms. It comes from the sun instead!

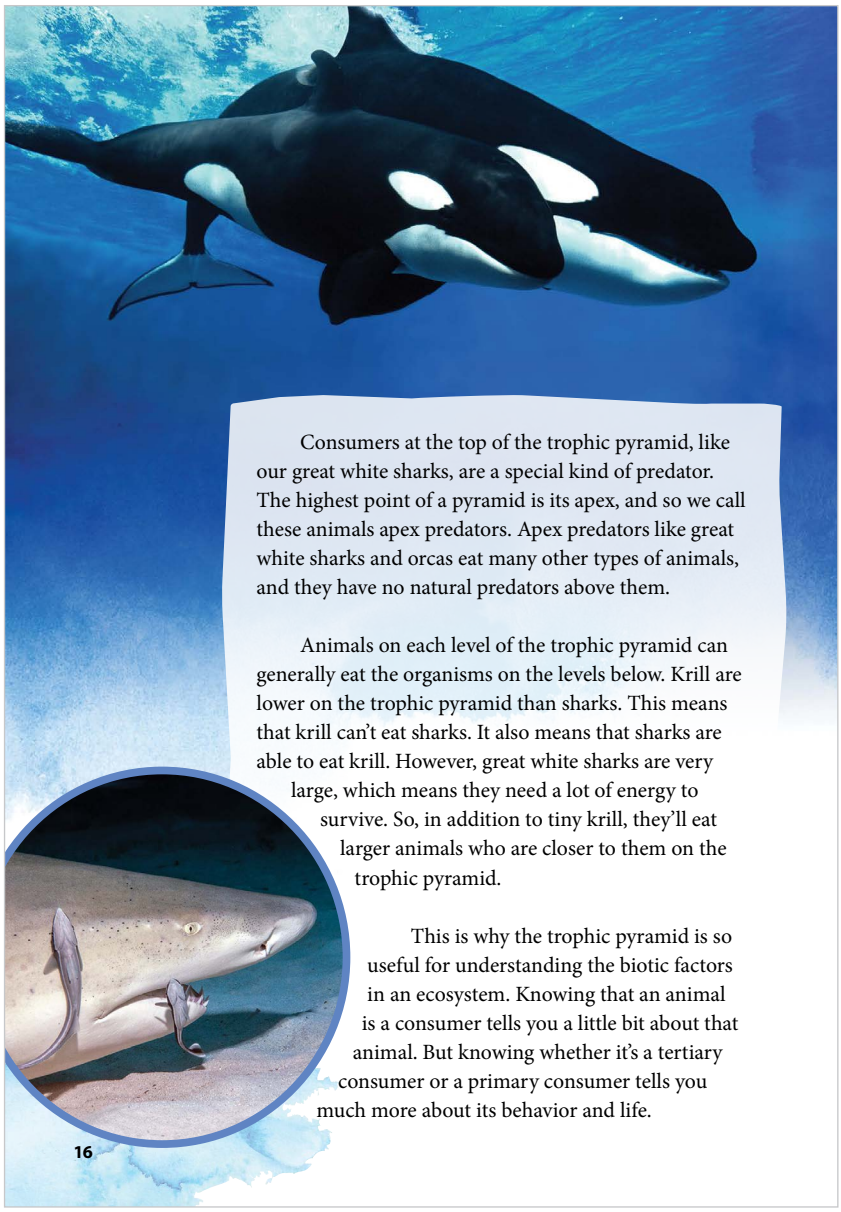
Above producers, the other levels of the trophic pyramid are filled with consumers. Most of the time, consumers are animals. Animals at the upper levels of the pyramid are called primary, secondary, tertiary, and even **quaternary** consumers. We classify these consumers based on how many steps away from producers they are on the trophic pyramid. (In our imaginary snorkeling trip, a secondary consumer like Atlantic herring is two steps away from the algae, a producer.)

Primary consumers, like the krill we saw, eat producers directly. Because many producers are plants, primary consumers are also often herbivores. In other words, they just eat plants!

Secondary consumers mostly eat primary consumers. (In our case, the Atlantic herring fed on the krill.) Tertiary consumers, like our tuna, mostly eat secondary consumers. In turn, quaternary consumers mostly eat tertiary consumers. Secondary, tertiary, and quaternary consumers tend to eat other consumers, which makes them carnivores: meat eaters. We also call these consumers who eat other consumers predators.

15

- Continue to read the rest of the chapter aloud following the same procedure, asking students to predict and record main topics for each section of text.



Consumers at the top of the trophic pyramid, like our great white sharks, are a special kind of predator. The highest point of a pyramid is its apex, and so we call these animals apex predators. Apex predators like great white sharks and orcas eat many other types of animals, and they have no natural predators above them.

Animals on each level of the trophic pyramid can generally eat the organisms on the levels below. Krill are lower on the trophic pyramid than sharks. This means that krill can't eat sharks. It also means that sharks are able to eat krill. However, great white sharks are very large, which means they need a lot of energy to survive. So, in addition to tiny krill, they'll eat larger animals who are closer to them on the trophic pyramid.

This is why the trophic pyramid is so useful for understanding the biotic factors in an ecosystem. Knowing that an animal is a consumer tells you a little bit about that animal. But knowing whether it's a tertiary consumer or a primary consumer tells you much more about its behavior and life.

16

- After reading pages 15 and 16 aloud, direct students to the illustration of the trophic pyramid on page 14.

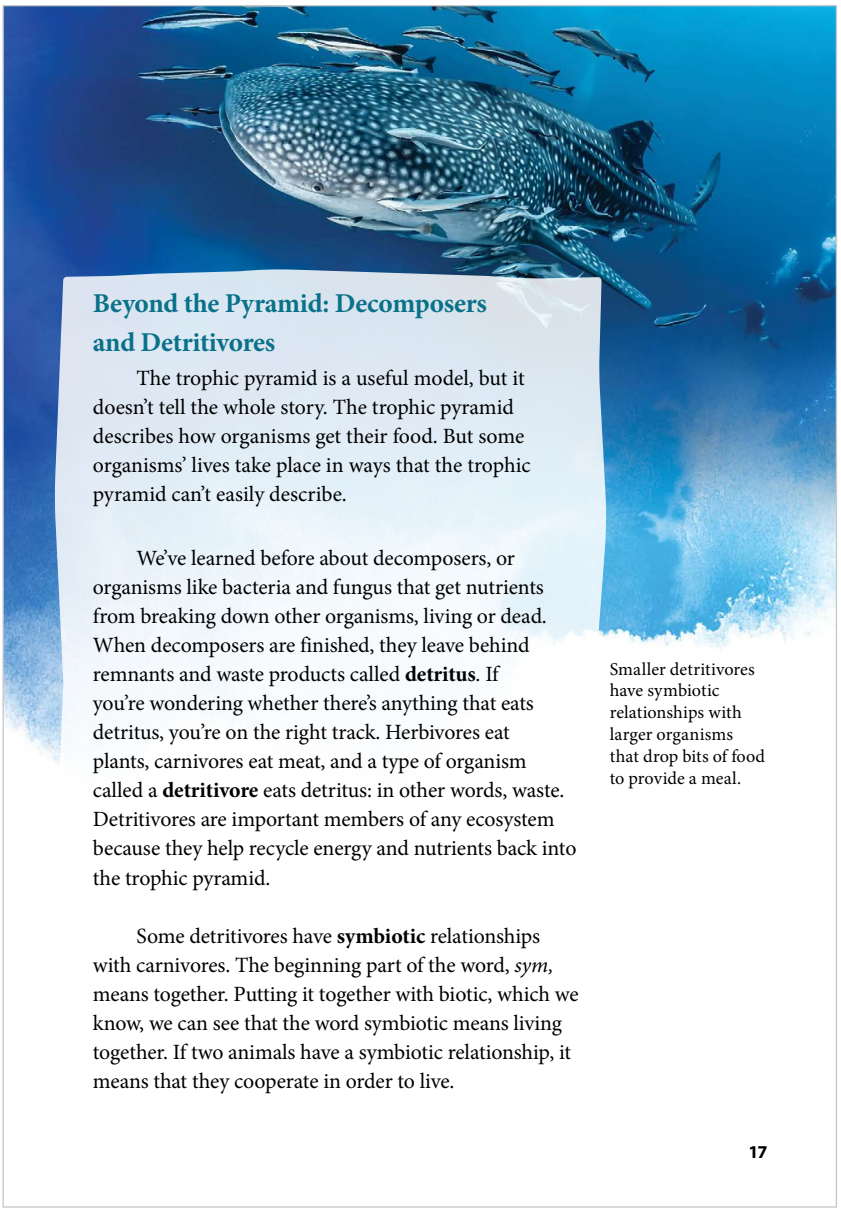
Evaluative. How does this pyramid shape, larger on the bottom and smaller on the top, represent energy in these food webs?

» Organisms at the top of the pyramid consume the energy of the organisms beneath them in the pyramid.

- Remind students that organisms in the food web are categorized by how they obtain their energy, usually from the sun.

Literal. How do producers obtain energy? What about consumers?

» Producers make, or produce, food directly from the energy of sunlight. Consumers eat producers and absorb their energy.



Beyond the Pyramid: Decomposers and Detritivores

The trophic pyramid is a useful model, but it doesn't tell the whole story. The trophic pyramid describes how organisms get their food. But some organisms' lives take place in ways that the trophic pyramid can't easily describe.

We've learned before about decomposers, or organisms like bacteria and fungus that get nutrients from breaking down other organisms, living or dead. When decomposers are finished, they leave behind remnants and waste products called **detritus**. If you're wondering whether there's anything that eats detritus, you're on the right track. Herbivores eat plants, carnivores eat meat, and a type of organism called a **detritivore** eats detritus: in other words, waste. Detritivores are important members of any ecosystem because they help recycle energy and nutrients back into the trophic pyramid.

Some detritivores have **symbiotic** relationships with carnivores. The beginning part of the word, *sym*, means together. Putting it together with biotic, which we know, we can see that the word symbiotic means living together. If two animals have a symbiotic relationship, it means that they cooperate in order to live.

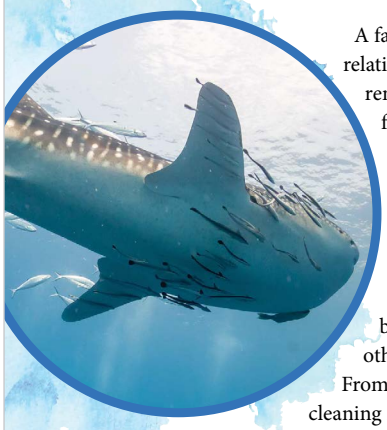
Smaller detritivores have symbiotic relationships with larger organisms that drop bits of food to provide a meal.

17

Inferential. What do the additional labels, primary, secondary, tertiary, and quaternary, tell us about where an organism fits into the food web?

» These labels show at what level of the trophic pyramid they consume energy. Primary consumers are one step away from producers, secondary consumers are two steps away and so on.

- Continue reading the chapter aloud.



Remora use special suction cups to attach themselves to larger organisms and catch a ride, eating their leftovers on the way.

A famous example of symbiosis is the relationship between great white sharks and remoras. A remora is a type of detritivore fish with a suction cup just below its head. Remoras use these suction cups to attach themselves to other animals, including great white sharks. Though a shark could easily eat a remora, they rarely do so. This is because when a remora attaches itself to a shark, it begins to eat dead skin, parasites, and other waste products from the shark's body. From the shark's point of view, the remora is cleaning it. From the remora's point of view, the shark is an easy source of food.

This relationship between remoras and sharks is symbiotic because it benefits both animals. Great white sharks aren't flexible enough to clean themselves, so without the remoras they might get sick. Remoras aren't very well suited to catching food on their own, so without the sharks they would go hungry. But because of the symbiosis between these two animals, they're both able to thrive.

Webs Below the Waves

Whether animals are eating each other or helping each other, they're all part of a set of relationships called a **food web**. Food webs are another model, like the trophic pyramid, that helps us understand more about how different organisms in an ecosystem behave. It also helps us understand how energy moves between different organisms when one eats another.

18

- Explain that this part of the text discusses ways organisms work together in an ecosystem, besides passing along energy as food.

Literal. What is a relationship that benefits both organisms called? Explain the example from the text. Include quotations in your response.

» Symbiotic. The example in the text is remoras and great white sharks. Quotations from the text may vary but could include, "From the shark's point of view, the remora is cleaning it. From the remora's point of view, the shark is an easy source of food."

Check for Understanding

Ask students to give a thumbs up or thumbs down to indicate whether or not the following examples are symbiotic relationships that benefit both organisms:

The stinging sea anemone protects clownfish who are immune to their stings and the clownfish clean the sea anemone by eating leftover bits of prey off of it.

» thumbs up

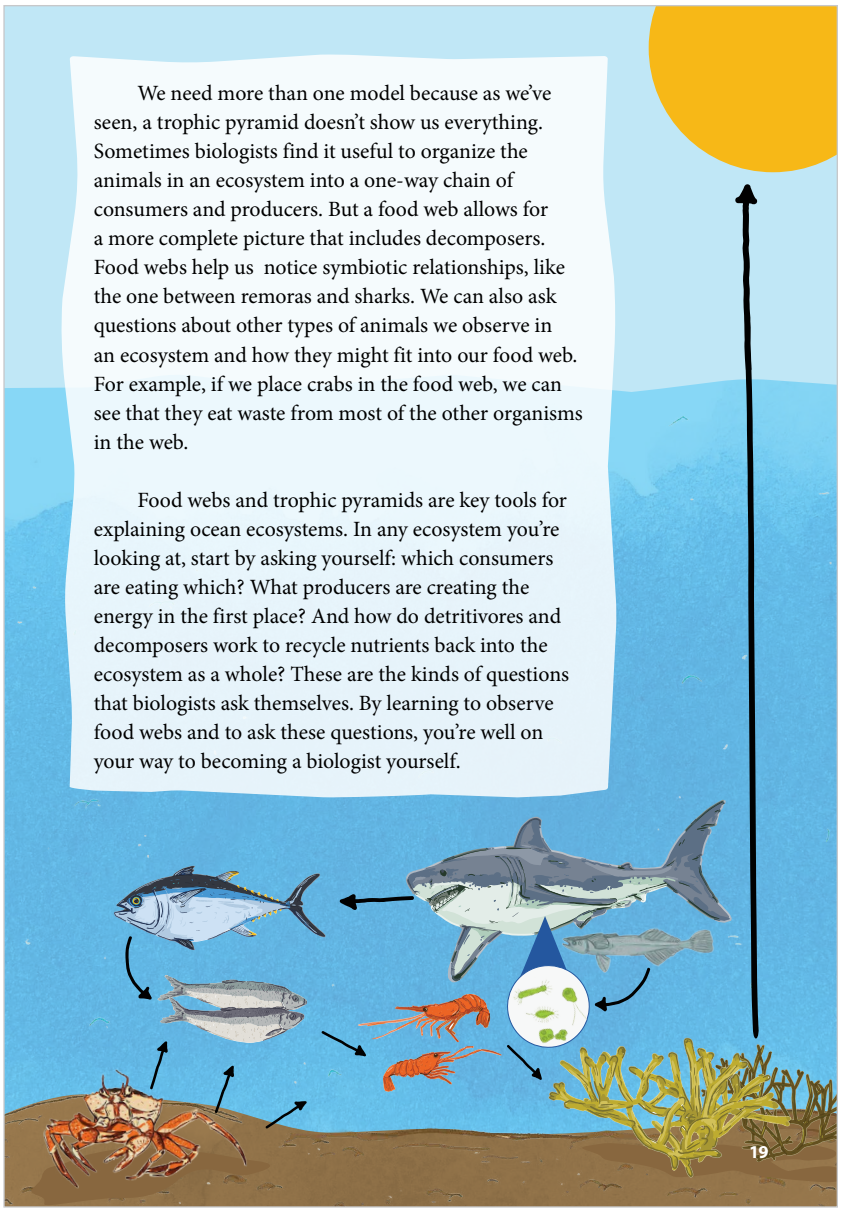
Isopods attach to a fish's tongue and drink its blood until the fish is too weak to live.

» thumbs down

Algae live, protected, inside the structure of hard coral and produce nutrients through photosynthesis that the coral can use as food.

» thumbs up

- Have student partners finish reading the chapter together.



- After reading chapter 2 aloud, prompt partners to reread the chapter, filling in supporting details from the text on Activity Page 2.1.
- Remind students that supporting details tell the reader more about the topic and often include examples.
- Remind students that when they take a quotation directly from the text for their notes, they should use quotation marks.
- After students reread chapter 2 with their partners, engage in a discussion using the following questions.

1. **Literal.** What are the main topics of this chapter that you recorded on Activity Page 2.1?
    - » The trophic pyramid, producers, consumers, and decomposers, and food webs
    - Direct students to the illustration of the trophic pyramid in the Reader to assist students with their responses to discussion questions 2 and 3.
2. **Inferential.** Expand the sentence, using the answers to *why* and *how* to explain the trophic pyramid. Include details from the text, such as vocabulary words or specific animals.

    The trophic pyramid has levels.

    - » Answers may vary but could include sentences such as:

      Why: to organize organisms in a food web

      How: using levels by type of producer and consumer

      Expanded sentence: The trophic pyramid organizes organisms of a food web into three levels by the type of producer and consumer.
3. **Inferential.** What is the difference between a food web and a food chain?
    - » Answers will vary but could include that food chains are more simple, showing a single path from a producer to consumers. A food web shows how energy is recycled by detritivores and gives a more complete picture of how many organisms interact.

ML/EL **MULTILINGUAL/ENGLISH LEARNERS**

Speaking and Listening

Exchanging Information and Ideas

Entering/Emerging	Have students discuss their understanding of producers, consumers, and decomposers with a partner.
Transitioning/ Expanding	Encourage students to use the question as the base for their response sentence starter and the word *because* to include supporting details. This may sound like "The main idea of this text is . . . because . . ."
Bridging	Provide students with key words from the question to use in their explanations or answers. Examples include *producers*, *consumers*, *decomposers*, *trophic pyramid*, *food web*, *food chain*, and *organisms*.

WORD WORK: *PRIMARY* (5 MIN.)

1. In the chapter you read, "Primary consumers, like the krill we saw, eat producers directly."
2. Say *primary* with me.
3. *Primary* means first in order or in importance.
4. My *primary* job as the goalie is to guard the net.
5. What are some animals in a food web? Be sure to use the word *primary* in your response.
   - Ask two or three students to use the target word in a sentence. If necessary, guide and/or rephrase students' responses to make complete sentences:

     "A *primary* animal in the coral reef food web is _____."

6. What part of speech is the word *primary*? *(adjective)*

   Use a Discussion activity for follow-up. Ask students to talk with their partners about what goals are first in order of importance to them when they have a free afternoon. For instance, students may discuss relaxing, organizing or decorating their space, or spending time with friends. Make sure students use the word *primary* in complete sentences as they discuss.

Lesson 2: Underwater Food Web

Writing

Primary Focus: Students will use their notes to write a paragraph explaining one example of a food web. **[W.5.2b, W.5.2d]**

WRITE A PARAGRAPH (30 MIN.)

- Explain that students will now use their knowledge of food webs to write an informational paragraph.
- Tell students that they will start by looking at an example of an informational paragraph, similar to what they will be writing.

Visual Support 2.1

- Display Visual Support 2.1 and read the model paragraph aloud.

Activity Page 2.1

- Ask, "What is the topic of this paragraph?"
  - » ocean ecosystems
- Explain that strong informational paragraphs do more than simply teach about a topic. Informational paragraphs usually teach something specific *about* the topic.
- Ask, "What is the purpose of a topic sentence?"
  - » Answers may vary but could include that the topic sentence tells the reader what the paragraph is primarily about.
- Ask students to find the topic sentence.
  - » "Oceans contain many places for living creatures to call home, known as ecosystems."
- Explain that the topic sentence of an informational paragraph often states the main idea, or point, about the topic presented. In this topic sentence, the author made a point about the topic, ocean ecosystems.
- Tell students that supporting detail sentences tell the reader more about the main idea and often include examples.
- Ask students, "Which sentences include details that support the topic sentence?"
  - » An ecosystem is a complex system of living things that rely on each other. One example of an ocean ecosystem is a tide pool. Tide pools are shallow areas of water that can contain animals such as snails and crabs as well as plants such as seagrass and algae.
- Tell students that often the concluding sentence of an informational text restates the main idea using different words or wraps up the paragraph. It may include a little of the supporting detail information to wrap things up. It should make it clear to the reader that the paragraph is finished.
- Ask students to find the concluding sentence.
  - » "The ocean contains many more interesting ecosystems filled with other amazing creatures for us to discover."
- Direct students to their copy of Activity Page 2.1.
- Read the writing prompt aloud.
- Tell students that their goal is to explain how food webs work so that anyone could understand, even if they did not read chapter 2.
- Tell students that they need to include:
  - a simple definition of a food web,
  - the different levels of a food web, using the new vocabulary, and

D Differentiation

Support

If students cannot find enough information in their notes on Activity Page 2.1, direct them to skim read chapter 2 for additional information and add it to their notes.

Challenge

Have students check their writing for repetitive sentences and revise as needed.

- examples of animals at each food web level.

- **Turn and Talk:** Have students share details from their notes that they think will work in a paragraph responding to the prompt.
- Remind students to signal when both partners have contributed to the conversation.
- Ask a few students to share what their partner shared from their notes.
- Have students underline or highlight useful information in their notes from chapter 2 that could be used in their paragraph.

Check for Understanding

Ask students to name the three basic parts of a paragraph.

» topic sentence, supporting detail sentences, conclusion sentence

- Direct students to the first line of notes on Activity Page 2.1 that were recorded while reading chapter 2.
- Model turning these notes into sentences with a think-aloud. Say:
  - "This main topic in my notes is the trophic pyramid."
  - "I also have recorded details about the trophic pyramid in the column beside it."
  - "Based on the supporting details I collected, what point do I want to make about the trophic pyramid? What is my main idea?"
  - "I can use these key words and phrases to create a sentence."
  - "For example, I could combine the key words *trophic pyramid* and the phrase 'how animals get their energy' to make the sentence, 'The trophic pyramid shows how animals get their energy in their food web.'
- When they are ready, direct students to turn their notes into sentences to create their paragraph.
- Encourage students to refer to the model paragraph in Visual Support 2.1 while they are working.

Activity Page 2.2

Visual Support 2.2

- After students finish writing their paragraphs, display Visual Support 2.2 and direct students to their own copy on Activity Page 2.2.
- Explain that they will use this checklist throughout the unit for different writing assignments, including their final assignment at the end of the unit.
- Tell students that today they should use the editing checklist to check their work for errors before it is collected.
- Explain that they will practice using the revision checklist in later lessons, but not today.
- Collect student work when complete.

D Differentiation

Support

Provide a copy of the crossword with some letters filled in.

Challenge

Provide a copy of the crossword that only shows the puzzle grid and word bank, but with blank word clues. Have students fill in the definitions using their own words.

ML/EL MULTILINGUAL/ENGLISH LEARNERS

Interacting in Meaningful Ways

Writing

Entering/Emerging	Provide direct student support generating sentences based on the graphic organizer by modeling how to change notes into sentences using the students' own notes.
Transitioning/ Expanding	Provide sentence stem and sentence frames to support writing. Examples: _____ is a (producer/consumer/decomposer). _____is on the _____ level of the trophic pyramid. I know_____because_____.
Bridging	Provide key words for students to discuss and use in the paragraph such as; *food web*, *producers*, *consumers*, *decomposers*, *trophic pyramid*, *energy*.

Lesson 2: Underwater Food Web

Language

15M

Primary Focus: Students will apply grade-level phonics and word analysis skills to decode and encode targeted spelling words. **[RF.5.3a]**

Activity Page 2.3

SPELLING: INTRODUCE SPELLING WORDS (15 MIN.)

- Direct students to Activity Page 2.3.
- Explain that students will practice ten words related to content in the Reader. These words do not follow one single spelling pattern. Tell students they will

be assessed on these words and will write a dictated sentence related to one or more of these words, later in the unit, in Lesson 6.

- Introduce the words by writing them on the board/chart paper. Say the word aloud, and then sound out each syllable, naming each letter aloud as you write it. Continue syllable by syllable until the word is spelled correctly. You may wish to use the pronunciation chart to guide students in saying the words.

Spelling Words

1. adaptation
2. conservation
3. function
4. extension
5. extract
6. absorb
7. effective
8. symbiotic
9. ecosystem
10. organism

Pronunciation Table		
Word	**CK Code**	**Syllable Type**
adaptation	/ad*ap*tay*shən/	closed*closed*open*ə
conservation	/con*ser*vay*shən/	closed*r-controlled*open*ə
function	/func*shən/	closed*ə
extension	/ex*ten*shən/	closed*closed*ə
extract	/ex*tract/	ə*closed
absorb	/əb*sorb/	ə*r-controlled
effective	/ee*fek*tiv/	open*closed*closed
symbiotic	/sim*bie*aw*tic/	closed*closed*open*closed
ecosystem	/ee*koe*sis*təm/	open*open*closed*ə
organism	/or*gə*ni*sem/	r-controlled*open*closed*closed

- Direct students to Activity Page 2.4: Spelling Words Crossword Puzzle. Students may complete the puzzle with a partner or independently.

Activity Page 2.4

End Lesson

LESSON

3

In the Zone

PRIMARY FOCUS OF LESSON

Language

Students will analyze the meanings of words that contain the word part *photo–*. **[L.5.4b]**

Reading

Students will determine the cause and effect relationships in an informational text about conditions in different ocean zones. **[RI.5.3]**

Students will demonstrate an understanding of the Tier 2 words *affect* and *effect*. **[L.5.4]**

Writing

Students will complete a flow chart showing the cause and effect relationships of ocean environments and the animals that live there. **[W.5.9b]**

FORMATIVE ASSESSMENT

Activity Page 3.1 — **In the Zone Flowchart** Locate facts that explain the cause and effect relationships in different ocean zones. **[W.5.9b, RI.5.3]**

Teacher Presentation Screens:
all lessons include slides

LESSON AT A GLANCE

	Grouping Recommendations	Time	Materials
Language (15 min.)			
Morphology: *photo–*	Whole Group	15 min.	❑ Visual Support 3.1
Reading (45 min.)			
Read-Aloud: Chapter 3	Whole Group	40 min.	❑ *Life in the Fathoms*
Word Work: *Affect* vs. *Effect*	Whole Group	5 min.	
Writing (30 min.)			
Showing Cause and Effect	Whole Group/ Independent	30 min.	❑ Activity Page 3.1

ADVANCE PREPARATION

Writing

- Prepare to display Activity Page 3.1.
- Prepare to assess and return Activity Page 3.1 at the start of the next lesson.

Language

- Prepare to display and write on Visual Support 3.1.

Universal Access

Language

- Provide individual copies of Visual Support 3.1 for students. An annotated copy that matches the instructions may be used for additional support.

VOCABULARY PREVIEW

- You may choose to preview the vocabulary words before reading the text.

sunlight zone, n. the area of the ocean between the surface and 200 meters in depth

fluctuate, v. to change back and forth

effect, n. the result of an affect, or impact

affect, v. how something is impacted

euphotic, adj. relating to water with enough sunlight for photosynthesis

twilight zone, n. the area of the ocean between 200 and 1000 meters in depth

constant, adj. occurring all the time

midnight zone, n. the area of the ocean between 1000 and 4000 meters in depth

abyssal zone, n. the area of the ocean between 4000 and 6000 meters in depth

hadal zone, n. trench areas of the ocean, located below the abyssal plain and between 6000 and 11000 meters in depth

Vocabulary Chart for Chapter 3 "In the Zone"			
Vocabulary Type	**Tier 3 Domain-Specific Words**	**Tier 2 General Academic Words**	**Tier 1 Everyday Speech Words**
Core Vocabulary	sunlight zone twilight zone midnight zone abyssal zone hadal zone euphotic	fluctuate effect affect constant	
Spanish Cognates	zona abisal afótica	fluctuar afectar efecto constante	
Multiple-Meaning			
Sayings and Phrases			

Start Lesson

Lesson 3: In the Zone

Language

15M

Primary Focus: Students will analyze the meanings of words that contain the word part *photo–*. **[L.5.4b]**

MORPHOLOGY: *PHOTO–* (15 MIN.)

- Explain that you are going to start working with the prefix *photo–*. Tell students that when you see *photo–* it means light.
- Show the word *photograph*. Ask a volunteer what it means.
  - » Answers may vary but could include a picture or image made with a camera.
- Circle *photo–*. Explain that this part means light and *–graph* means to write. Together this word means to write, or make, a picture.
- Tell students that you will look at another *photo–* word. Show the word *photosynthesis*. Ask a volunteer what this means.
  - » Answers may vary but could include how plants make food with sunlight.
- Circle *photo–*. Explain that they just learned that *photo–* means light. *Synthesis* means a process to make something. Together this word means to make something out of light. In this case, plants use photosynthesis to make food from sunlight.

Check for Understanding

Ask students what a camera lens needs to create an image, keeping in mind the meaning of the word parts in *photograph*.

- » light

- Tell students that they will work with some more *photo–* words.

Visual Support 3.1

- Display Visual Support 3.1.
- Ask students to use what they just learned about the meaning of *photo–* to match the word to its definition.

D Differentiation

Support

Provide a copy of Visual Support 3.1 for students to follow along with at their seats. An annotated copy that matches the instruction may be used for additional support.

Challenge

Provide additional practice by asking students to create nonsense words with definitions by using *photo–* and other known word parts.

Lesson 3: In the Zone

Reading

Primary Focus

Students will determine the cause and effect relationships in an informational text about conditions in different ocean zones. **[RI.5.3]**

Students will demonstrate an understanding of the Tier 2 words *affect and effect*. **[L.5.4]**

READ-ALOUD: CHAPTER 3 (40 MIN.)

Introduce the Chapter

- Tell students you will begin chapter 3, "In the Zone" by reading aloud. They should follow along in their Reader as you read.
- Have students turn to the table of contents, locate the chapter, and then turn to the first page of the chapter.
- Preview the vocabulary words before reading the chapter.
- Remind students that each vocabulary word is bolded the first time it appears in the chapter. These words are also in the glossary, which they may refer to at any time.

Read Chapter 3, "In the Zone"

- Have one student read The Big Question at the beginning of the chapter. Ensure students understand the meaning of The Big Question before reading the chapter.
  - How does the amount of sunlight affect life in the ocean?
- Ask students, "What does sunlight contribute to a food web? How do you predict that might affect life in the ocean?"
  - » Energy. Answers may vary but may include that where there is abundant sunlight, there are more organisms.
- Begin reading chapter 3 aloud.

Chapter 3

In the Zone

Let's pay an imaginary visit to the ocean—only this time, forget the snorkel. Instead, we'll give ourselves an invincible submarine, a boat that can travel underwater. In reality, only a very few special submarines can voyage as deep into the ocean as we're about to go. So it's a good thing we're in the realm of imagination, even though the places we'll visit are very real.

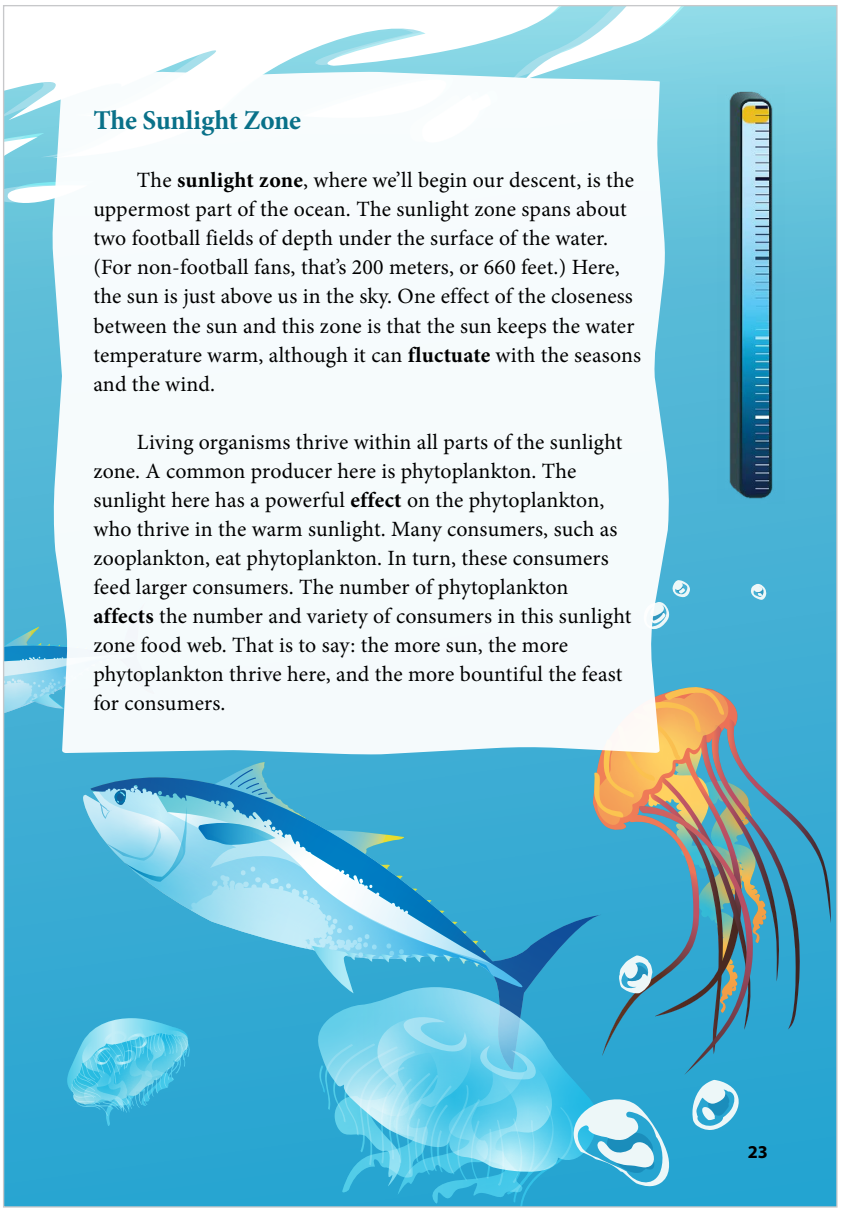
Why would we want to explore such an unusual place as the bottom of the ocean? According to scientists who study the ocean, we still have a lot to learn from these deepest zones of the ocean. Each ocean zone is full of unique organisms that can thrive in environments full of darkness, poison smoke, and silence. We know so little about these other lives. Humans have only known since the mid-1800s that there was life in the deep sea at all, and we've only been exploring its deepest zones since the 1960s, less than a century ago. When it comes to the deep sea and the life in it, scientists still have many more questions than answers.

Let's start to explore some of those questions for ourselves. All systems are go, and we have the green light to proceed, so let's begin our trip beneath the waves.

20

- Ask a student to look ahead in the chapter and read the bolded headings aloud, listing the different ocean zones.
- **Think-Pair-Share:** Make predictions with your partner about the characteristics of organisms in each of these zones.
- Remind students to signal when both partners have contributed to the conversation.
- Have students share one idea from their partner, and write these thoughts on the board.
- Continue reading chapter 3 aloud.


22



- Ask students to give a thumbs up or thumbs down, indicating if their prediction about the organisms in the twilight zone was correct.
- **Think-Pair-Share:** Have students discuss with a neighbor the evidence in the text that shows whether their prediction was accurate and why.
- Repeat this reflection after each section of the chapter.

Literal. How does the amount of phytoplankton affect the food web?

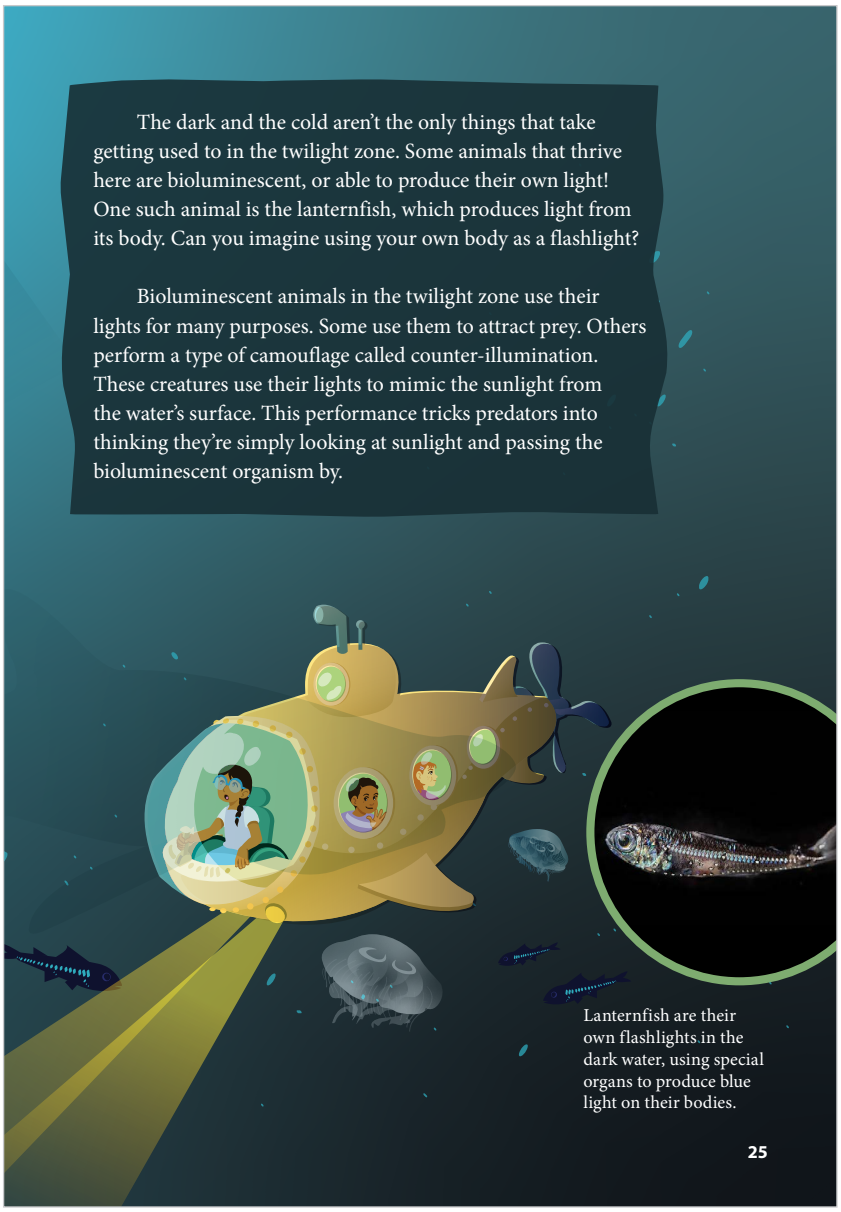
» The more phytoplankton to provide food, the more consumers can be supported in the food web.

- Direct students to the sentence, "the sun keeps the water temperature warm, although it can fluctuate with the seasons and the wind."

Inferential. How may seasonal and wind conditions affect the phytoplankton population? What impact could that have on the overall food web?

» Answers may vary but could include that conditions that reduce sunlight could reduce the amount of phytoplankton, which then reduces the amount of consumers in the food web.

- Direct students to read the next section, "The Twilight Zone," with partners. Have them pause and indicate they are finished after reading together.

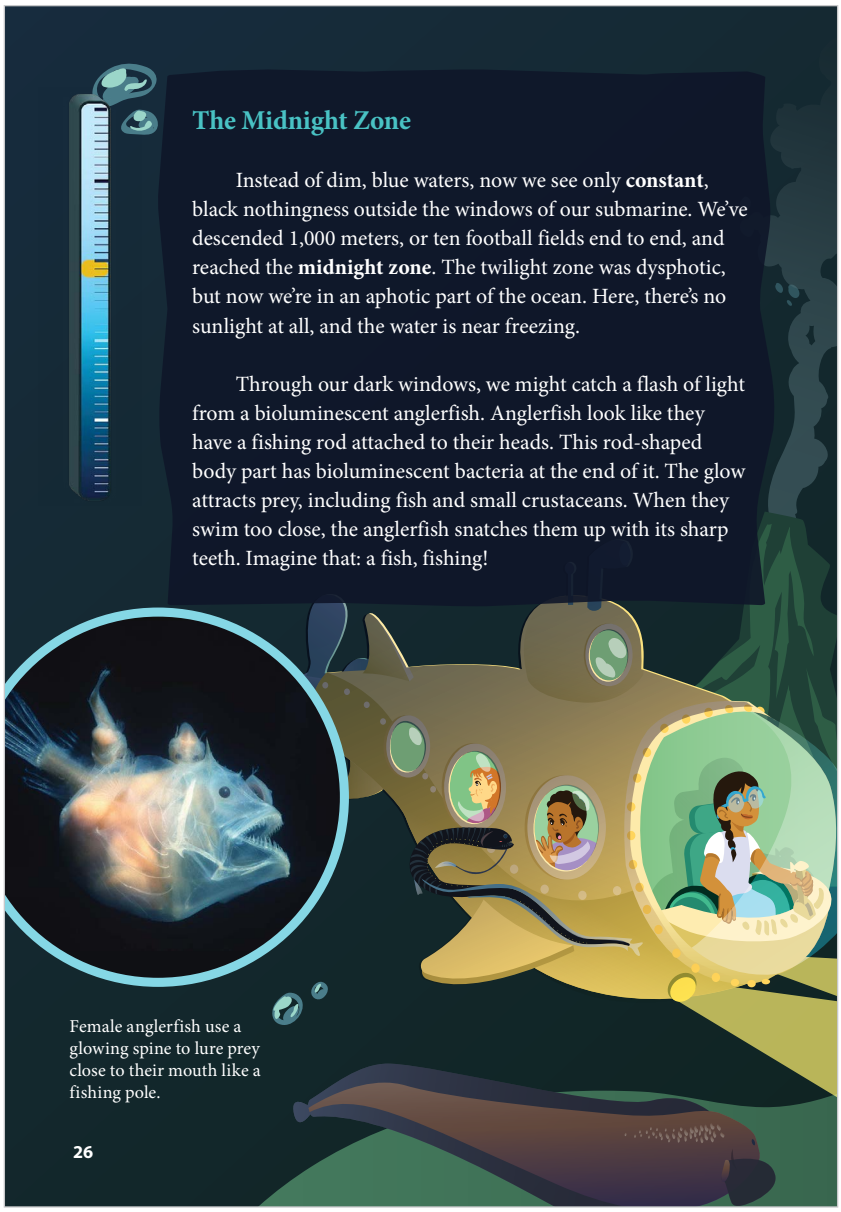


Evaluative. What pattern can be seen as the chapter progresses through the ocean zones and sunlight is reduced?

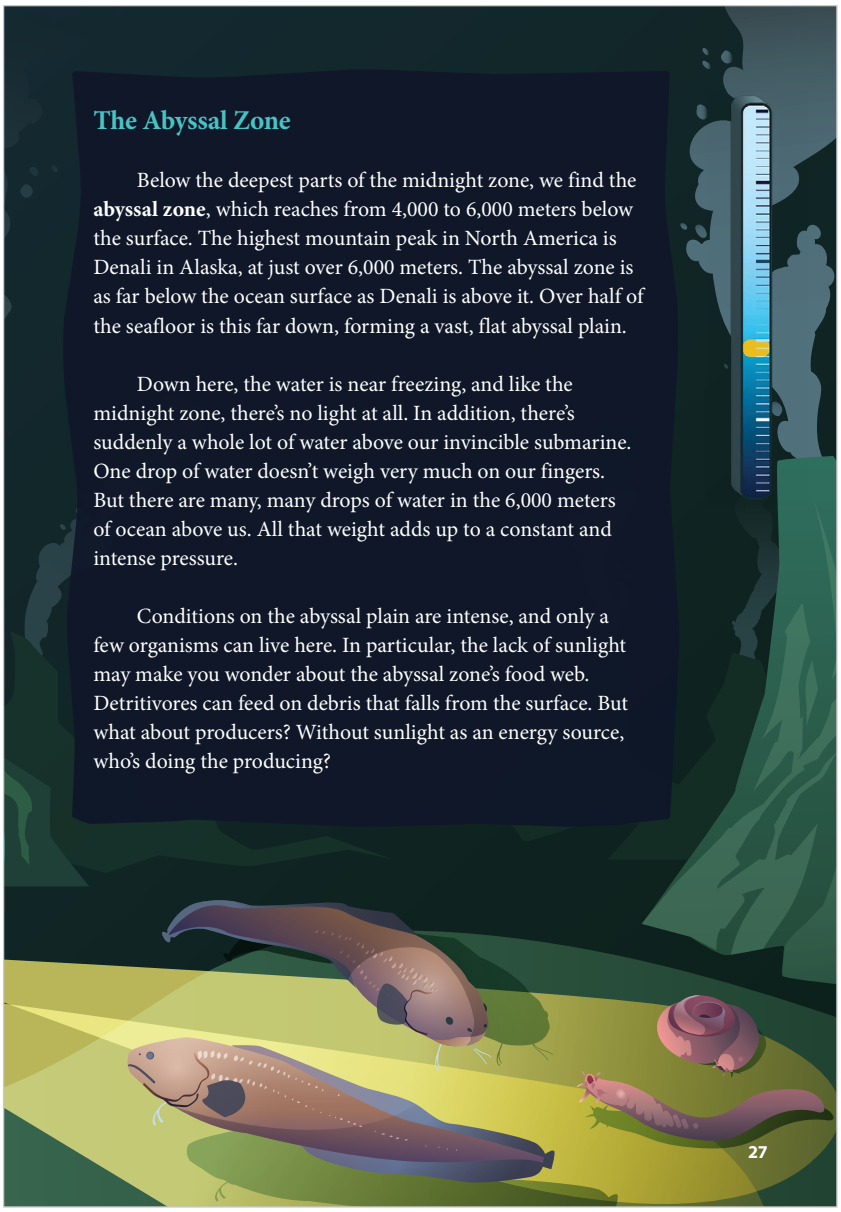
» Each zone is progressively deeper, darker, and colder as less and less sunlight is found in each zone.

Literal. What are some ways organisms use bioluminescence in the twilight zone?

» They use them to attract prey and for camouflage.



- Direct students to read the next two sections, "The Midnight Zone" and "The Abyssal Zone," with partners. Have them pause and indicate they are finished after reading together.


The Abyssal Zone
Below the deepest parts of the midnight zone, we find the **abyssal zone**, which reaches from 4,000 to 6,000 meters below the surface. The highest mountain peak in North America is Denali in Alaska, at just over 6,000 meters. The abyssal zone is as far below the ocean surface as Denali is above it. Over half of the seafloor is this far down, forming a vast, flat abyssal plain.
Down here, the water is near freezing, and like the midnight zone, there's no light at all. In addition, there's suddenly a whole lot of water above our invincible submarine. One drop of water doesn't weigh very much on our fingers. But there are many, many drops of water in the 6,000 meters of ocean above us. All that weight adds up to a constant and intense pressure.
Conditions on the abyssal plain are intense, and only a few organisms can live here. In particular, the lack of sunlight may make you wonder about the abyssal zone's food web. Detritivores can feed on debris that falls from the surface. But what about producers? Without sunlight as an energy source, who's doing the producing?
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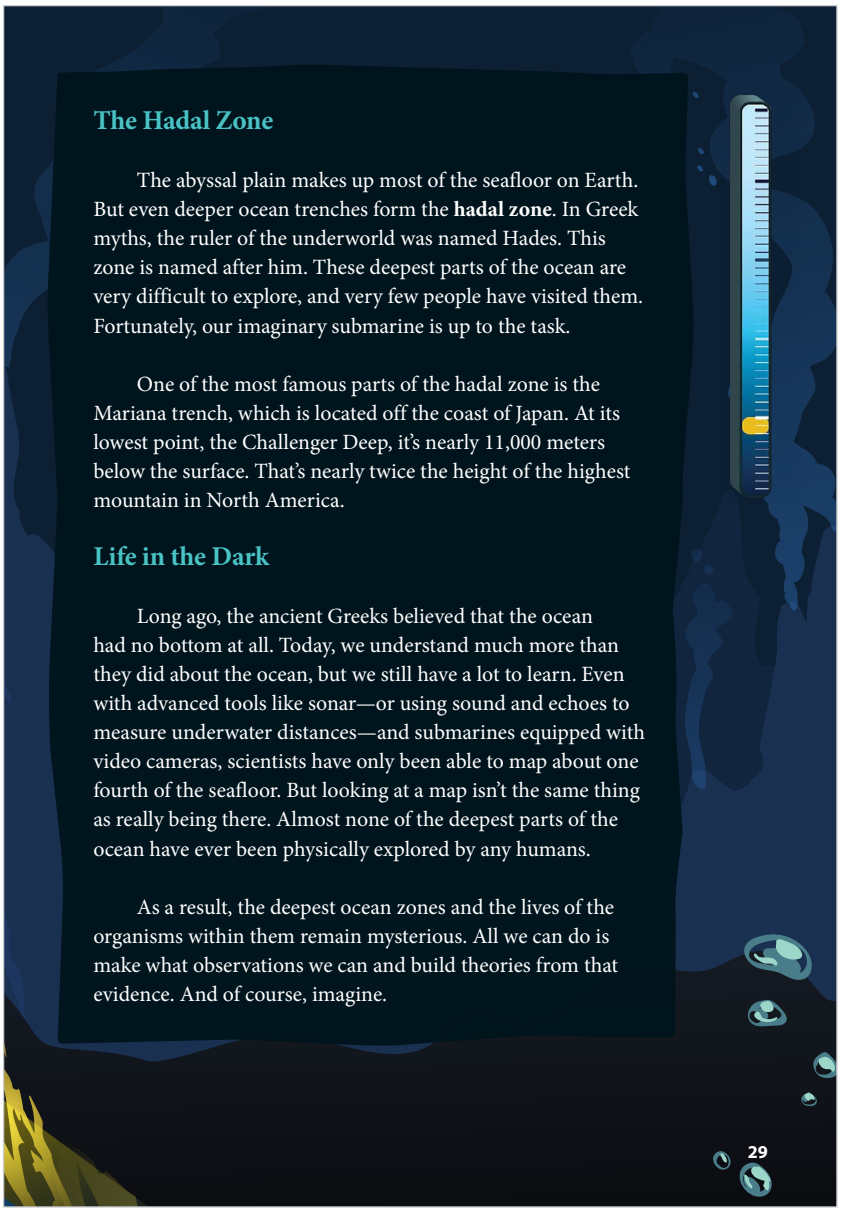
Inferential. What conditions make it difficult for organisms to thrive in the midnight and abyssal zones?

» Little sunlight and freezing temperatures.

Literal. How do producers produce without sunlight in these zones?

» *Chemosynthesis, creating energy from chemicals.*

- Direct students to read the remaining two sections, "The Hadal Zone" and "Life in the Dark," with their partners. Have them pause and indicate they are finished after reading together.



The Hadal Zone

The abyssal plain makes up most of the seafloor on Earth. But even deeper ocean trenches form the **hadal zone**. In Greek myths, the ruler of the underworld was named Hades. This zone is named after him. These deepest parts of the ocean are very difficult to explore, and very few people have visited them. Fortunately, our imaginary submarine is up to the task.

One of the most famous parts of the hadal zone is the Mariana trench, which is located off the coast of Japan. At its lowest point, the Challenger Deep, it's nearly 11,000 meters below the surface. That's nearly twice the height of the highest mountain in North America.

Life in the Dark

Long ago, the ancient Greeks believed that the ocean had no bottom at all. Today, we understand much more than they did about the ocean, but we still have a lot to learn. Even with advanced tools like sonar—or using sound and echoes to measure underwater distances—and submarines equipped with video cameras, scientists have only been able to map about one fourth of the seafloor. But looking at a map isn't the same thing as really being there. Almost none of the deepest parts of the ocean have ever been physically explored by any humans.

As a result, the deepest ocean zones and the lives of the organisms within them remain mysterious. All we can do is make what observations we can and build theories from that evidence. And of course, imagine.

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- After reading chapter 3, engage in a discussion using the following questions.

ML/EL MULTILINGUAL/ENGLISH LEARNERS

Speaking and Listening

Exchanging Information and Ideas

Entering/Emerging	Ask simple *wh*– (*who*, *what*, *where*, *when*) questions, such as, "What ocean zone is this paragraph about?" Allow students to point to their responses in the text, as needed.
Transitioning/ Expanding	Provide students with key words from the question to use in their explanations or answers such as *unique, depth, zones, challenge,* and *light*.
Bridging	Encourage students to use the question as the base for their response sentence starter and the word "because" to include supporting details. This may sound like, "Mapping the ocean by___ is unique because___."

1. **Literal.** Describe one of the ocean's zones and its connection to the zone name. Use examples from the text to support your answer.
   - » Answers may vary but should include the correct name of an ocean zone and salient text details about that zone. For example, the sunlight zone is closest to the surface where the sunlight can be seen in the water.
2. **Inferential.** What is unique about how we map the ocean?
   - » Answers may vary but could include that the ocean is mapped by depths, or that the different zones are named and described by the amount of sunlight there.
3. **Literal.** What makes exploring and mapping below the sunlight zone challenging?
   - » A lack of light and pressure from deep water.
4. **Evaluative.** Create a sentence about a marine animal that interests you in this chapter that answers the questions what, where, and why it's interesting. Use information from the text to support your opinion.
   - » Answers may vary, but could include an example such as:

     What: the anglerfish

     Where: lives in the midnight zone

     Why: attracts prey with a glowing rod

     Expanded sentence: The anglerfish lives in the midnight zone and has the interesting ability to attract prey with a glowing rod.

Check for Understanding

Think about organisms that rely on photosynthesis to make their food. In what zone would they be found and why?)

» Sunlight zone, where enough sunlight is accessible to conduct photosynthesis.

WORD WORK: *AFFECT* VS. *EFFECT* (5 MIN.)

1. In the chapter you read, "The number of phytoplankton affects the number and variety of consumers in this sunlight zone food web." You also read, "The sunlight here has a powerful effect on the phytoplankton, who thrive in the warm sunlight." These sentences contain the words *affect* and *effect*.
2. These words sound very similar. Say each word with me and listen carefully for the difference. *Affect* begins with the sound /a/, spelled 'a' and *effect* begins with sound /ee/, spelled 'e'.
3. *Affect* is a verb or action. *Affect* is how something is impacted.
4. *Effect* is a noun. An effect is the result of that impact.
5. The depth of the water affects how much light reaches the ocean floor. One effect of deep water is darkness.

   Use a Making Connections activity for follow-up. Say, "I am going to read several pairs of sentences. Decide which word, *affect* or *effect*, belongs in each sentence."

   - How fast a fish can swim can _____ if it is caught by a predator.
     » affect
   - The _____ of sandy colored scales allows prey to hide more easily.
     » effect
   - The type of algae living near coral _____ its color.
     » affects
   - Coral bleaching is an _____ of water that is too warm for algae.
     » effect
   - The tall stems in a kelp forest give the _____ of trees growing from the ocean floor.
     » effect

- The tides and currents _____ how kelp sways in the water.
  - » affect

6. *affect* OR *effect* » The tall stems in a kelp forest give the _____ of trees growing from the ocean floor.
   - » effect

   affect OR *effect* » The tides and currents _____ how kelp sways in the water.
   - » affect

Lesson 3: In the Zone

Writing

30M

Primary Focus: Students will complete a flow chart showing the cause and effect relationships of ocean environments and the animals that live there. **[W.5.9b]**

SHOWING CAUSE AND EFFECT (30 MIN.)

- Tell students that they will use a graphic organizer called a flowchart to show the relationship between one of the ocean zones and an animal that lives there. The goal is to show the cause and effect relationship between the conditions in that zone and the animals that have adapted to life in that particular place.
- Display the flowchart planning tool on Activity Page 3.1.
- Model skimming the text for an example of an ecosystem characteristic and adding it to the flowchart displayed.
  - Say: In the first paragraph about the Sunlight Zone it says, "Here, the sun is just above us in the sky. This keeps the water temperature warm." I am going to fill in *Sunlight Zone* after Ocean Zone on the flowchart. Under that I am going to paraphrase, or put in my own words, that sentence and write *sunlight makes water warm*. Notice that I don't need complete sentences here because these are just notes.
  - Say: I see that in the next paragraph the text says, "A common producer here is phytoplankton. The sunlight here has a powerful effect on the phytoplankton, who thrive in the warm sunlight." I'm going to paraphrase this fact about phytoplankton as *makes food from sunlight*. I know this because it says that the phytoplankton is a producer, so I know it is producing food. I also see that it has *phyto* in the name of the animal.

Activity Page 3.1

Here the word part *photo* is spelled *phyto* instead of *photo*, but with the same meaning. So, I can infer it is making that food from sunlight. This tells me that the warm sunlight characteristic of the sunlight zone matches with this characteristic of phytoplankton and I can add that to the flowchart.

- Ask students to volunteer information needed to fill in another set of boxes.
- Direct students to complete their flowchart independently.
- Remind students that they should refer back to the text as often as is needed to collect information for their flowchart.
- Collect Activity Page 3.1.

ML/EL **MULTILINGUAL/ENGLISH LEARNERS**

Interacting in Meaningful Ways

Writing

Entering/Emerging	Have students work with a peer or teacher to discuss and fill in the graphic organizer.
Transitioning/ Expanding	Have students use sticky notes to list key words from the Reader to discuss with a peer or teacher before writing them on the graphic organizer.
Bridging	Use cause and effect sentence frames to form key phrases on the graphic organizer. Example: _____(ocean characteristic) causes_____ (effect).

End Lesson

D Differentiation

Challenge

Encourage students to elaborate by noting how the animal uses that characteristic for survival in the specific ocean zone. For example, students may name a characteristic and how it assists the animal in locating prey.

Support

Allow students to write facts on sticky notes from their reading before transferring notes onto their flowchart.

LESSON

4

Unique Environments and Adaptations

PRIMARY FOCUS OF LESSON

Reading

Students will read paired informational texts and complete a graphic organizer about the relationship between a marine animal's adaptations and its environment. **[RI.5.3]**

Students will demonstrate an understanding of the Tier 2 word *adaptation*. **[L.5.4]**

Writing

Students will write a paragraph, drawing supporting details from informational text to explain how a creature's adaptations connect to its environment. **[W.5.2b, W.5.9b]**

Language

Students will analyze the meanings of words that contain the word part *micro–*. **[L.5.4b]**

FORMATIVE ASSESSMENT

Activity Page 4.1	**Two Source Paragraph** Write a paragraph explaining how a creature's adaptations connect to its environment. **[W.5.2b]**

Teacher Presentation Screens:
all lessons include slides

LESSON AT A GLANCE

	Grouping Recommendations	Time	Materials
Reading (45 min.)			
Read-Aloud: Chapter 4	Whole Group	40 min.	❏ *Life in the Fathoms* ❏ Activity Pages 3.1, 4.1 ❏ Visual Support 4.1
Word Work: *Adaptation*	Whole Group	5 min.	
Writing (30 min.)			
Using Supporting Details from Two Texts	Whole Group/ Independent	30 min.	❏ Visual Support 2.1 ❏ Activity Page 4.1
Language (15 min.)			
Morphology: *micro–*	Whole Group	15 min.	❏ Visual Support 4.1

ADVANCE PREPARATION

Reading

- Prepare partners for reading.

Writing

Visual Support 2.1

- Prepare to display Visual Support 2.1.
- Prepare to return Activity Page 3.1 to students.

Language

Visual Support 4.1

- Prepare to display Visual Support 4.1.

Universal Access

Writing

- Arrange for dictation during writing or voice typing as needed.

Language

- Provide a copy of Visual Support 4.1 for students to follow along with at their seats. An annotated copy that matches the instructions may be used for additional support.

VOCABULARY PREVIEW

- You may choose to preview the vocabulary words before reading the text.

agile, adj. the characteristic of moving with speed and grace

adaptation, n. a characteristic that adjusts to the environment or situation

bioluminescence, n. the ability for an organism to generate light

microbes, n. extremely small organisms that can be seen under a microscope

Vocabulary Chart for Chapter 4 "Unique Environments and Adaptations"			
Vocabulary Type	**Tier 3 Domain-Specific Words**	**Tier 2 General Academic Words**	**Tier 1 Everyday Speech Words**
Core Vocabulary	bioluminescence microbes	agile adaptation	
Spanish Cognates	bioluminiscencia microbios	ágil adaptación	
Multiple-Meaning			
Sayings and Phrases			

Start Lesson

Lesson 4: Unique Environments and Adaptations

Reading

45M

Primary Focus

Students will read paired informational texts and complete a graphic organizer about the relationship between a marine animal's adaptations and its environment. **[RI.5.3]**

Students will demonstrate an understanding of the Tier 2 word *adaptation*. **[L.5.4]**

READ-ALOUD: CHAPTER 4 (40 MIN.)

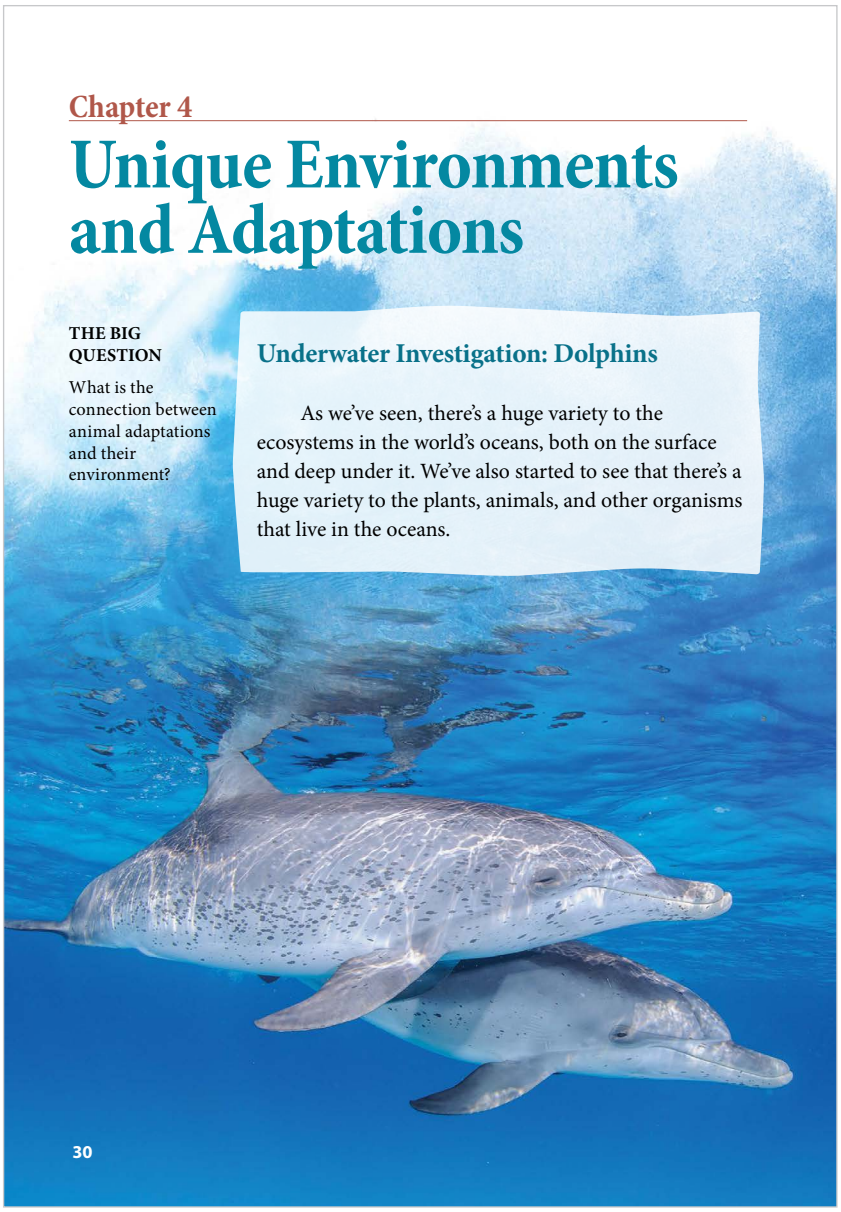
Introduce the Chapter

- Tell students you will begin chapter 4, "Unique Environments and Adaptations" by reading aloud. They should follow along in their Reader as you read.
- Have students turn to the table of contents, locate the chapter, and then turn to the first page of the chapter.
- Preview the vocabulary words before reading the chapter.
- Remind students that each vocabulary word is bolded the first time it appears in the chapter. These words are also in the glossary, which they may refer to at any time.

Read Chapter 4

Activity Page 3.1

- Have one student read The Big Question at the beginning of the chapter. Ensure students understand the meaning of The Big Question before reading the chapter.
    - What is the connection between animal adaptations and their environment?
- Ask students, "What is an adaptation?"
    - » Characteristics of plants or animals that allow them to survive in their environment.

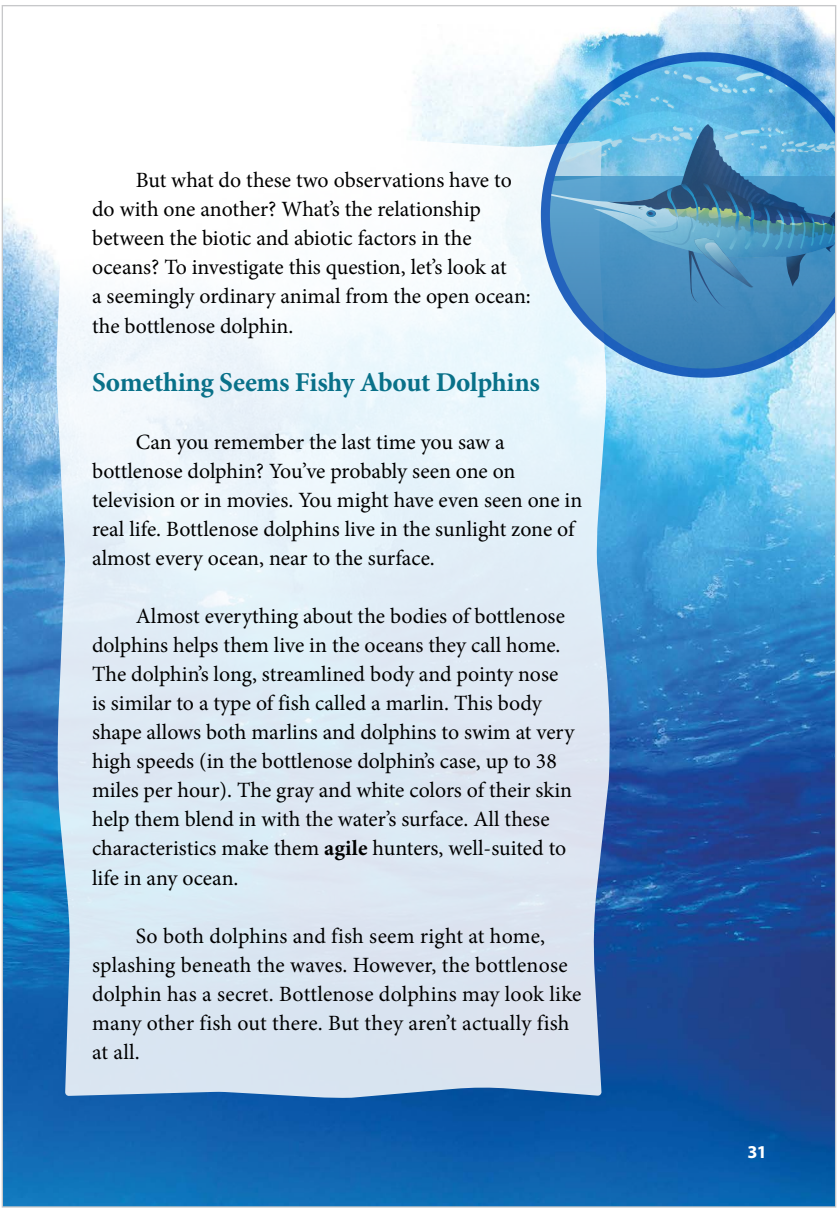


- Ask students, "What conditions may require an adaptation to survive?"
  - » Answers may vary but could include darkness, cold or warm temperatures, and the existence of predators.
- Begin reading chapter 4 aloud.

D Differentiation

Support

While listening, if a section of text is not understood, direct students to place a sticky note in the margin. Check students' Readers for these notes to follow up.



But what do these two observations have to do with one another? What's the relationship between the biotic and abiotic factors in the oceans? To investigate this question, let's look at a seemingly ordinary animal from the open ocean: the bottlenose dolphin.

Something Seems Fishy About Dolphins

Can you remember the last time you saw a bottlenose dolphin? You've probably seen one on television or in movies. You might have even seen one in real life. Bottlenose dolphins live in the sunlight zone of almost every ocean, near to the surface.

Almost everything about the bodies of bottlenose dolphins helps them live in the oceans they call home. The dolphin's long, streamlined body and pointy nose is similar to a type of fish called a marlin. This body shape allows both marlins and dolphins to swim at very high speeds (in the bottlenose dolphin's case, up to 38 miles per hour). The gray and white colors of their skin help them blend in with the water's surface. All these characteristics make them **agile** hunters, well-suited to life in any ocean.

So both dolphins and fish seem right at home, splashing beneath the waves. However, the bottlenose dolphin has a secret. Bottlenose dolphins may look like many other fish out there. But they aren't actually fish at all.

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Inferential. How might a bottlenose dolphin's swimming speed and skin colors help it survive in its environment?

» Answers may vary but could include the ability to hunt, outrun predators, and use camouflage.

- Direct students to continue reading with their partners, pausing before the heading "Other Ecosystems, Other Adaptations."

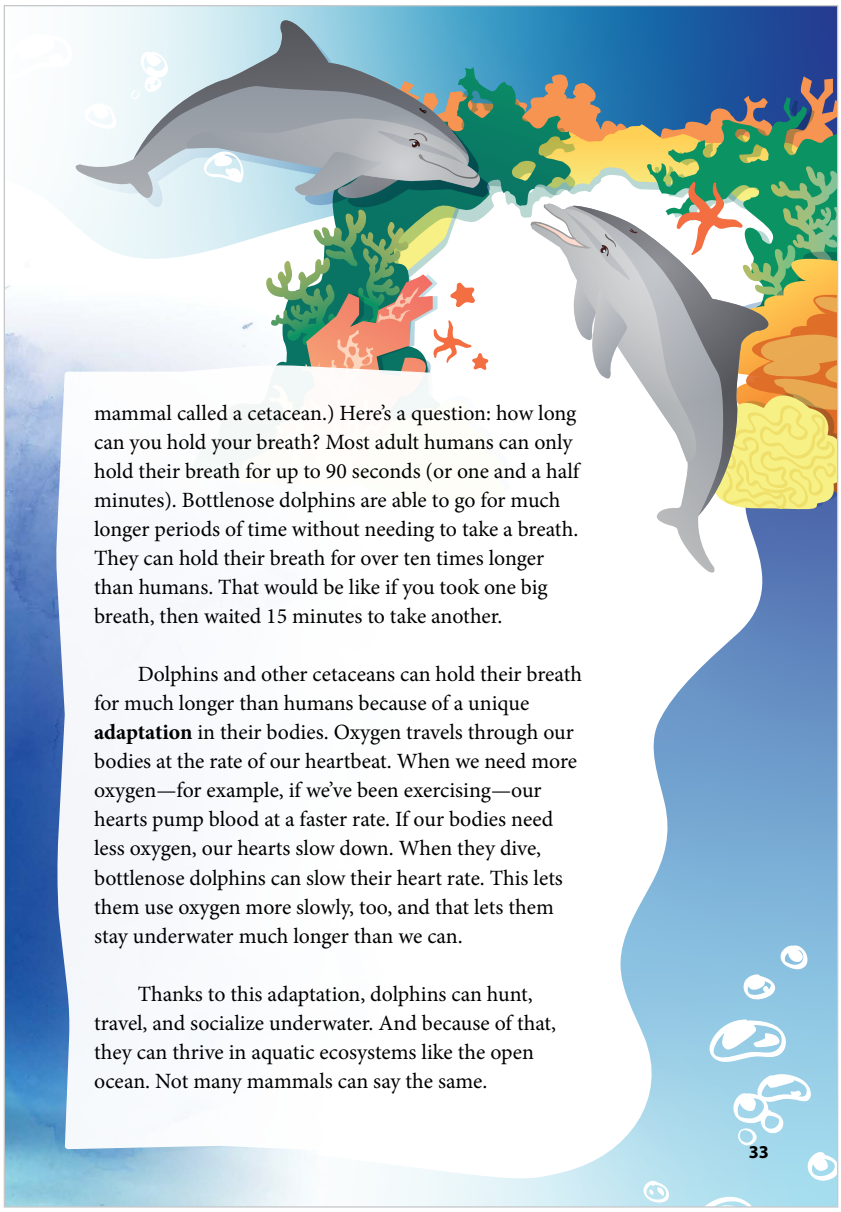
Mammals at Sea

Bottlenose dolphins have three times as much blood as humans to store lots of extra oxygen for diving underwater.

Bottlenose dolphins are a type of mammal. When you think about mammals, what do you imagine? Do you think about fuzzy woodland critters shuffling through long grass? Do you think about monkeys swinging through the treetops? Maybe you even imagine the most familiar of mammals: humans!

But here's the thing: dolphins are also mammals. Like other mammals, dolphins are warm-blooded, and they produce milk to feed their babies. And, like all other mammals, dolphins can't breathe in the water. They don't have gills like fish do. Instead, just like humans, they have to come to the surface of the water to take breaths of fresh air when they swim.

That question of how mammals breathe while in the ocean highlights a big difference between land mammals like us and aquatic mammals like dolphins and whales. (Dolphins and whales are both a type of



mammal called a cetacean.) Here's a question: how long can you hold your breath? Most adult humans can only hold their breath for up to 90 seconds (or one and a half minutes). Bottlenose dolphins are able to go for much longer periods of time without needing to take a breath. They can hold their breath for over ten times longer than humans. That would be like if you took one big breath, then waited 15 minutes to take another.

Dolphins and other cetaceans can hold their breath for much longer than humans because of a unique **adaptation** in their bodies. Oxygen travels through our bodies at the rate of our heartbeat. When we need more oxygen—for example, if we've been exercising—our hearts pump blood at a faster rate. If our bodies need less oxygen, our hearts slow down. When they dive, bottlenose dolphins can slow their heart rate. This lets them use oxygen more slowly, too, and that lets them stay underwater much longer than we can.

Thanks to this adaptation, dolphins can hunt, travel, and socialize underwater. And because of that, they can thrive in aquatic ecosystems like the open ocean. Not many mammals can say the same.

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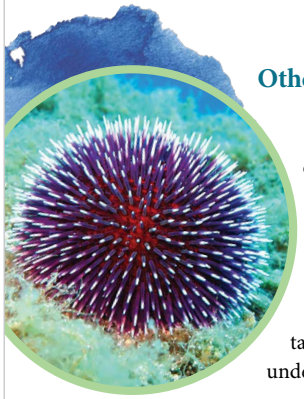
Literal. Explain the adaptation that allows dolphins and other cetaceans to hold their breath for a long period of time.

» Answers may vary but could include the ability to slow their heart rate which reduces the need for oxygen from the air.

- Direct students to the images of the organisms beneath the header Other Ecosystems, Other Adaptations. Ask students to take a moment to examine what they see.
- Direct students to the questions written on the board in advance:
  - What do you see?
  - What do you think about it?
  - What does it make you wonder?

- Have students write one sentence in response to each question.
- **Turn and Talk:** Have students share their sentences with a neighbor.
- Remind students to signal when both partners have contributed to the conversation.
- Ask a few students to share what their partner wrote in response to the question, "What does it make you wonder?"
- Have students read the remainder of "Underwater Investigation: Dolphins" with their partners.

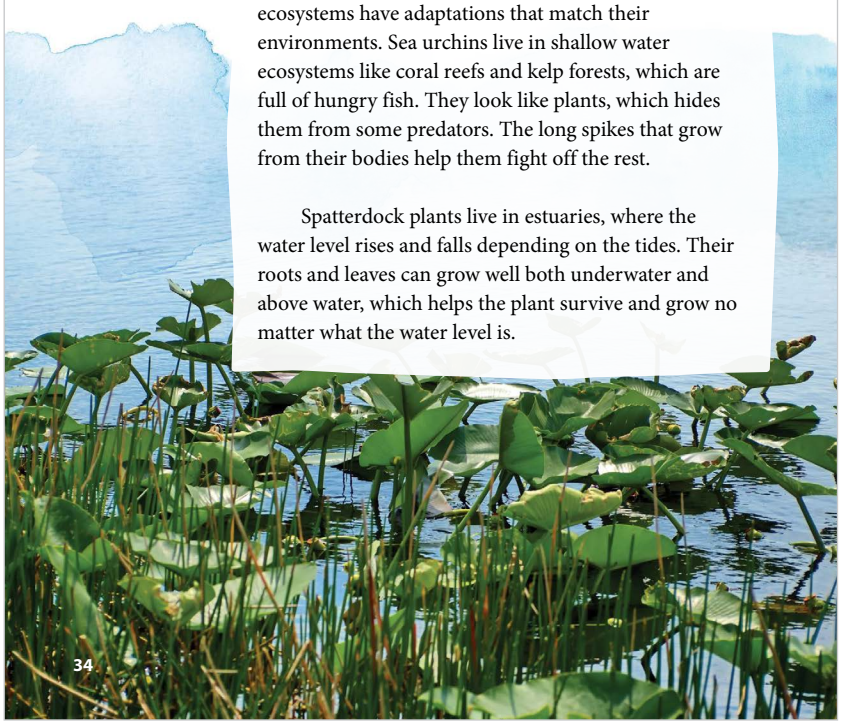


Other Ecosystems, Other Adaptations

Looking beyond the open ocean, we find that organisms have adaptations that help them live in the ecosystems where we find them. There are big differences between dolphins, marlins, and great white sharks, but they all have similar body adaptations. They have similar shapes, similar colors, and similar diets. And even though they take different approaches to the challenges of living underwater, in the end, all these animals can do it.

Many of the animals we'll look at in our ocean ecosystems have adaptations that match their environments. Sea urchins live in shallow water ecosystems like coral reefs and kelp forests, which are full of hungry fish. They look like plants, which hides them from some predators. The long spikes that grow from their bodies help them fight off the rest.

Spatterdock plants live in estuaries, where the water level rises and falls depending on the tides. Their roots and leaves can grow well both underwater and above water, which helps the plant survive and grow no matter what the water level is.

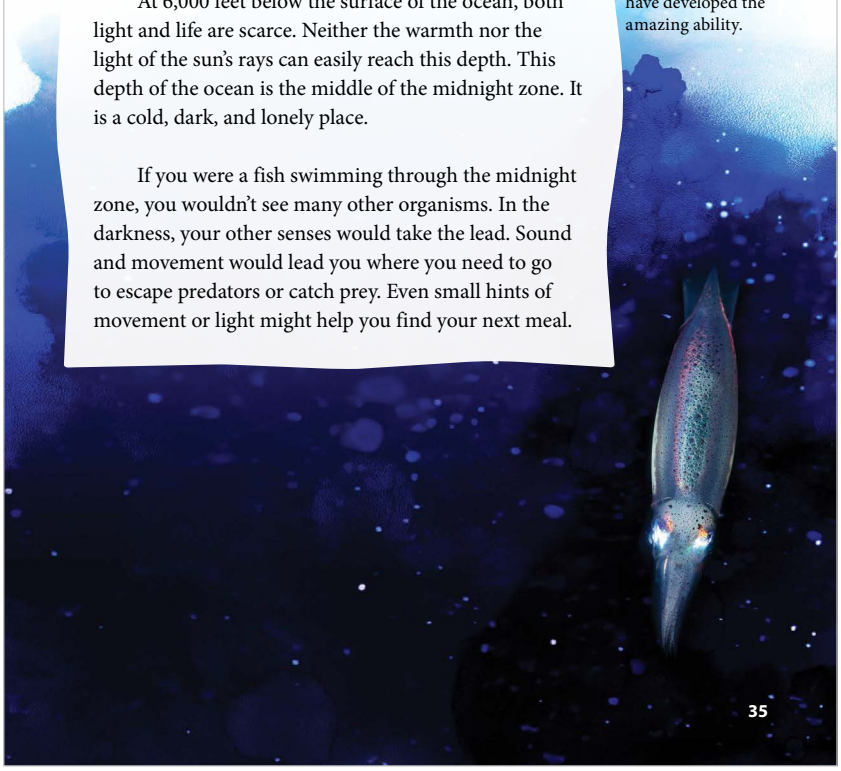


In all these cases and more, an organism's body, behavior, and other characteristics help it thrive within the place it lives. So, next time you go on a nature walk or visit the ocean, remember to take a second look at the world around you. What animals and plants do you see? And how do they function within the environment around them? If you watch carefully, you might discover a few secrets of your own.

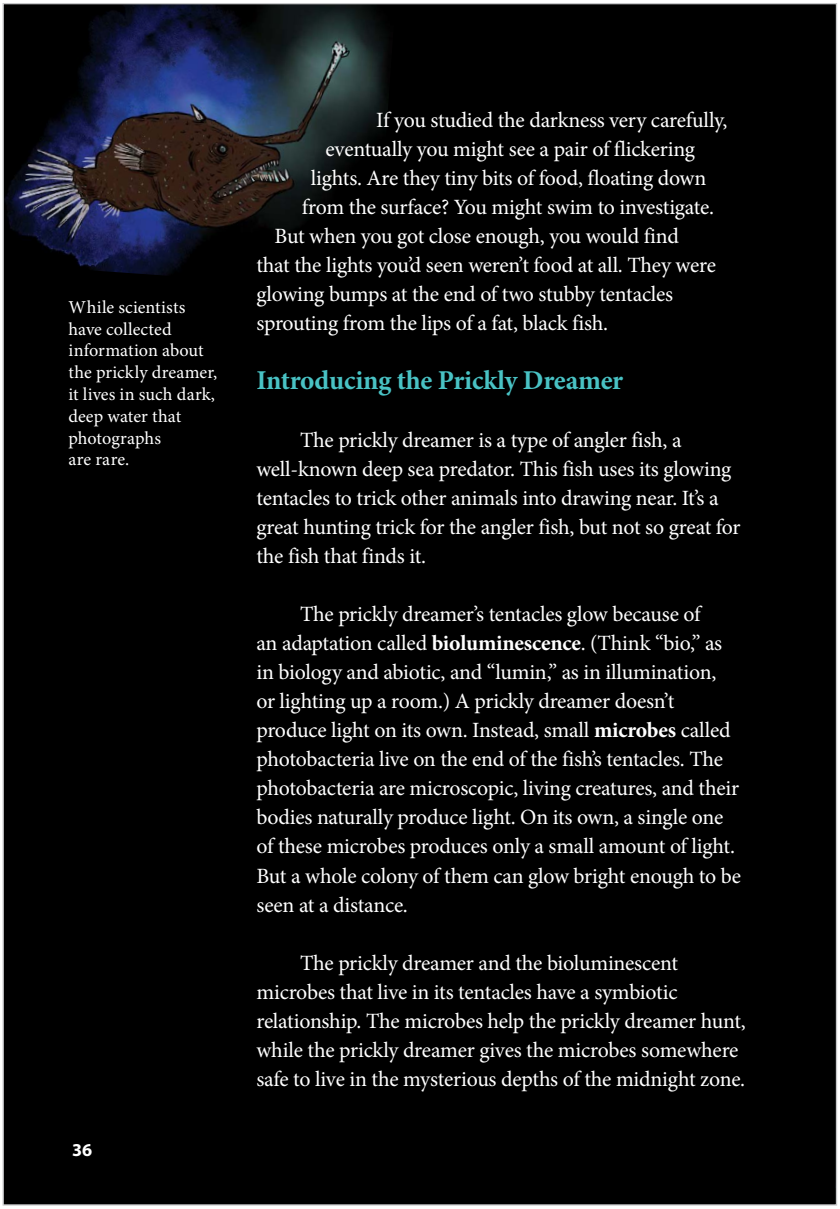
Underwater Investigation: Bioluminescence

At 6,000 feet below the surface of the ocean, both light and life are scarce. Neither the warmth nor the light of the sun's rays can easily reach this depth. This depth of the ocean is the middle of the midnight zone. It is a cold, dark, and lonely place.

If you were a fish swimming through the midnight zone, you wouldn't see many other organisms. In the darkness, your other senses would take the lead. Sound and movement would lead you where you need to go to escape predators or catch prey. Even small hints of movement or light might help you find your next meal.



Bioluminescence is rare near the surface, but many organisms in deep ocean ecosystems have developed the amazing ability.



While scientists have collected information about the prickly dreamer, it lives in such dark, deep water that photographs are rare.

If you studied the darkness very carefully, eventually you might see a pair of flickering lights. Are they tiny bits of food, floating down from the surface? You might swim to investigate. But when you got close enough, you would find that the lights you'd seen weren't food at all. They were glowing bumps at the end of two stubby tentacles sprouting from the lips of a fat, black fish.

Introducing the Prickly Dreamer

The prickly dreamer is a type of angler fish, a well-known deep sea predator. This fish uses its glowing tentacles to trick other animals into drawing near. It's a great hunting trick for the angler fish, but not so great for the fish that finds it.

The prickly dreamer's tentacles glow because of an adaptation called **bioluminescence**. (Think "bio," as in biology and abiotic, and "lumin," as in illumination, or lighting up a room.) A prickly dreamer doesn't produce light on its own. Instead, small **microbes** called photobacteria live on the end of the fish's tentacles. The photobacteria are microscopic, living creatures, and their bodies naturally produce light. On its own, a single one of these microbes produces only a small amount of light. But a whole colony of them can glow bright enough to be seen at a distance.

The prickly dreamer and the bioluminescent microbes that live in its tentacles have a symbiotic relationship. The microbes help the prickly dreamer hunt, while the prickly dreamer gives the microbes somewhere safe to live in the mysterious depths of the midnight zone.

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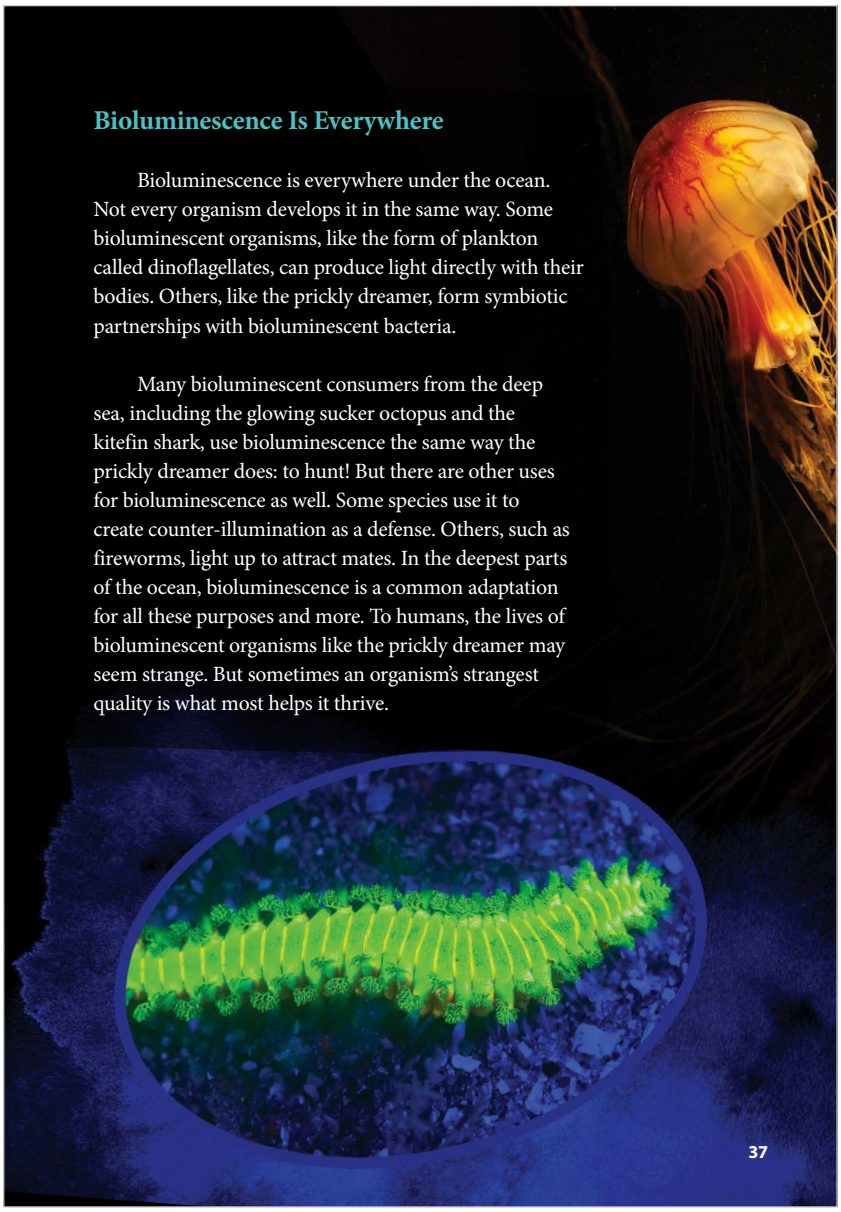
- After reading "Unique Environments and Adaptations", engage in a brief discussion using the following questions.



Bioluminescence Is Everywhere

Bioluminescence is everywhere under the ocean. Not every organism develops it in the same way. Some bioluminescent organisms, like the form of plankton called dinoflagellates, can produce light directly with their bodies. Others, like the prickly dreamer, form symbiotic partnerships with bioluminescent bacteria.

Many bioluminescent consumers from the deep sea, including the glowing sucker octopus and the kitefin shark, use bioluminescence the same way the prickly dreamer does: to hunt! But there are other uses for bioluminescence as well. Some species use it to create counter-illumination as a defense. Others, such as fireworms, light up to attract mates. In the deepest parts of the ocean, bioluminescence is a common adaptation for all these purposes and more. To humans, the lives of bioluminescent organisms like the prickly dreamer may seem strange. But sometimes an organism's strangest quality is what most helps it thrive.

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- Discuss the text using the following questions.

Literal. What is the water like at 6,000 feet deep?

» Answers may vary but could include that the water is cold and dark.

Inferential. Why are many of the organisms with biolunimescent adaptations in this text consumers?

» Answers may vary but could include that the ability to make light helps to find and attract prey.

Evaluative. Why do different organisms develop different ways of producing and using bioluminescence?

» Answers may vary but could include that organisms have different needs. For example, a consumer like an anglerfish needs to attract prey, while photo bacteria need a symbiotic relationship with a larger organism for survival.

- Ask students to read "Underwater Investigation: Bioluminescence" independently. Ask students to add additional information from this text to their flowchart on Activity Page 3.1 as they read.
- After reading and taking notes, ask a few students to share the information added to their flowcharts.

WORD WORK: *ADAPTATION* (5 MIN.)

1. In the chapter you read, "Dolphins and other cetaceans can hold their breath for much longer than humans because of a unique adaptation in their bodies."
2. Say *adaptation* with me.
3. An adaptation is a characteristic that adjusts to the environment or situation.
4. Gills are an adaptation that allow fish to breathe underwater.
5. What are some other adaptations you have learned about? Be sure to use the word *adaptation* in your response.
   - Ask two or three students to use the target word in a sentence. If necessary, guide and/or rephrase students' responses to make complete sentences:

     "An adaptation of an animal in the coral reef food web is _____."
6. What part of speech is the word *adaptation*?
   - » (noun

Use a Discussion activity for follow-up. Ask students to talk with their partners about conditions in the ocean that require adaptations to live there. Make sure students use the word *adaptation* in complete sentences as they discuss.

Lesson 4: Unique Environments and Adaptations

Writing

30M

Primary Focus: Students will write a paragraph, drawing supporting details from informational text to explain how a creature's adaptations connect to its environment. **[W.5.2b, W.5.9b]**

USING SUPPORTING DETAILS FROM TWO TEXTS (30 MIN.)

- Explain that authors of informational texts use information from several different sources to make their writing as strong as it can be.
- Tell students that in their informational paragraph they will use information that they recorded on their flowcharts using at least two of the texts they have read during today's and yesterday's lessons.
- Direct students to look back at the model paragraph on Visual Support 2.1.
- Remind students that this is the type of paragraph they will be writing with the information from their flowcharts.
- Remind students that in lesson two they used the key words and phrases in their notes to write sentences in their paragraphs.
- **Turn and Talk:** Practice creating sentences using details from your notes on Activity Page 3.1.
- Remind students to signal when both partners have contributed to the conversation.
- Ask a few students to share their partner's sentences.
- Direct students to write their 5–8 sentence paragraph on Activity Page 4.1.
- Collect completed paragraphs on Activity Page 4.1.

Activity Page 4.1

D Differentiation

Challenge

Encourage students to use a mixture of short and longer sentences within the paragraph.

Support

Have students add labels in the paper margins of the activity page, indicating where the topic sentence, detail sentences, and conclusion sentence should be.

ML/EL MULTILINGUAL/ENGLISH LEARNERS

Interacting in Meaningful Ways

Writing

Entering/Emerging	Provide sentence stem and sentence frames to support writing. Examples: The _____ zone has _____ (how much) light. _____ is an animal from the _____ ecosystem. The ability to _____ is important because _____.
Transitioning/ Expanding	Provide a word bank of key vocabulary related to adaptations to use in the paragraph such as: adaptations, zone, light, and temperature.
Bridging	Have students add words and phrases that indicate relationships in their paragraph such as: due to, so, as a result, because of.

Lesson 4: Unique Environments and Adaptations

Language

15M

Primary Focus: Students will analyze the meanings of words that contain the word part *micro–*. **[L.5.4b]**

MORPHOLOGY: *MICRO–* (15 MIN.)

- Tell students that they are going to work with the word part *micro–*. When they see *micro–*, it means extremely small.
- Remind students that they worked on words with *bio–* in a recent lesson.
- Ask, "What does *bio–* mean?"
  - » *Bio–* means life.
- Write the word *microscopic* on the board. Ask, "Can a volunteer tell us what this means?"
  - » Answers may vary.
- Circle the *micro–* in *microscopic* on the board. Explain that this part means extremely small and *-scopic* means "to look at." Together this word means something that is so small it can only be seen with a microscope.
- Ask, "What is a microscope?"
  - » a tool used to view extremely small things

- Say, "Let's look at that *micro–* word, *microscope*."
- Write the word *microscope*. Ask, "Can a volunteer tell us what this means?"
  - » Answers may vary but could include a tool scientists use to see small things.
- Circle *micro–* in *microscope*. Ask, "What did we just learn that this means?"
  - » extremely small
- Circle *–scope* in *microscope*. Say, "This part means *to look at*. Together this word means a tool used for viewing certain objects too small to be seen with the human eye."
- When you look at a sample of ocean water under a microscope, do the tiny organisms look larger or smaller?
  - » Answers may vary but could include that the extremely tiny, microscopic, organisms—and all their details—appear large enough to fill the viewfinder.

Check for Understanding

Ask students to name the words based on the following clues.

- an extremely small organism
  - » microorganism
- a biologist who studies microorganisms
  - » microbiologist

- Tell students that now they will make some more *micro–* words.

Visual Support 4.1

- Display Visual Support 4.1. Use the visual support to continue analyzing the meaning of each word and then connect the correct definition as a whole group.
  - microbe
    - » a very small organism that can be seen through a microscope
  - microphone
    - » a device that amplifies a small, or quiet voice
  - micromanage
    - » to direct the small details of another's task or work.

End Lesson

Differentiation

Challenge

Allow students to complete the words shown on Visual Support 4.1. independently and then generate additional words, with definitions, that combine *photo–* or *bio–* with other known word parts. These additional words can be shared after the whole group exercise has been completed.

LESSON

5

Marine Biologists

PRIMARY FOCUS OF LESSON

Reading

Students will read and compare paired informational texts about important people and discoveries in the field of marine biology. **[RI.5.6, RI.5.9]**

Students will demonstrate an understanding of the Tier 2 word *conservation*. **[L.5.4]**

Writing

Students will write an informative paragraph about marine biology accomplishments using supporting details from paired informational texts. **[W.5.2b, W.5.2d]**

Language

Students will apply grade-level phonics and word analysis skills to decode and encode targeted spelling words. **[RF.5.3a]**

FORMATIVE ASSESSMENT

Activity Page 5.1	**Two Texts: Main Idea and Details** Record main ideas and supporting details from multiple texts about people and accomplishments in the field of marine biology. **[RI.5.6, RI.5.9]**
Activity Page 5.2	**Marine Biology Accomplishments Paragraph** Write about significant accomplishments in marine biology. **[W.5.2b]**

Teacher Presentation Screens:
all lessons include slides

LESSON AT A GLANCE

	Grouping Recommendations	Time	Materials
Reading (45 min.)			
Read-Aloud: Chapter 5	Whole Group/Partner/ Independent	25 min.	❑ *Life in the Fathoms*
Read "Joan Murrell Owens: A Marine Biologist Who Broke Barriers"	Independent	15 min.	
Word Work: *Conservation*	Whole Group	5 min.	
Writing (30 min.)			
Using Supporting Details from Two Texts	Whole Group/ Independent	30 min.	❑ Activity Pages 5.1, 5.2 ❑ Visual Support 5.1
Language (15 min.)			
Spelling: Practice	Whole Group	15 min.	❑ Activity Page 5.3

ADVANCE PREPARATION

Reading

- Prepare partners for shared note taking.

Writing

- Prepare to display the annotated copy of Visual Support 5.1.

Universal Access

Writing

- Arrange for dictation during writing or voice typing as needed.

VOCABULARY PREVIEW

- You may choose to preview the vocabulary words before reading the text.

marine biologists, n. people who study living organisms in the ocean

extinct, adj. no longer living or existing

conservation, n. the protection of species and their environments

genus, n. a group that contains living organisms with common characteristics

Vocabulary Chart for Chapter 5 "Marine Biologists"			
Vocabulary Type	**Tier 3 Domain-Specific Words**	**Tier 2 General Academic Words**	**Tier 1 Everyday Speech Words**
Core Vocabulary	marine biologists genus	extinct conservation	
Spanish Cognates	biólogos marinos género	extinto conservación	
Multiple-Meaning		conservation	
Sayings and Phrases			

Start Lesson

Lesson 5: Marine Biologists

Reading

45M

Primary Focus

Students will read and compare paired informational texts about important people and discoveries in the field of marine biology. **[RI.5.6, RI.5.9]**

Students will demonstrate an understanding of the Tier 2 word *conservation.* **[L.5.4]**

READ-ALOUD: CHAPTER 5 (25 MIN.)

- Have one student read The Big Question at the beginning of the chapter. Ensure students understand the meaning of The Big Question before reading the chapter.
  - What is the impact of a marine biologist's work on ocean ecosystems?
- Ask students, What does it mean to make an impact?
  - » *to make a difference*

Introduce Chapter 5

- Tell students you will read aloud "Marine Biologists." They should follow along in their Reader as you read.
- Have students turn to the table of contents, locate the chapter, and then turn to the first page of the chapter.
- Preview the vocabulary words before reading the chapter.
- Remind students that each vocabulary word is bolded the first time it appears in the chapter. These words are also in the glossary, which they may refer to at any time.

Read Chapter 5

- Begin reading chapter 5, "Marine Biologists" aloud.

Chapter 5

Marine Biologists

THE BIG QUESTION

What is the impact of a marine biologist's work on ocean ecosystems?

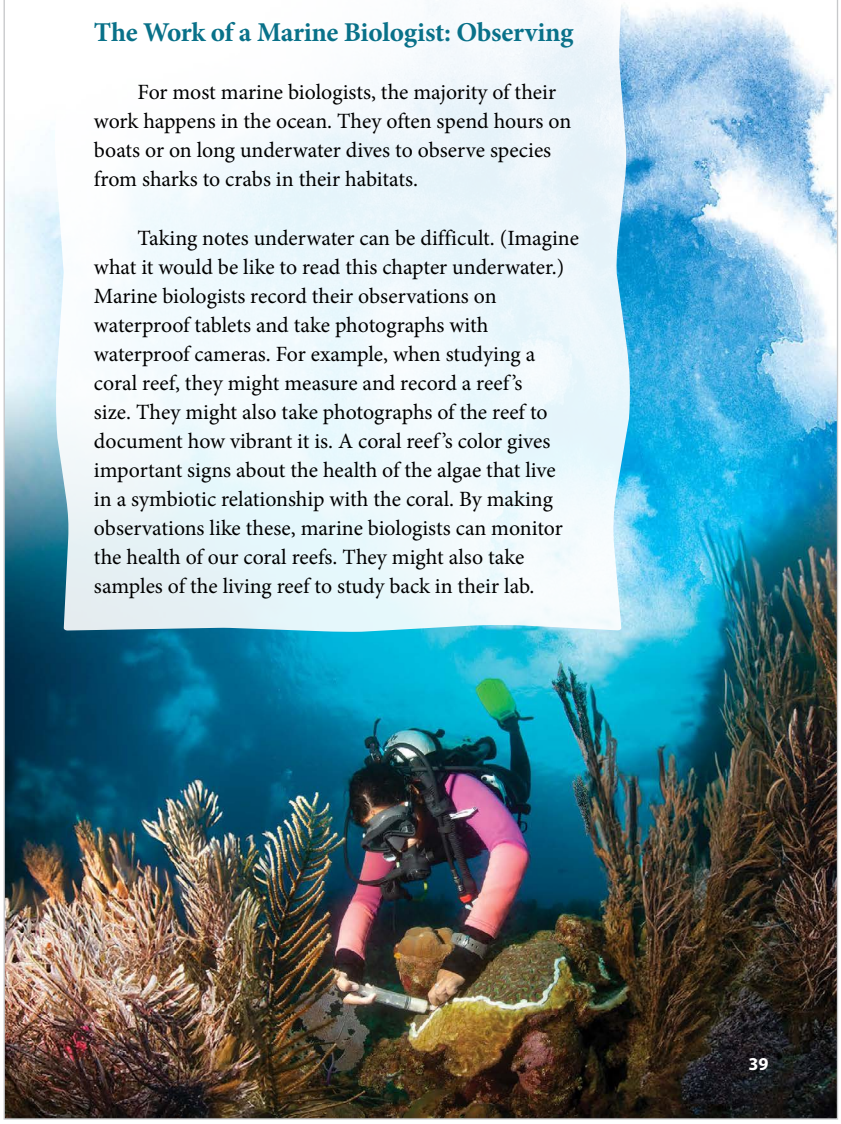
As we've started to see, marine life is fascinating and diverse. In fact, much of life on Earth is found in the world's oceans, a place humans don't inhabit. Oceans are home to organisms of all sizes, from tiny plants called phytoplankton, which you can only see under a microscope, to the world's largest creatures, such as the majestic blue whale, which can weigh up to 330,000 pounds!

The scientists who study marine life are called **marine biologists**. Like other biologists, marine biologists use tools like the trophic pyramid and food webs to study and understand organisms. Since marine biologists often work in an ecosystem they can't inhabit, gathering information on ocean species can be challenging. At the same time, that challenge makes the work rare and exciting. Imagine swimming through a bustling coral reef in special diving gear, waiting for an octopus to appear. Or imagine watching a dolphin give birth in the open ocean: a powerful experience few others get to see. As a marine biologist, you get to see these things and share them with the world.

The Work of a Marine Biologist: Observing

For most marine biologists, the majority of their work happens in the ocean. They often spend hours on boats or on long underwater dives to observe species from sharks to crabs in their habitats.

Taking notes underwater can be difficult. (Imagine what it would be like to read this chapter underwater.) Marine biologists record their observations on waterproof tablets and take photographs with waterproof cameras. For example, when studying a coral reef, they might measure and record a reef's size. They might also take photographs of the reef to document how vibrant it is. A coral reef's color gives important signs about the health of the algae that live in a symbiotic relationship with the coral. By making observations like these, marine biologists can monitor the health of our coral reefs. They might also take samples of the living reef to study back in their lab.



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Marine biologists also gather and record data. They might use a global positioning system, or GPS, to study the population and migration patterns of leatherback turtles. Biologists can attach tags to turtles' bodies and receive a GPS signal from the tags. The biologist can then use satellites, or tiny machines that orbit the earth and send and receive messages, to track the tagged turtle's exact location. This lets the biologist know where the turtle is, no matter where on the planet it swims. By studying the turtles' movements and interactions with their habitats, scientists can predict turtle birth rates and population changes. A marine biologist might even track the movement of sea turtles to their nesting beaches, where young hatchlings are born.

After locating a turtle laying eggs, the marine biologist lends a helping hand.

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Literal. What is a marine biologist?

» a scientist who studies life in the ocean

Literal. What are some examples of the work they do?

» Answers may vary but could include observing species, gathering and recording data, and tracking animal movements.

Inferential. What makes studying the ocean a unique challenge for marine biologists?

» Answers may vary but could include that they do not inhabit this environment and may need to dive with special equipment or travel by boat to do their work.

- Continue reading the chapter aloud.

The Ocean Floor

Along with studying marine species, marine biologists also study the ocean floor. One way they do this is through a process called coring. This process uses special tools called cores, which are similar to drills. Marine biologists use long wires to lower the cores to the bottom of the sea. The core works its way into the ocean floor and pulls up samples of sediment. Marine biologists study these samples to better understand the ocean floor.

Marine biologists can also study the ocean floor by using geographic information systems, or GIS. A GIS is made up of satellites in space that take pictures and other data about the Earth below. These satellites give us information about the depth of the seafloor, which helps us better understand the behavior of animals in some ocean zones. A GIS can also map coral reefs, which helps marine biologists observe reefs that might be in danger of disappearing.

Collecting sample cores can be messy work!

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Inferential. Why is the use of GPS useful for a marine biologist?

» Answers may vary but could include that it allows them to gather information and see locations that are very large or hard to access by diving or in a submarine.

- Read the first paragraph of "Conservation and Community Work." Then, discuss the following question.

Inferential. What makes determining if a species is at risk complicated in a marine ecosystem?

» Answers may vary but could include that there are many interconnected factors that can lead to damage including other endangered species.

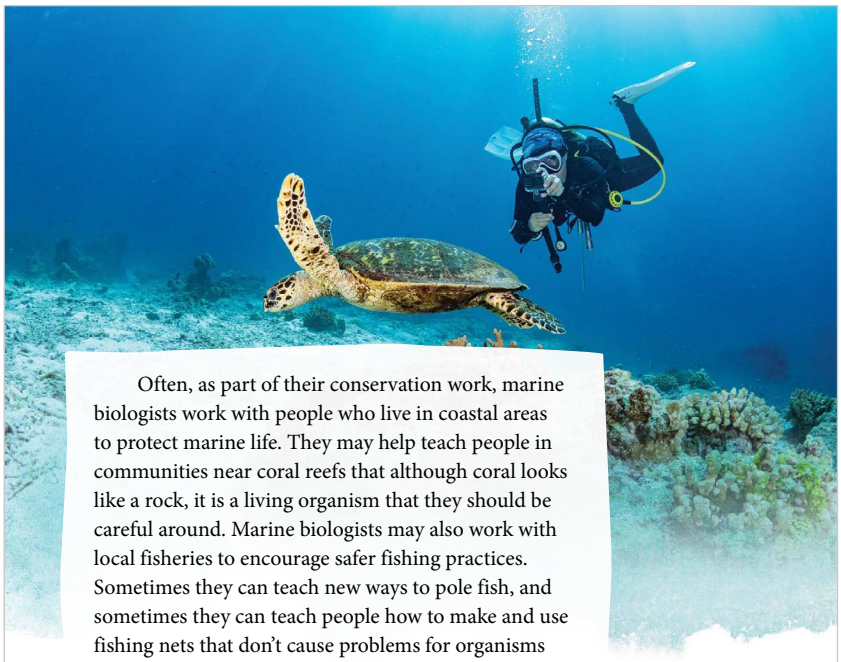
- Continue reading "Conservation and Community Work" aloud.

Conservation and Community Work

Food webs in ecosystems can be delicate, and many factors can damage them. If key producer or primary consumer species decline, or if an abiotic factor like salt level or temperature changes, it may affect other consumers in the ecosystem. If severe damage to an ecosystem's food web continues, organisms in the food web may not be able to get the food they need to survive. In some cases, a species might become endangered. An endangered species, to a biologist, has a population so small that there's a risk of the species going **extinct**.

Part of marine biology is studying species to understand why they might be endangered. But another part of their work is **conservation**, the protection of species and their environments.

These two parts of a marine biologist's work go hand in hand. For example, in the 1930s, fishermen working in California's Monterey Bay caught so many sardines that the species became hard to find. Marine biologists who studied the local sardine population noticed and worried about the decline. They brought their facts to the government, which passed laws to limit the number of sardines that could be taken out of the bay. Thanks to the work done by marine biologists, the sardine population recovered, and the species is plentiful in California today.



Diving equipment is used to study organisms that cannot be easily seen from a boat.

Often, as part of their conservation work, marine biologists work with people who live in coastal areas to protect marine life. They may help teach people in communities near coral reefs that although coral looks like a rock, it is a living organism that they should be careful around. Marine biologists may also work with local fisheries to encourage safer fishing practices. Sometimes they can teach new ways to pole fish, and sometimes they can teach people how to make and use fishing nets that don't cause problems for organisms in an ecosystem. This conservation work helps people understand how to keep the ocean healthy for future generations.

Challenges and Rewards

Scuba diving and underwater exploration can be dangerous, and hours upon hours of work go into research, study, and conservation efforts. But many marine biologists will tell you that the rewards are well worth facing these challenges. Marine biologists get a close and personal understanding of the mysterious world that thrives under the ocean's surface. And, not only that, marine biologists get to use their voice to protect that world and to help it thrive.

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Evaluative. How does working with communities help marine biologists do conservation work?

» Answers may vary but could include that involving the community helps improve the health of marine ecosystems by teaching the public about conservation and how to protect the places where they live and work.

- Remind students that they have been gathering details in texts to help them write their own informational texts. Tell students that they will also do that later in today's lesson. In preparation for writing their informational paragraphs, students will reread "Marine Biologists" and "Joan Murrell Owens: A Marine Biologist Who Broke Barriers." They will identify the main idea of each text and record supporting details on Activity Page 5.1.

- Direct students to Activity Page 5.1 and point to the "topic" and "main idea" lines under Text 1: "Marine Biologists."
- Ask, "How does a main idea differ from the main topic of a text?"
  - » Answers may vary but could include that a main idea says something specific about a topic; it includes the point an author is making about a topic.
- Explain that one way to identify the main idea of a text is to first identify the main topic, then ask, "What about this topic?" or "What did the author teach me about this topic?"
- **Turn and Talk:** Discuss with a neighbor: What is the main topic of the first text, "Marine Biologists"? What point is the author making about the main topic?
- Remind students to signal when both partners have contributed to the conversation.
- Ask a few students to share their partner's responses. Write their responses on the board.
  - » Answers may vary but could include that the topic is marine biologists; the author is making the point that marine biologists do challenging, rewarding work to improve ocean ecosystems.
- Have students record the topic and main idea for Text 1, "Marine Biologists," on Activity Page 5.1.
- Arrange students in the partners you have prepared.
- Have partners reread "Marine Biologists" and record supporting details from the text together.
- After taking notes, ask students to share some examples of supporting details from the text they have recorded on their activity page. Write these examples on the board.

Activity Page 5.1

Check for Understanding

Ask students how they selected supporting details to include in their graphic organizer.

- » The detail supported the main idea by providing examples and specific information that say more about the main idea.

READ "JOAN MURRELL OWENS: A MARINE BIOLOGIST WHO BROKE BARRIERS" (15 MIN.)

- Direct students to read "Joan Murrell Owens: A Marine Biologist Who Broke Barriers" independently.

Differentiation

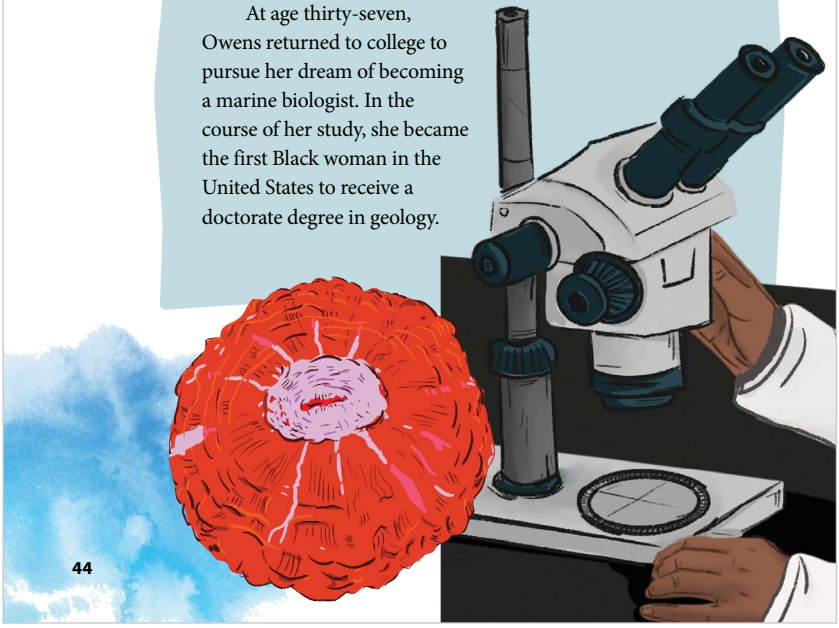
Support

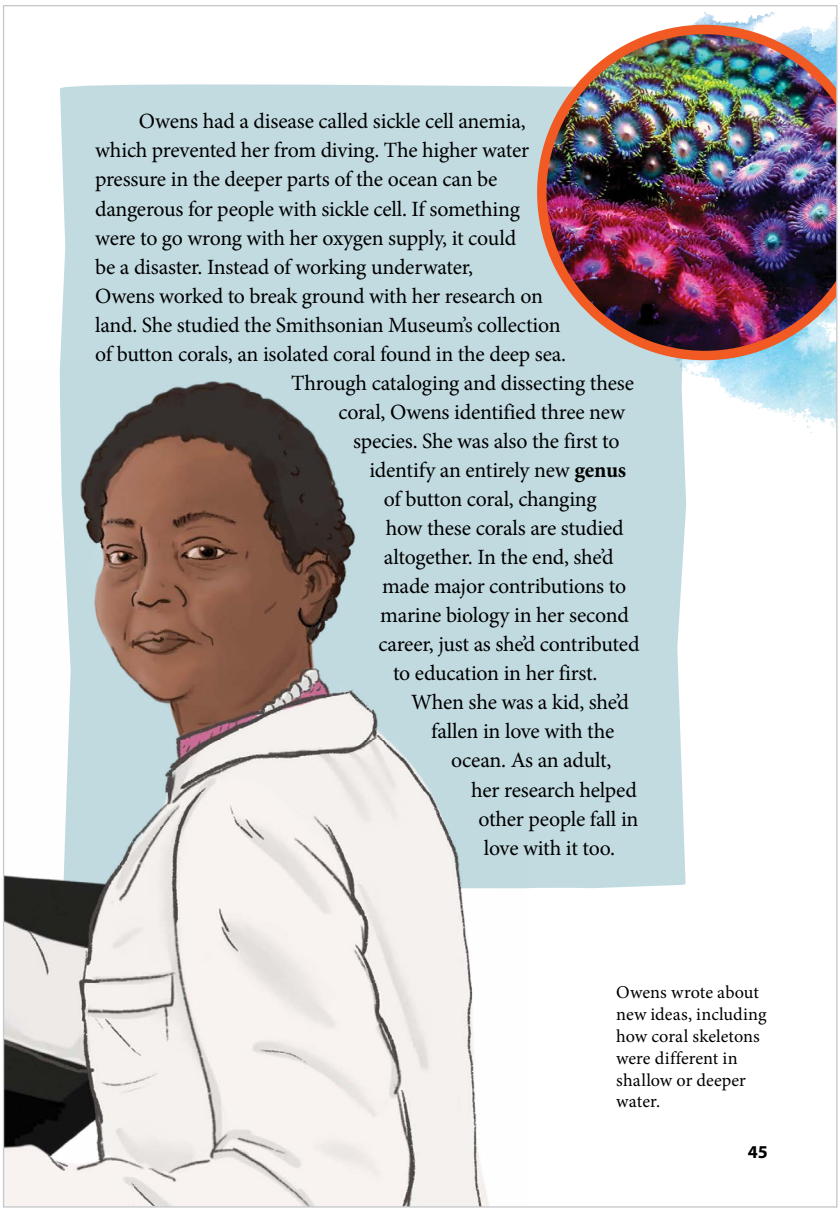
Allow students to read the text with a partner. Partners should work together to identify and record a main idea on Activity Page 5.1.

Joan Murrell Owens: A Marine Biologist Who Broke Barriers

Joan Murrell Owens was born in Florida in 1933. Her father was a fisherman, and while accompanying him and her siblings on fishing trips, Owens fell in love with the ocean. She was also fascinated by Eugenia Clark, a scientist who studied and swam with sharks. At a very young age, Owens decided she would become a marine biologist. Because her local university did not offer degrees in marine biology, Owens studied counseling and reading instruction instead. For a long time, she worked in education as a guidance counselor and a reading therapist. She was very successful in her education work. But she never forgot about the ocean.

At age thirty-seven, Owens returned to college to pursue her dream of becoming a marine biologist. In the course of her study, she became the first Black woman in the United States to receive a doctorate degree in geology.





- After students finish reading, discuss the text using the following questions.

Literal. When did Owens first become interested in the ocean?

» Answers may vary but could include that she was interested since she was a young child watching her father the fisherman and learning about Eugenia Clark.

Inferential. What challenges did Owens overcome?

» Answers may vary but could include that her local university did not offer a marine biology program so she earned her doctorate after a career in education, and that sickle cell anemia made diving dangerous so she conducted her work on land.

Evaluative. How has Owens contributed to the field of marine biology?

» She broke barriers as the first black woman with a doctorate in geology and identified new kinds of coral.

- **Turn and Talk:** Summarize the accomplishments of Owens as described in the text.
- Remind students to signal when both partners have contributed to the conversation.
- Ask a few students to share their neighbor's summary.
- Direct students to reread the text and record a main idea and supporting details on Activity Page 5.1 in the space labeled Text 2 with a partner.
- After finishing Activity Page 5.1, ask a few students to share the supporting details they added from "Joan Murrell Owens: A Marine Biologist Who Broke Barriers." Record these on the board.

ML/EL **MULTILINGUAL/ENGLISH LEARNERS**

Speaking and Listening

Exchanging Information and Ideas

Entering/Emerging	Have students read their work directly from Activity Page 5.1 to share their notes with the class.
Transitioning/ Expanding	Have students share their notes by summarizing with single words or simple phrases.
Bridging	Have students use the word *because* when sharing the notes they included on Activity Page 5.1, such as "I included ___ because ___."

WORD WORK: *CONSERVATION* (5 MIN.)

1. In the chapter you read, "Another part of their work is conservation, the protection of species and their environments."
2. Say *conservation* with me.
3. Conservation is the protection of species and their environments.
4. Conservation of endangered marine species is one part of a marine biologist's work.
5. What species or environments do you believe would benefit from conservation?
   - Ask two or three students to use the word *conservation* in a sentence. If necessary, guide and/or rephrase students' responses to make complete sentences: "Conservation would benefit _____." or "The conservation of _____."

6. What part of speech is the word *conservation*?
    - » noun

Use a Discussion activity for follow-up. Ask students to talk with their partners about ways conservation can impact marine food webs.

Lesson 5: Marine Biologists

Writing

Primary Focus: Students will write an informative paragraph about marine biology accomplishments using supporting details from paired informational texts. **[W.5.2b, W.5.2d]**

USING SUPPORTING DETAILS FROM TWO TEXTS (30 MIN.)

- Remind students that for the previous two lessons they have been working on gathering and organizing information and then using it to write a paragraph.
- Display the annotated copy of Visual Support 5.1.
- Remind students that this is a model of a complete paragraph, like the one they will be writing.
- Explain that in this lesson they will write another informative paragraph, with a focus on making that information as clear as possible for their reader.
- Ask, "What can make a text hard to understand?"
    - » Answers may vary but could include unfamiliar vocabulary or missing explanations.
- Ask, "How can an author clarify vocabulary and ideas that are new to the reader?"
    - » Answers may vary but could include text that includes definitions and simple explanations.
- Read the following line of text from "Joan Murrell Owens: A Marine Biologist Who Broke Barriers:"

  "She studied the Smithsonian Museum's collection of button corals, an isolated coral found in the deep sea."

- Ask, "How does this author help the reader understand what button corals are?"
  - » The text includes the definition, "an isolated coral found in the deep sea" in the text.

Activity Page 5.2

- Read the directions on Activity Page 5.2.
- Direct students to draft their informative paragraphs using the information gathered on Activity Page 5.1.
- Remind students that they should check their work, as needed, using the prompts on Activity Page 5.2.
- When students finish writing and using the checklist, direct students to exchange with a neighbor their finished paragraphs, checking that it contains:
  - All parts of a paragraph
  - Information that is clear to the reader
- Collect Activity Pages 5.1 and 5.2.

D Differentiation

Challenge

Encourage the student to use a mixture of short and longer sentences within the paragraph and vocabulary words from the text.

Support

Prompt students to underline the main idea and details from their planning page in their draft to check that their work is complete

ML/EL MULTILINGUAL/ENGLISH LEARNERS
Interacting in Meaningful Ways
Writing

Entering/Emerging	Have students dictate their writing while referring to their graphic organizer.
Transitioning/ Expanding	Provide a template constructed of sentence frames to be filled in by students, such as: ___ is a marine biologist. ___ studies___. To study___ they need to ___.
Bridging	Provide students with a copy of the annotated model paragraph as an exemplar while writing.

Lesson 5: Marine Biologists

Language

15M

Primary Focus: Students will apply grade-level phonics and word analysis skills to decode and encode targeted spelling words. **[RF.5.3a]**

SPELLING: PRACTICE (15 MIN.)

- Tell students that they will practice writing spelling words.
- Have students turn to Activity Page 5.3. Explain that they will work with a partner to sort the words and create sentences for each of these words.
- Remind students that they will complete their spelling assessment during the next lesson.
- Collect the completed Activity Page 5.3 to review and grade later.

Activity Page 5.3

End Lesson

LESSON

6

Coral Reefs and Kelp Forests

PRIMARY FOCUS OF LESSON

Language

Students will apply grade-level phonics and word analysis skills during an assessment of targeted words. **[RF.5.3a]**

Reading

Students will find and record key information, including main idea and details, about coral reefs and kelp forest ecosystems. **[RI.5.1, RI.5.2]**

Students will demonstrate an understanding of the Tier 2 word *clusters*. **[L.5.4]**

Writing

Students will write multiple paragraphs explaining characteristics of coral reefs and kelp forests. **[RI.5.1, W.5.8]**

FORMATIVE ASSESSMENT

Activity Page 6.3	**Paragraph Planning Page: Coral Reefs and Kelp Forests** Explain characteristics of coral reefs and kelp forests using precise vocabulary from their reading. **[W.5.2]**

Teacher Presentation Screens:
all lessons include slides

LESSON AT A GLANCE

	Grouping Recommendations	Time	Materials
Language (15 min.)			
Spelling Assessment	Independent	15 min.	❑ Activity Page 6.1
Reading (35 min.)			
Read-Aloud: Chapter 6	Whole Group/ Partner	30 min.	❑ *Life in the Fathoms* ❑ Activity Page 6.2
Word Work: *Clusters*	Whole Group	5 min.	
Writing (40 min.)			
Writing About Ocean Ecosystems: Coral Reefs and Kelp Forests	Whole Group/ Independent	40 min.	❑ Activity Pages 6.2–6.4 ❑ Visual Support 2.1

ADVANCE PREPARATION

Reading

- Prepare to display and annotate chapter 6 "Coral Reefs and Kelp Forests."
- Prepare to display Activity Page 6.2.

Writing

Visual Support 2.1

- Prepare to display Visual Support 2.1.

Universal Access

Writing

- Provide an individual copy of Visual Support 2.1 for students to follow at their seats. An annotated copy that matches the instruction may be used for additional support.

VOCABULARY PREVIEW

- You may choose to preview the vocabulary words before reading the text.

expedition, n. a trip for the purpose of exploration

amphipod, n. a type of animal with a shell and flat body that lives in the water

clusters, n. groups positioned close together, or clumps

polyp, n. a soft growth

Vocabulary Chart for Chapter 6 "Coral Reefs and Kelp Forests"

Vocabulary Type	Tier 3 Domain-Specific Words	Tier 2 General Academic Words	Tier 1 Everyday Speech Words
Core Vocabulary	amphipod polyp	expedition clusters	
Spanish Cognates	anfípodo pólipo	expedición	
Multiple-Meaning			
Sayings and Phrases			

Start Lesson

Lesson 6: Coral Reefs and Kelp Forests

Language

15M

Primary Focus: Students will apply grade-level phonics and word analysis skills during an assessment of targeted words. **[RF.5.3a]**

SPELLING ASSESSMENT (15 MIN.)

- Direct students to Activity Page 6.1 for the spelling assessment.
- Using the list below, read the words one at a time in the following way: say the word, use it in a sentence, and then repeat the word.
- Tell students that you will review the list once more at the end.
- Remind students to pronounce and spell each word syllable by syllable.
- After reading all the words, review the list slowly, reading each word once more.
- Collect all spelling assessments to grade later.

Activity Page 6.1

Spelling Words

1. adaptation
   - The fins of a fish are an adaptation that allows them to move in the water.
2. conservation
   - Conservation of marine life helps preserve fragile ecosystems.
3. function
   - The main function of a diver's oxygen tank is to allow them to breathe underwater.
4. extension
   - The deadline extension gave the scientist extra time to write their report.
5. extract
   - A marine biologist may extract samples to study the ocean's water.
6. absorb
   - Many producers absorb energy from light in the sunlight zone.

7. effective
   - Mangrove roots are effective at holding soil in place.
8. symbiotic
   - The symbiotic relationship between anemones and clownfish helps both organisms.
9. ecosystem
   - An ecosystem contains a variety of life that works together to thrive.
10. organism
    - An organism can be as small as plankton or as large as a whale.

Lesson 6: Coral Reefs and Kelp Forests

Reading

Primary Focus

Students will find and record key information, including main idea and details, about coral reefs and kelp forest ecosystems. **[RI.5.1, RI.5.2]**

Students will demonstrate an understanding of the Tier 2 word *clusters*. **[L.5.4]**

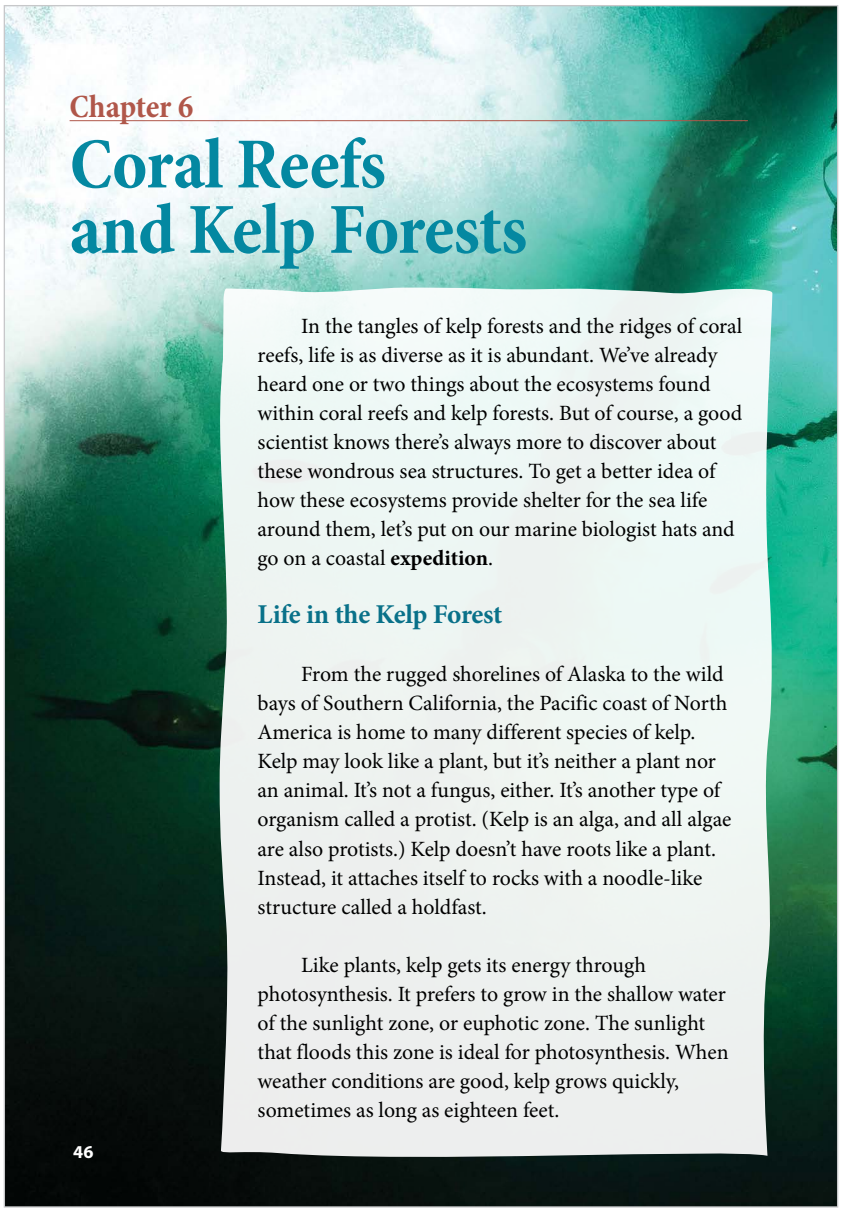
READ-ALOUD: CHAPTER 6 (30 MIN.)

Introduce the Chapter

- Tell students that they will read and take notes on chapter 6, "Coral Reefs and Kelp Forests," with their partners.
- Have students turn to the table of contents, locate the chapter, and then turn to the first page of the chapter.
- Preview the vocabulary words before reading the chapter.
- Ask, "How do you know when you encounter a new vocabulary word in the text?"
  - » The vocabulary word is bolded the first time it appears in the chapter.
- Ask, "Where else can you find these vocabulary words and their definitions?"
  - » These words are also in the glossary.
- Remind students that they may refer to the glossary at any time.

- Have one student read The Big Question at the beginning of the chapter. Ensure students understand the meaning of The Big Question before reading the chapter.
  - How do stationary organisms support the kelp forest and coral reef ecosystems?
- Ask, "What does *stationary* mean? What could be an example of a stationary organism?"
  - » *Stationary* means still, not moving. Answers may vary but could include plants.
- Ask students what information was recorded in their notes during the last lesson.
  - » main ideas and details
- Ask, "How did you determine the main idea of a text during the last lesson?"
  - » by identifying the main topic, then asking "What about this topic?" or "What point is the author making about this topic?"
- **Think-Pair-Share:** Have students discuss with a neighbor the strategies they used in the last class to determine which are the key details of a passage.
- Remind students to signal when both partners have contributed to the conversation.
- Ask a few students to share their partner's strategies and record them on the board.
- Explain that they will continue to record key details that support the main idea in their notes on Activity Page 6.2 today.
- Remind students that they may refer to their classmates' strategies as they work.
- Explain that they will read today's chapter at least twice so that the information needed for writing later on can be gathered.
- Draw a T-chart on the board.
- Read aloud the introduction and first section of chapter 6.

Activity Page 6.2



Chapter 6

Coral Reefs and Kelp Forests

In the tangles of kelp forests and the ridges of coral reefs, life is as diverse as it is abundant. We've already heard one or two things about the ecosystems found within coral reefs and kelp forests. But of course, a good scientist knows there's always more to discover about these wondrous sea structures. To get a better idea of how these ecosystems provide shelter for the sea life around them, let's put on our marine biologist hats and go on a coastal **expedition**.

Life in the Kelp Forest

From the rugged shorelines of Alaska to the wild bays of Southern California, the Pacific coast of North America is home to many different species of kelp. Kelp may look like a plant, but it's neither a plant nor an animal. It's not a fungus, either. It's another type of organism called a protist. (Kelp is an alga, and all algae are also protists.) Kelp doesn't have roots like a plant. Instead, it attaches itself to rocks with a noodle-like structure called a holdfast.

Like plants, kelp gets its energy through photosynthesis. It prefers to grow in the shallow water of the sunlight zone, or euphotic zone. The sunlight that floods this zone is ideal for photosynthesis. When weather conditions are good, kelp grows quickly, sometimes as long as eighteen feet.

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- Use a think-aloud as you model taking notes. For example:
  - Say, "I notice that this last phrase, 'life is as diverse as it is abundant,' is a general statement about kelp forests and coral reefs."
  - Say, "The details I read below fall under this idea, so I will record it as a main idea of this text in my notes."
  - Record the main idea on the left column of the T-chart you drew on the board.
  - Pause and direct students to record the main idea "life is as diverse as it is abundant in kelp forests and coral reefs" on Activity Page 6.2.

- Ask students to share the supporting details that should be recorded under this main idea.
  - » Answers will vary but could include "these ecosystems provide shelter for the sea life around them."
- Arrange students in the partners prepared in advance.
- Direct students to read the remainder of "Life in the Kelp Forest" with a partner.

Literal. Describe some examples of organisms found in a kelp forest.

» Answers may vary but could include: kelp provides food and shelter to other organisms, sea otters use kelp leaves to keep from floating away when resting, amphipods hide from predators in kelp leaves, urchins can eat too much kelp and create urchin barrens.

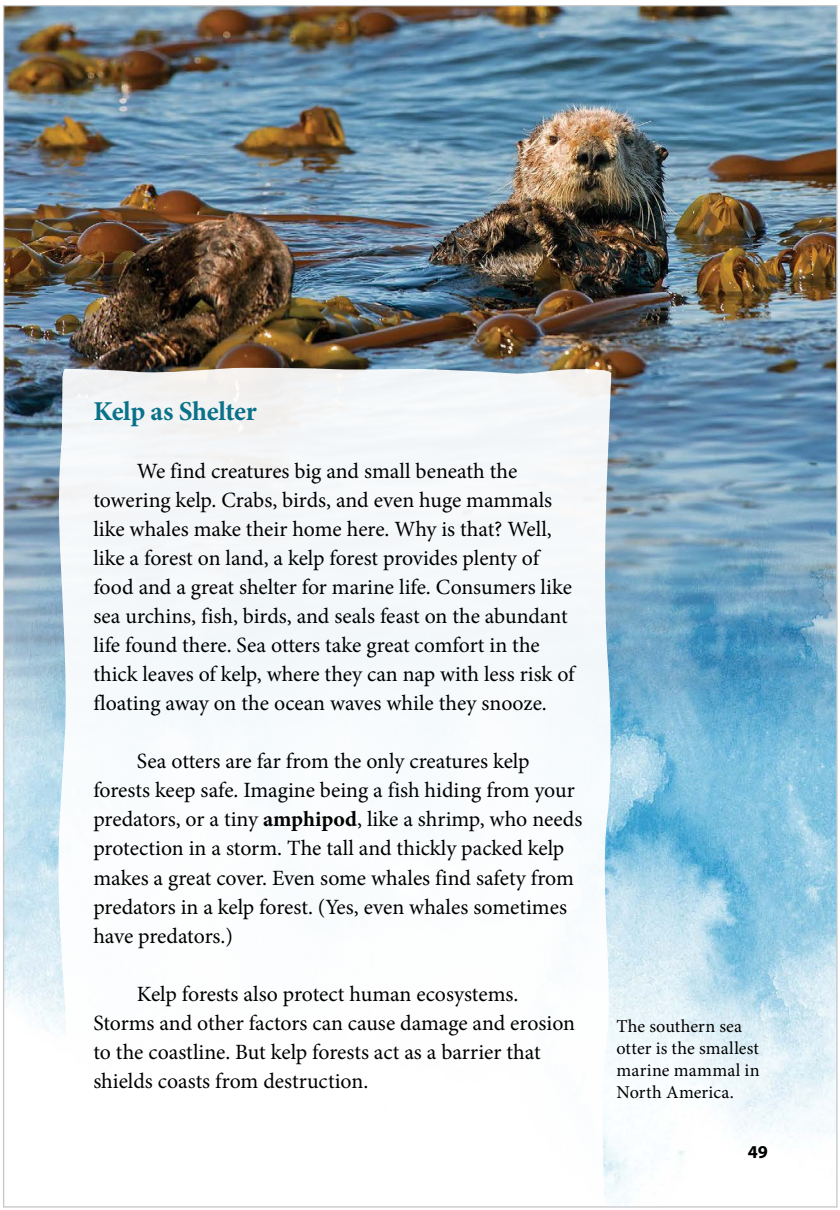
Literal. Which stationary organism uses energy from the sun?

» kelp

Inferential. What kind of organism in the trophic pyramid is this stationary organism and why?

» It's a producer, because it uses the sun for photosynthesis.

- Direct student partners to read the section titled "Life in the Kelp Forest" a second time, recording notes as they read.
- After taking notes, ask students to share the main ideas and details they recorded on Activity Page 6.2. Record these examples on the board.
- Direct students to read the remainder of chapter 6 with their partners.



Kelp as Shelter

We find creatures big and small beneath the towering kelp. Crabs, birds, and even huge mammals like whales make their home here. Why is that? Well, like a forest on land, a kelp forest provides plenty of food and a great shelter for marine life. Consumers like sea urchins, fish, birds, and seals feast on the abundant life found there. Sea otters take great comfort in the thick leaves of kelp, where they can nap with less risk of floating away on the ocean waves while they snooze.

Sea otters are far from the only creatures kelp forests keep safe. Imagine being a fish hiding from your predators, or a tiny **amphipod**, like a shrimp, who needs protection in a storm. The tall and thickly packed kelp makes a great cover. Even some whales find safety from predators in a kelp forest. (Yes, even whales sometimes have predators.)

Kelp forests also protect human ecosystems. Storms and other factors can cause damage and erosion to the coastline. But kelp forests act as a barrier that shields coasts from destruction.

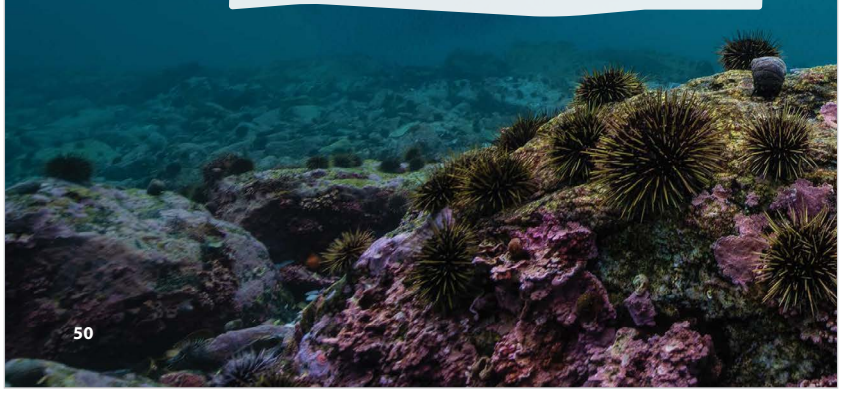
The southern sea otter is the smallest marine mammal in North America.

Food Webs in the Forest

As you might have guessed, the most common producer in a kelp forest is, well, kelp! But not every kelp forest is the same. Kelp comes in many different species, which thrive among other algae and phytoplankton. Two types of kelp that dominate North American coastlines are giant kelp and bull kelp. Giant kelp tends to thrive in rough Southern waters. It has long, thin blades of rubbery grass that grow from waving stems. Bull kelp—which looks nothing like a bull—thrives in Northern waters. This golden brown kelp floats near the surface of the water, a thick, tangly collection of strands that grow from round bulbs.

Sea stars, sea otters, and sea urchins are key consumers in the kelp forest. In a day, sea urchins can eat thousands of pounds of kelp. In turn, sea stars and sea otters eat the sea urchins.

Because sea urchins are primary consumers who are low on the trophic pyramid, you might think: the more sea urchins, the healthier the kelp forest. Right? But in fact, too many sea urchins can harm kelp forests,



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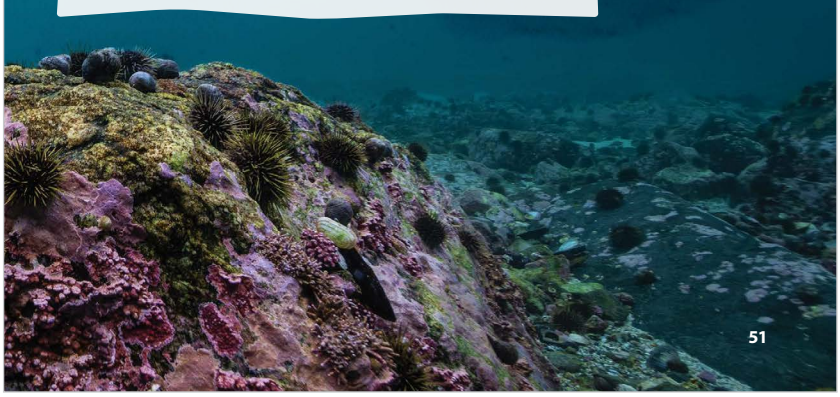
creating dead zones called urchin barrens. To strike the right balance, there need to be plenty of large consumers like sea stars and sea otters (not to mention foxes and birds) who eat sea urchins. Marine biologists work to protect those consumers so that they'll keep sea urchin populations down. This prevents these spiny purple consumers from eating up too much kelp and creating urchin barrens. When kelp forests are in balance, they grow into wild, nutrient-rich canopies that provide shelter for so many living things.

Creeping slowly across the kelp forest floor, one of the major detritivores in the kelp forest searches for a snack. Behold the hairy sea cucumber. Sometimes brown or dark green, sea cucumbers are similar in size to cucumbers found on land. But unlike land cucumbers, sea cucumbers are living organisms covered in little tubes that help them feed. Their many tubes help them move like caterpillars. They also use their tubes to eat up uneaten kelp and other waste floating in the water. They even filter the sand by absorbing bacteria, releasing cleaner sand back into the ocean. Pretty helpful for a sea pickle!

Sea cucumbers can shoot their toxic organs at predators to save their bodies from becoming a meal!

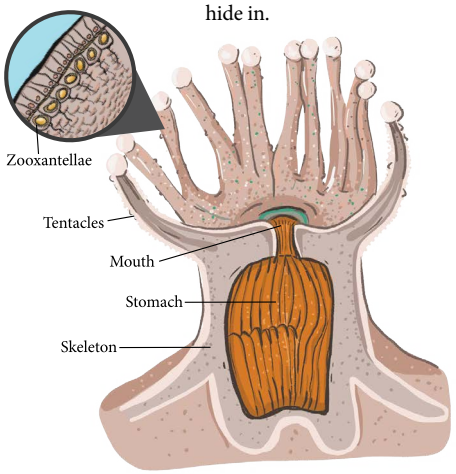


Can a Coral Reef Compare?

Kelp forests are a great respite for creatures who live in cooler waters. But now that our expedition to their weedy world is wrapped up, it's time to visit the warmer waters where coral reefs thrive. Just like kelp forests, coral reefs are amazing structures that provide food and coastal protection. In fact, millions of people around the world rely on coral reefs for protection from land erosion.

Corals That Stick Together Stay Together

Coral doesn't move, and it can be hard like a rock. But coral isn't a rock: it's an animal that grows and eats, even as it stays in one place in the ocean! Coral grows in **clusters**, or colonies. When these colonies become large, we call them reefs. When corals stick together, they create these rock-like structures for other animals to live and hide in.



Zooxanthellae use photosynthesis to produce the sugar that feed the coral polyps.

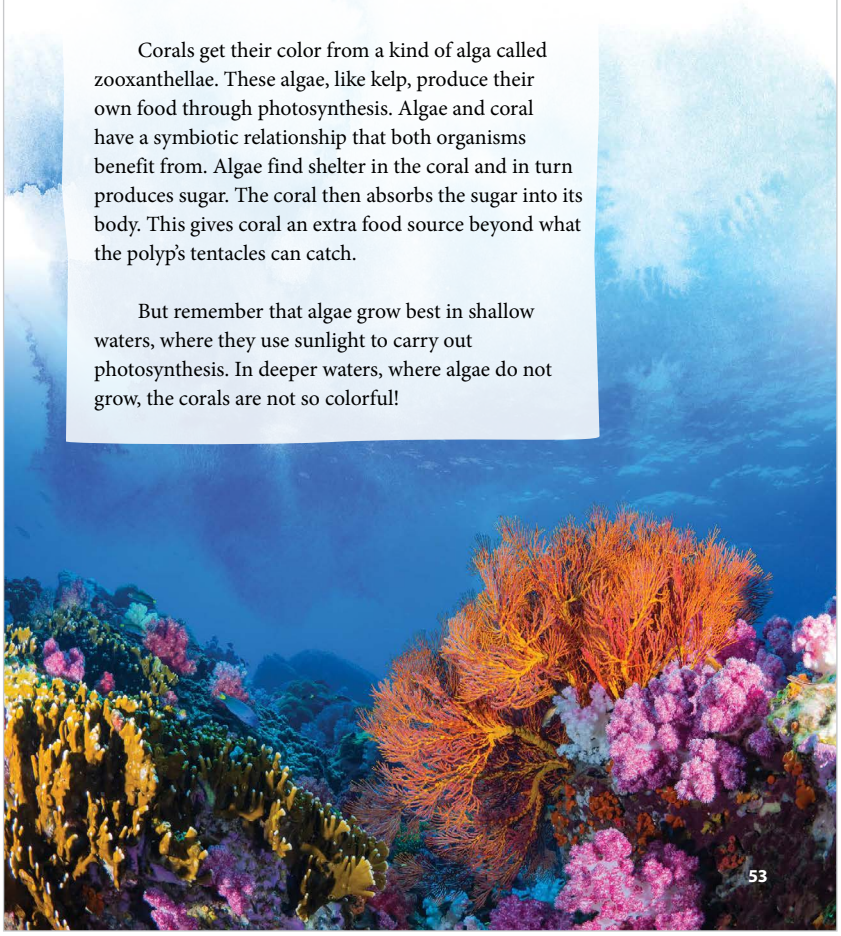
The soft part of a coral's body is called a **polyp**. The polyp is hollow and shaped like a cylinder, and it also has a mouth with tentacles. In deep water, corals use these to catch and eat food. A coral's polyp produces a stony skeleton made up of the chemical calcium carbonate, or limestone. This skeleton protects and supports the coral.

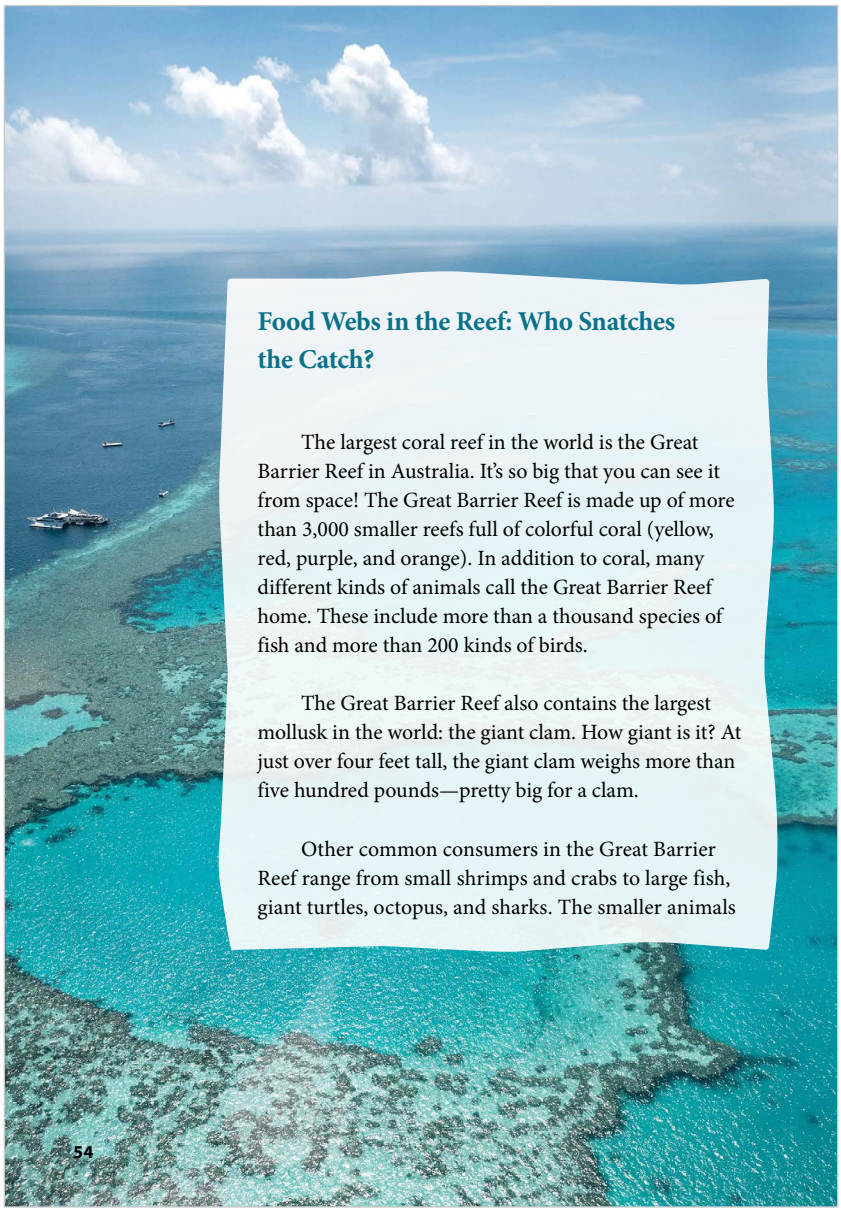
Some coral polyps don't have this hard skeleton, but they're still tough! We call these soft corals. Even though they are flexible, soft coral's bodies may grow spikes to deter predators.

How Does Coral Get Its Color?

Corals get their color from a kind of alga called zooxanthellae. These algae, like kelp, produce their own food through photosynthesis. Algae and coral have a symbiotic relationship that both organisms benefit from. Algae find shelter in the coral and in turn produces sugar. The coral then absorbs the sugar into its body. This gives coral an extra food source beyond what the polyp's tentacles can catch.

But remember that algae grow best in shallow waters, where they use sunlight to carry out photosynthesis. In deeper waters, where algae do not grow, the corals are not so colorful!





Food Webs in the Reef: Who Snatches the Catch?

The largest coral reef in the world is the Great Barrier Reef in Australia. It's so big that you can see it from space! The Great Barrier Reef is made up of more than 3,000 smaller reefs full of colorful coral (yellow, red, purple, and orange). In addition to coral, many different kinds of animals call the Great Barrier Reef home. These include more than a thousand species of fish and more than 200 kinds of birds.

The Great Barrier Reef also contains the largest mollusk in the world: the giant clam. How giant is it? At just over four feet tall, the giant clam weighs more than five hundred pounds—pretty big for a clam.

Other common consumers in the Great Barrier Reef range from small shrimps and crabs to large fish, giant turtles, octopus, and sharks. The smaller animals

feed on the algae, and the larger creatures feed upon the smaller ones. Reef sharks often feed in the same crevice over long periods of time, much as humans keep going back to their favorite restaurant. Generally, these sharks leave humans alone as they are not aggressive. But if you happen to be fishing, one might attempt to snatch your catch.

One of the most common detritivores in coral reefs are, again, sea cucumbers! There are more than 200 different types of sea cucumbers in the Great Barrier Reef, all working to clean up the waters and sand. Sea cucumbers are also a source of food for humans, and overharvesting has led to a decline in populations. Different countries, including the United States, have taken action to protect these detritivores from extinction.

Home Sweet Home

Our expedition into tangled webs of kelp forests and multi-colored ridges of coral reefs is over for now, but your exploration of ocean ecosystems is still well underway. As you continue to explore the different environments that marine organisms call home, try to ask two questions. What makes each ecosystem unique? And what similarities does it have to other ecosystems? You might be surprised by the answers. After all, who could have guessed that when it comes to both kelp forests and coral reefs, home is where the cucumbers are?

Giant clams, which can live for 100 years, depend on the zooxanthellae that live inside them.

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- After partners have finished reading, briefly discuss the following questions.

Literal. What stationary organism grows in a coral reef?

» coral

Inferential. How does a coral protect itself without being able to move?

» A coral "produces a stony skeleton made up of the chemical calcium carbonate" and "soft coral's bodies may grow spikes to deter predators."

- Direct student partners to read the text a second time, recording notes as they read.

Differentiation

Support

Read the text aloud to small groups requiring reading support, but work with partners to take notes.

ML/EL **MULTILINGUAL/ENGLISH LEARNERS**

Speaking and Listening

Exchanging Information and Ideas

Entering/Emerging	Have students refer to details in the text with single words and short phrases as needed.
Transitioning/ Expanding	Prompt students to use the word *because* as they take notes with a partner. For example, "We should include ___ because ___."
Bridging	Have students add to their partner's comments while discussing their notes. For example, "I agree with ___ because ___."

- After taking notes, have students share the main ideas and details they recorded on Activity Page 6.2. Record these examples on the board.

Check for Understanding

Ask students to name the two stationary organisms that kelp forests and coral reefs are reliant on.

» kelp, coral

- Discuss the comprehension questions below.

1. **Literal.** What kind of organism is kelp? What makes it different from a plant?
   » Kelp is a protist, which is different from a plant because it attaches itself with a holdfast instead of roots.
2. **Literal.** What kind of organism is coral? What makes it different from a rock?
   » A coral is an animal that creates a hard skeleton, but it also grows and eats like other animals. Answers may also include that some corals are soft corals without a skeleton.
3. **Evaluative.** Expand the following sentence stem by adding the conjunction *because* and appropriate details: Corals may be confused with rocks.
   » Answers may vary, but could include an example such as: Corals may be confused with rocks because their hard outer skeleton is similar in texture and appearance to rocks.

Differentiation

Challenge

Have students record extension questions they have about the text on sticky notes and place in the margins as they read.

WORD WORK: *CLUSTERS* (5 MIN.)

1. In the chapter you read, "Coral grows in clusters, or colonies."
2. Say *clusters* with me.
3. Clusters are groups positioned close together, or clumps.
4. Clusters of seagulls stood together against the cold wind.
5. What else can be found in a cluster?

   Ask two or three students to use the target word in a sentence. If necessary, guide and/or rephrase students' responses to make complete sentences.

6. What part of speech is the word *clusters*?

   » noun

Use a Discussion Activity for follow-up. Ask students to talk with their partners about things that are found in clusters and why. Make sure they use the word *clusters* in complete sentences as they discuss.

Lesson 6: Coral Reefs and Kelp Forests

Writing

Primary Focus: Students will write multiple paragraphs explaining characteristics of coral reefs and kelp forests. **[RI.5.1, W.5.8]**

WRITING ABOUT OCEAN ECOSYSTEMS: CORAL REEFS AND KELP FORESTS (40 MIN.)

- Display Activity Page 6.3. Direct students to the prompt on the planning page. Read the prompt aloud.
- Remind students that they have already gathered the details they will add to their graphic organizer in their notes.
- Have students begin planning on Activity Page 6.3.
- Remind students that, if they find that they have information missing from their finished planner on Activity Page 6.3, it may be necessary to go back and read portions of the text an additional time to gather that missing information.

Activity Page 6.3

Activity Page 6.4

- Tell students that they will now turn their notes into sentences to write a paragraph about "Coral Reefs and Kelp Forests."
- Direct students to Activity Page 6.4. Read the directions aloud.
- Direct students to the first bullet.
- Remind students to include important vocabulary from their notes in their paragraphs.

Check for Understanding

Ask students what key words are used in the directions of Activity Page 6.4 that should also be used in their paragraphs.

» kelp forests, coral reefs, zone, biotic and abiotic factors, organisms

MULTILINGUAL/ENGLISH LEARNERS
ML/EL Interacting in Meaningful Ways
Writing

Entering/Emerging	Have students circle key vocabulary in their notes to be included when writing.
Transitioning/ Expanding	Have students select a vocabulary word they have included and explain the meaning in their own words to a partner.
Bridging	Ask students to discuss with their partner a key vocabulary word they included and why.

Visual Support 2.1

- Display Visual Support 2.1.
- Direct students to the first and second sentences:
- Ask, "What key vocabulary word appears in both sentences?"
  - » ecosystem
- Explain that the author also explained this important word for the reader.

Activity Page 6.4

Differentiation

Challenge

Encourage students to include words from throughout the unit, such as morphology instruction and word work, in their writing.

Challenge

Have students use at least three different transitional phrases when explaining vocabulary or ideas in their writing. Examples may include *such as, for example, for instance,* and *in other words*.

Support

Provide an individual copy of Visual Support 2.1 for students to reference at their seats. Encourage students to underline or highlight the first two sentences that were used as an exemplar during writing instruction.

- Ask, "What phrases explain the word *ecosystem*?"
  - » "Oceans contain many places for living creatures to call home" and "a complex system of living things that rely on each other."
- Tell students to use this as an example for how they should include and explain key vocabulary in their own paragraphs.
- Direct students to begin writing.
- Collect completed writing.

End Lesson

LESSON

7

Estuaries and Mangrove Forests

PRIMARY FOCUS OF LESSON

Reading

Students will find and record key information, including main ideas and details, about estuary and mangrove forest ecosystems. **[RI.5.1, RI.5.2]**

Students will demonstrate an understanding of the Tier 2 word *erosion*. **[L.5.4]**

Language

Students will apply grade-level phonics and word analysis skills to decode and encode targeted spelling words. **[RF.5.3, RF.5.3a]**

Writing

Students will write multiple paragraphs explaining characteristics of estuaries and mangrove forests. **[RI.5.1, W.5.8]**

FORMATIVE ASSESSMENT

Activity Page 7.1	**Chapter 7 Notes** Find key information about estuary and mangrove forest ecosystems using vocabulary and relevant phrases in the reading. **[RI.5.1, RI.5.2]**
Activity Page 7.3	**Paragraph Planning Page: Estuaries and Mangrove Forests** Organize facts that explain characteristics of estuary and mangrove forest ecosystems using precise vocabulary from the reading. **[W.5.2d, W.5.8]**

Teacher Presentation Screens:
all lessons include slides

LESSON AT A GLANCE

	Grouping Recommendations	Time	Materials
Reading (40 min.)			
Read-Aloud: Chapter 7	Whole Group/ Partner/ Small Group	35 min.	❑ *Life in the Fathoms* ❑ Activity Page 7.1
Word Work: *Erosion*	Whole Group	5 min.	
Language (10 min.)			
Spelling: Introduce Spelling Words	Whole Group	10 min.	❑ Activity Page 7.2
Writing (40 min.)			
Planning with a Graphic Organizer	Whole Group/ Independent	15 min.	❑ Visual Support 2.1 ❑ Activity Page 7.3
Writing about Estuary and Mangrove Forest Ecosystems	Independent/ Partner/ Whole Group	25 min.	❑ Activity Page 7.4

ADVANCE PREPARATION

Reading

- Prepare partners for shared reading and notetaking.
- Prepare to assign reading parts for the jigsaw activity. Assignments may be random or based on student need. Please note that part four is shorter than the others.

Writing

Visual Support 2.1

- Prepare to display Visual Support 2.1.

Language

- Erase or cover the list of spelling words before the assessment.

Universal Access

Writing

- Prepare to provide individual copies of Visual Support 2.1 to students utilizing the writing segment support.

VOCABULARY PREVIEW

- You may choose to preview the vocabulary words before reading the text.

aquatic organism, n. a living thing whose habitat is in or around water

terrestrial organism, n. a living thing whose habitat is in or around land

microorganisms, n. organisms that are too small to be seen without a microscope

mollusks, n. animals with soft bodies that live in shells

erosion, n. process in nature where land is worn away by water running over it, again and again, over a period of time

Vocabulary Chart for Chapter 7 "Estuaries and Mangrove Forests"			
Vocabulary Type	**Tier 3 Domain-Specific Words**	**Tier 2 General Academic Words**	**Tier 1 Everyday Speech Words**
Core Vocabulary	aquatic organism terrestrial organism microorganisms mollusks	erosion	
Spanish Cognates	organismo acuático organismo terrestre microorganismos moluscos	erosión	
Multiple-Meaning			
Sayings and Phrases			

Start Lesson

Lesson 7: Estuaries and Mangrove Forests

Reading

40M

Primary Focus

Students will find and record key information, including main ideas and details, about estuary and mangrove forest ecosystems. **[RI.5.1, RI.5.2]**

Students will demonstrate an understanding of the Tier 2 word *erosion*. **[L.5.4]**

READ-ALOUD: CHAPTER 7 (35 MIN.)

Introduce the Chapter

- Tell students they will begin by reading and taking notes on chapter 7, "Estuaries and Mangrove Forests," with a partner.
- Have students turn to the table of contents, locate the chapter, and then turn to the first page of the chapter.
- Preview the vocabulary words before reading the chapter.
- Ask, "How do you know when you encounter a new vocabulary word in the text?"
  - » The vocabulary word is bolded the first time it appears in the chapter.
- Ask, "Where else can you find these vocabulary words and their definitions?"
  - » These words are also in the glossary.
- Remind students that they may refer to the glossary at any time.

Read "Estuaries and Mangrove Forests"

Activity Page 7.1

- Have one student read The Big Question at the beginning of the chapter. Ensure students understand the meaning of The Big Question before reading the chapter.
  - How do terrestrial and aquatic organisms contribute to ecosystems that support each other?

Chapter 7

Estuaries and Mangrove Forests

THE BIG QUESTION

How do **terrestrial** and **aquatic organisms** contribute to ecosystems that support each other?

When the land and the ocean meet, they create coastlines. Coastlines have features of both the land and the ocean, and they come in many different forms. Sometimes they look like the warm, sandy beaches of Southern California, where people lounge and play. But they can also look like the cliffs of Reynisfjara (REY-niss-fya-ra) in Iceland, where cold and violent waves crash against tall, black rocks.

All coastal landscapes occur in the ocean's intertidal zone. The intertidal zone is any part of the ocean that's below water at high tide and above water at low tide. Coastal landscapes like estuaries and mangrove

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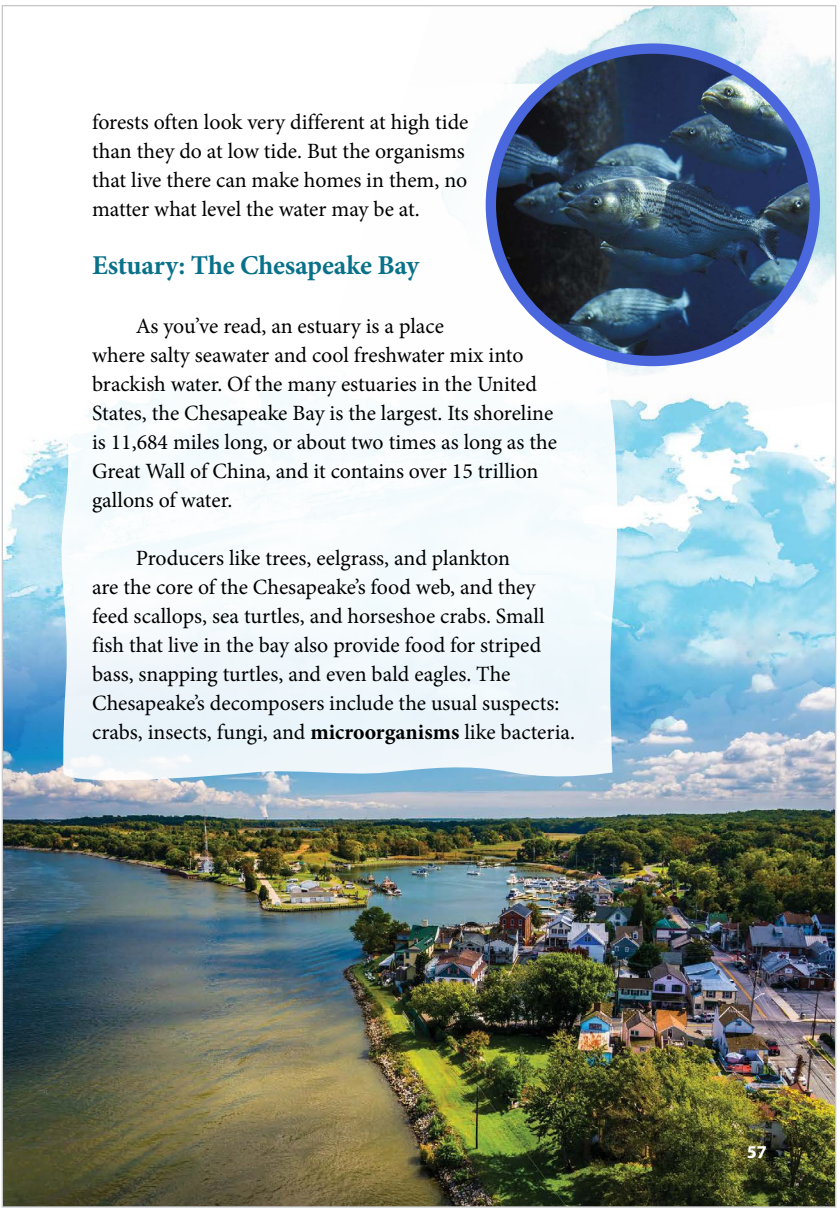
- Ask "What does it mean to be a terrestrial or aquatic organism?"
  - » Terrestrial organisms generally live on land and aquatic organisms generally live in the water.
- Read the first two paragraphs of the text aloud.



forests often look very different at high tide than they do at low tide. But the organisms that live there can make homes in them, no matter what level the water may be at.

Estuary: The Chesapeake Bay

As you've read, an estuary is a place where salty seawater and cool freshwater mix into brackish water. Of the many estuaries in the United States, the Chesapeake Bay is the largest. Its shoreline is 11,684 miles long, or about two times as long as the Great Wall of China, and it contains over 15 trillion gallons of water.

Producers like trees, eelgrass, and plankton are the core of the Chesapeake's food web, and they feed scallops, sea turtles, and horseshoe crabs. Small fish that live in the bay also provide food for striped bass, snapping turtles, and even bald eagles. The Chesapeake's decomposers include the usual suspects: crabs, insects, fungi, and **microorganisms** like bacteria.

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Literal. What is a coastline?

» where the land and sea meet

Literal. What causes these areas to appear very different at different times of the day?

» Intertidal areas are covered or exposed by water depending on the tide level.

- **Turn and Talk:** What details about coastlines are in the first two paragraphs?
- Remind students to signal when both partners have contributed to the conversation.
- Ask a few students to share their partner's response and record them on the board.

    - » Answers may vary but could include that they "have features of both the land and the ocean," may be warm and welcoming or cold with "violent waves," occur in the "intertidal zone," and "any part of the ocean that's below water at high tide and above water at low tide."
- Draw a T-chart on the board and model taking notes with a think-aloud.
    - The first line of this paragraph introduces the main topic, coastlines. I noticed that all the details that follow in this paragraph are about coastlines in some way. To find the main idea of this paragraph, I'll ask myself, "What about coastlines?" The first sentence says that coastlines are created where "the land and ocean meet." The paragraph also mentions that they "come in many different forms" and says they can be warm and sandy or cold and rocky. So I think the author's point about coastlines is that they are diverse areas where the land meets the ocean.
    - I will record the main idea, "Coastlines are diverse areas where the land meets the ocean," on the left side of my chart.
    - I see the rest of the first paragraph describes their different forms, warm and sandy or cold and rocky, for example.
    - I will record those details to the right of my main idea in my chart.
    - Now I'll find the main idea of the second paragraph. I see the first line of the second paragraph describes where coastlines occur, the intertidal zone. I can see intertidal and tide appear in many of the sentences that follow.
    - I know that the main topic is intertidal zones. So I'll figure out the main idea by asking, "What about intertidal zones?"
    - I see a few supporting details about intertidal zones here, such as "any part of the ocean that's below water at high tide and above water at low tide." Those are the exact words from the text, so I will use quotation marks when I write them in my notes.
- **Turn and Talk:** What other details remain in the paragraph?
- Ask a few students to share their partner's response and record them on the board.
    - » Answers may vary but could include that coastlines look different at low and high tides, or that organisms can live there regardless of water level.
- Ask, "Based on the supporting details we recorded on the board, what is the main idea of this paragraph? Remember that the main topic is intertidal zones, so ask yourself, 'What about intertidal zones?'"

- » Answers may vary but could include that intertidal zones contain coastal landscapes that can look very different depending on the tide levels.

- Ask, "What text feature can we use on this page to help us predict what will likely be the main topic of the next section of this text?"
  - » Answers may vary but could include bold headings, specifically "Estuary: The Chesapeake Bay."
- Direct students to read the first two paragraphs of "Estuary: the Chesapeake Bay" together.
- **Turn and Talk:** Have students discuss with a neighbor, "What was the main idea of this section of the text?"
- Remind students to signal when both partners have contributed to the conversation.
- Ask a few students to share their partner's response.
  - » Answers may vary but could include that the Chesapeake Bay is a large, unique estuary that is an important environment for many organisms.
- Tell students they will now read the text a second time, independently. Ask them to look for details that support the main idea.
- **Turn and Talk:** Have students discuss with a neighbor, "What were the supporting details about Chesapeake Bay in this section of the text?"
- Ask a few students to share their partner's response.
  - » Answers may vary but could include that Chesapeake Bay is "where salty seawater and cool freshwater mix into brackish water," it is the largest estuary in the United States, it contains producers such as trees, eelgrass and plankton, it contains consumers such as fish, turtles, and eagles, and it contains decomposers such as crabs, insects, fungi, and bacteria.

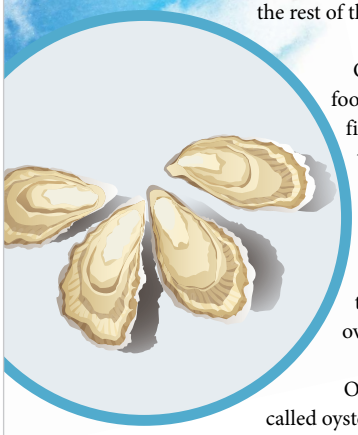
Inferential. Which of these details apply to other estuaries besides the Chesapeake Bay? Why?

- » "Where salty seawater and cool freshwater mix into brackish water" applies to all estuaries because all estuaries are located where the saltwater ocean and freshwater rivers meet.

- **Evaluative.** Why would the other details only apply to Chesapeake Bay?
  - » Chesapeake Bay is one location with its own unique characteristics, so many organisms in that ecosystem are different from other estuaries, such as the cold cliffs of Reynisfjara.
- Explain that students will read and take notes on the rest of the text with a partner.
- Remind students that they will read the text twice. The first time they will read for understanding. The second time they will take notes on Activity Page 7.1.

Oyster Reefs

One of the most common animals of the Chesapeake Bay are eastern oysters. Oysters, like clams and scallops, are **mollusks**. (Mollusks are a kind of soft-bodied animal that has a hard shell.) But unlike clams and scallops, oysters can't move around very easily. As larvae, or spat, they attach their shells to a single surface. It might be the seafloor of the bay, a large rock, or a piece of driftwood. Whatever they choose, oysters spend the rest of their lives in that one spot.



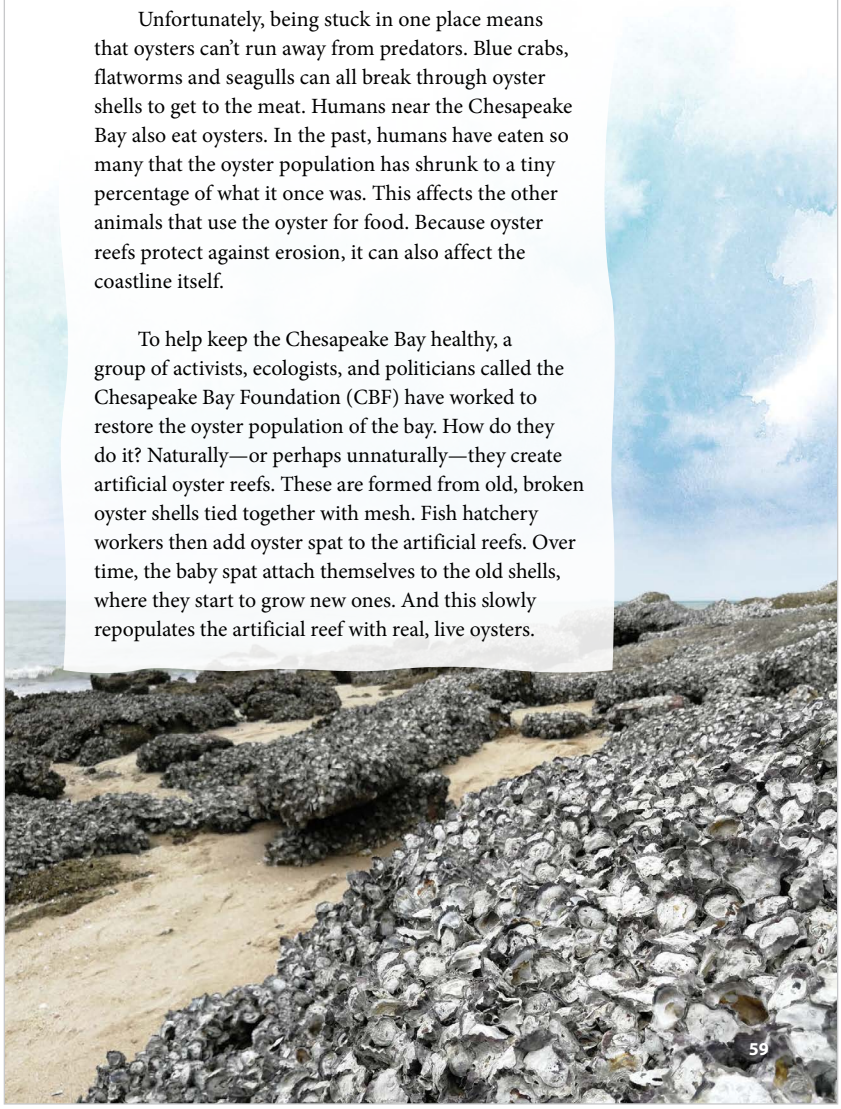
Oysters provide clean water for their neighbors by filtering up to 50 gallons each day.

Oysters are a major part of the Chesapeake's food web, and not just as food. Oysters are filter feeders. In order to eat, they pump water through their bodies and strain it in search of algae and nutrients. When they do this, oysters also remove algae and chemicals from the water, making it very clear and clean. This helps keep other organisms in the Chesapeake healthy and strengthens the overall food web.

Oyster shells also form into hard habitats called oyster reefs. Other animals in the Chesapeake use these for shelter, and they also help protect coasts. When the tide fills an estuary, the ocean's waves crash onto the shore. Sometimes they cause the rocks and soil of the coast to break up and slide into the ocean, which we call **erosion**. Coral reefs and kelp forests help protect coastlines from erosion. In estuaries with high oyster populations, so do oyster reefs.

Unfortunately, being stuck in one place means that oysters can't run away from predators. Blue crabs, flatworms and seagulls can all break through oyster shells to get to the meat. Humans near the Chesapeake Bay also eat oysters. In the past, humans have eaten so many that the oyster population has shrunk to a tiny percentage of what it once was. This affects the other animals that use the oyster for food. Because oyster reefs protect against erosion, it can also affect the coastline itself.

To help keep the Chesapeake Bay healthy, a group of activists, ecologists, and politicians called the Chesapeake Bay Foundation (CBF) have worked to restore the oyster population of the bay. How do they do it? Naturally—or perhaps unnaturally—they create artificial oyster reefs. These are formed from old, broken oyster shells tied together with mesh. Fish hatchery workers then add oyster spat to the artificial reefs. Over time, the baby spat attach themselves to the old shells, where they start to grow new ones. And this slowly repopulates the artificial reef with real, live oysters.

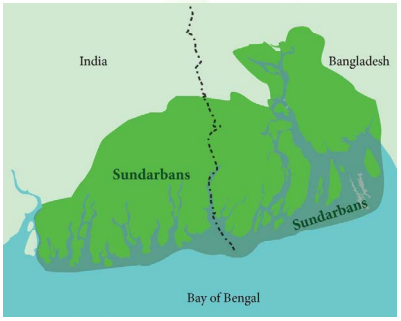


Mangrove Forest: The Sundarbans

You may have noticed that some of the animals tangled up in the Chesapeake's food web, like the bald eagle, weren't technically marine life. This is something true of all coastal ecosystems. When the food webs of the land and the water become linked, what happens in the water affects what happens on land, too. Keep this in mind as we take our next journey.

When the Ganges River and the Indian Ocean meet an estuary is created.

In Bangladesh and eastern India, there's a stretch of coast where dozens of rivers, including the Ganges, meet the ocean. Together, they create brackish water that connects a network of islands, inlets, and peninsulas. Here, sturdy grasses and mangrove trees with huge, snaking roots coat the patches of dry land. Monkeys screech and play in their branches, while shrimps, small fish, and amphibians dart around their underwater roots.



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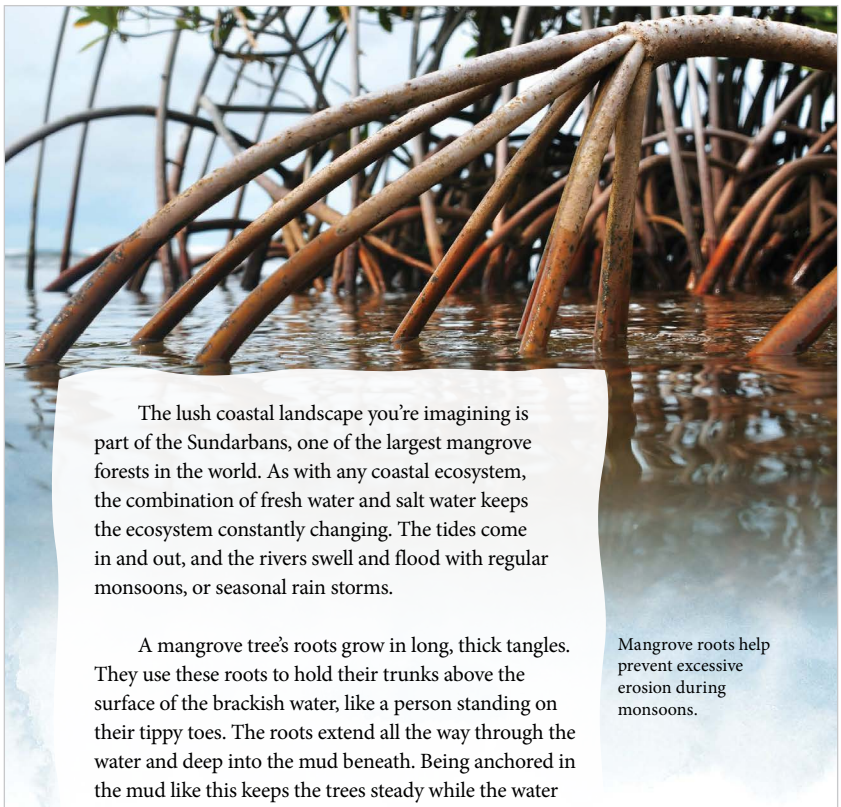
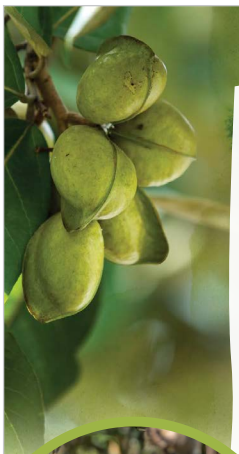


The lush coastal landscape you're imagining is part of the Sundarbans, one of the largest mangrove forests in the world. As with any coastal ecosystem, the combination of fresh water and salt water keeps the ecosystem constantly changing. The tides come in and out, and the rivers swell and flood with regular monsoons, or seasonal rain storms.

A mangrove tree's roots grow in long, thick tangles. They use these roots to hold their trunks above the surface of the brackish water, like a person standing on their tippy toes. The roots extend all the way through the water and deep into the mud beneath. Being anchored in the mud like this keeps the trees steady while the water around them raises, lowers, rushes, and stops.

Mangrove roots help prevent excessive erosion during monsoons.

Mangrove roots also help the mangrove tree filter the water around it. You might think that since mangrove trees live in brackish water, they prefer its high salinity, or level of salt. But mangrove trees actually need fresh water to live. Over time, they've adapted to using their roots to filter out salt. Where does the salt from the water go? You can find crystals of it coating the leaves of some mangrove species.

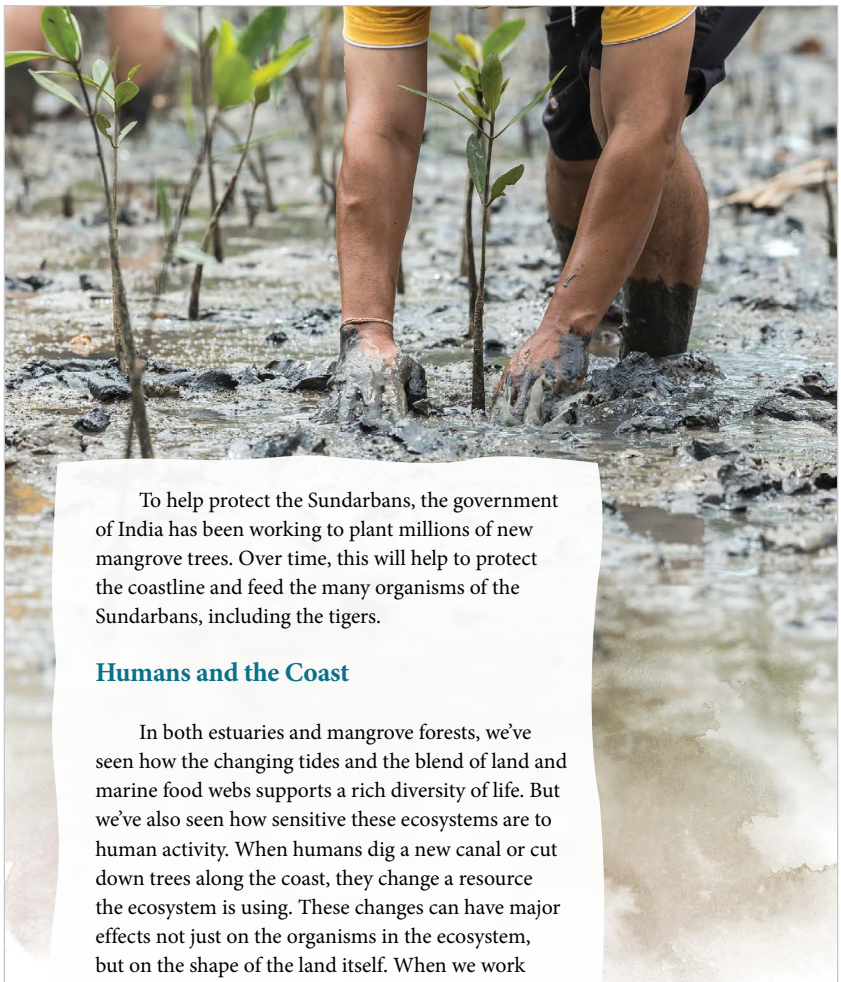


Mangroves and Dolphins and Tigers (Oh My)

The bright red flowers, sour mangrove apples, and salty leaves of mangrove trees provide food to a range of consumers, including crabs and rhesus monkeys. (Mangrove apples are lime green and tangy, and they're very different from the apples we find in orchards.) Fungi and other detritivores break down the waste from these consumers, and shrimp and oysters prey on them in turn. Larger consumers like monitor lizards and humpback dolphins eat everyone else.

However, the apex predator of the Sundarbans is the Bengal tiger. As expert swimmers, climbers, and runners, they can hunt high and low, from treetops to river bottoms. But despite their status as top cat, Bengal tigers are an endangered species. Although some Bengal tigers live in other areas, researchers have counted fewer than 100 tigers left in the Sundarbans.

Why are the Bengal tigers disappearing? One reason is deforestation. Deforestation occurs when humans cut down trees to make room for farms or cities. When there is no forest, the Bengal tigers can't climb, hide, or hunt. Remember, also, how central mangrove trees are to this food web. If people remove the trees, smaller consumers and producers don't have as much food, and the tigers have less to hunt. The mangrove trees also protect the coastline, just like oyster reefs in the Chesapeake.



To help protect the Sundarbans, the government of India has been working to plant millions of new mangrove trees. Over time, this will help to protect the coastline and feed the many organisms of the Sundarbans, including the tigers.

Humans and the Coast

In both estuaries and mangrove forests, we've seen how the changing tides and the blend of land and marine food webs supports a rich diversity of life. But we've also seen how sensitive these ecosystems are to human activity. When humans dig a new canal or cut down trees along the coast, they change a resource the ecosystem is using. These changes can have major effects not just on the organisms in the ecosystem, but on the shape of the land itself. When we work to understand these ecosystems, we also start to understand more of what it takes to keep them healthy. In the end, the health of our land ecosystems depends on the health of our coasts.

Humans can support estuary ecosystems by replacing lost mangrove trees through replanting.

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Discuss "Estuaries and Mangrove Forests"

- When all students have finished reading and taking notes, discuss the comprehension questions below.

1. **Literal.** Why do estuaries and mangrove forests contain terrestrial and aquatic organisms?
    - » Answers may vary but could include that estuaries and mangrove forests exist where there is both land and water, providing habitats for both terrestrial and aquatic organisms in those ecosystems.
2. **Literal.** Expand the following sentence stem by adding details that explain when, where, how, and why to write one sentence: "Human activity may impact the ecosystem."
    - » Answers may vary but could include an example such as, "When they remove trees or build artificial oyster beds in marine environments, humans may impact the estuary ecosystem because they are changing the habitat of the organisms that live there."
3. **Inferential.** What adaptations of a mangrove tree show that it would not thrive in water with high salinity?
    - » Answers may vary but could include that it grows away from the brackish water on high roots and the leaves filter out the salt from the water.
4. **Evaluative.** How does having areas of land and water make estuaries and mangrove forests vulnerable to harm from human activity?
    - » Answers may vary but could include that changes to the land and changes to the water could impact each other because "the blend of land and marine food webs supports a rich diversity of life."

Check for Understanding

How does the terrestrial mangrove tree support the marine organisms in a mangrove forest?

» Its roots provide shelter for marine organisms.

Jigsaw: Comparing Notes

Small Group

- After students have read the text and taken notes, arrange them into small groups of four for a jigsaw activity.
  - Assign each student one portion of the text:

    Part 1: "Estuary: The Chesapeake Bay and Oyster Reefs"

    Part 2: "Mangrove Forest: The Sundarbans"

    Part 3: "Mangroves, Dolphins and Tigers (Oh My)"

    Part 4: "Humans and the Coast"
  - Each student will share their notes for their assigned section of the text with the group. The group will consult their own notes and check if they are similar.
  - Have students discuss notes that are different from those being shared. Revise notes as needed.
  - Each student takes a turn sharing their notes until all sections of the text have been reviewed by the group.
- Circulate as students work.
  - Ask students to share how they decided which details to include in their notes.

Differentiation

Challenge

Have students generate alternate headings that could be included in the Reader.

WORD WORK: *EROSION* (5 MIN.)

1. In the chapter you read, "Because oyster reefs protect against erosion, it can also affect the coastline itself."

   This sentence contains the word *erosion*.

2. Say *erosion* with me.
3. *Erosion* is a process in nature where land is worn away by water running over it, again and again, over a period of time.
4. Every time a wave crashes onto the rocky shore it contributes to the *erosion* that will someday turn the rock into sand.
5. How or where else could *erosion* occur? Be sure to use the word *erosion* in your response.
   - Ask two or three students to use *erosion* in a sentence. If necessary, guide and/or rephrase students' responses to make complete sentences:

     "*Erosion* happens when _____." "_____ causes *erosion.*"
6. What part of speech is the word *erosion*?
   - » noun

Lesson 7: Estuaries and Mangrove Forests

Language

Primary Focus: Students will apply grade-level phonics and word analysis skills to decode and encode targeted spelling words. **[RF.5.3, RF.5.3a]**

SPELLING: INTRODUCE SPELLING WORDS (10 MIN.)

Activity Page 7.2

- Direct students to Activity Page 7.2.
- Explain that students will practice 10 words related to content in the Reader. These words do not follow one single spelling pattern. Tell students they will be assessed on these words and will write a dictated sentence related to one or more of these words, later in the unit, in Lesson 11.
- Introduce the words by writing them on the board/chart paper. Say the word aloud, and then sound out each syllable, naming each letter aloud as you write it. Continue syllable by syllable until the word is spelled correctly. You may wish to use the pronunciation chart to guide students in saying the words.

Spelling Words

1. biotic
2. debris
3. microorganism
4. clarity
5. crevice
6. rigid
7. biologist
8. chemical
9. biodegradable
10. entangle

Pronunciation Table		
Word	**CK Code**	**Syllable Type**
biotic	/bie*ah*tik/	open*closed
debris	/de*bree/	open*open
microorganism	/mie*kroe*or*ge*ni*zəm/	open*open*closed*open*open*ə
clarity	/kler*ə*tee/	r-controlled*ə*open
crevice	/kre*vis/	open*closed
rigid	/ri*jid/	closed*closed
biologist	/bie*ah*loe*jist/	open*open*open*closed
chemical	/ke*mi*kal/	closed*closed*closed
biodegradable	/bie*oh*dee*grae*dee*bl/	open*open*open*open*closed
entangle	/en*tae*gl/	open*open*closed

Lesson 7: Estuaries and Mangrove Forests

Writing

40M

Primary Focus: Students will write multiple paragraphs explaining characteristics of estuaries and mangrove forests. **[RI.5.1, W.5.8]**

PLANNING WITH A GRAPHIC ORGANIZER (15 MIN.)

- Remind students that in the last class they used their notes to write about the kelp forest and coral reef ecosystems.
- Explain that they will use their notes in this lesson to write about estuary and mangrove forest ecosystems.
- Direct students to Activity Page 7.3. Read the directions aloud.
- Direct students to fill in their graphic organizer on Activity Page 7.3 using their notes from Activity page 7.1 related to the main idea and details in chapter 7.

Activity Page 7.3

ML/EL MULTILINGUAL/ENGLISH LEARNERS

Interacting in Meaningful Ways

Writing

Entering/Emerging	Have students orally explain the graphic organizer or paragraph to a partner or teacher before writing.
Transitioning/ Expanding	Have students use sentence stems and frames to support writing. Examples: Estuaries/mangrove forests are located ____. These ecosystems can be ___ or ___. The ___ in an estuary/mangrove forest is caused by ____.
Bridging	Review definitions of the key words *unique* and *geographic* from the prompt before writing.

WRITING ABOUT ESTUARY AND MANGROVE FOREST ECOSYSTEMS (25 MIN.)

- After completing Activity Page 7.3, have students share their plan with a partner.
- Have students orally rehearse what their paragraphs will say in a few sentences for their partners.
- Ask a few students to share their partner's orally rehearsed paragraph with the class.
- Have students turn to Activity Page 7.4 and read the directions aloud.
- Direct students to the bullet that says "Verb Tense: Do your verbs match the time you are discussing?"
- Remind students that they learned about verb tenses in earlier units.
- Explain that they should check for verb-tense agreement after writing their paragraphs.
- Model this by asking what form of the verb *write* you should use to show the present tense in the sentence, "They are ___ at a table."
  - » writing
- **Turn and Talk:** What would the sentence sound like if it were changed to the past tense? The future tense?
- Remind students to signal when both partners have contributed to the conversation.
- Ask a few students to share their partner's response.
  - » Answers may vary but could include, "They wrote at a table" (past), "They will write at a table" (future).
- Direct students to complete Activity Page 7.4 using their plan on Activity page 7.3.
- Remind students to review and check their work, as needed, before it is collected.
- Collect Activity Pages 7.3 and 7.4.

End Lesson

Activity Page 7.4

D Differentiation

Challenge

Encourage students to use paraphrasing when drawing evidence from the text.

Support

Provide an individual copy of Visual Support 2.1 for students' reference at their seats. Have students underline or highlight the first two sentences that were used as an exemplar during writing instruction.

LESSON

8

The Open Ocean and the Deep Sea

PRIMARY FOCUS OF LESSON

Reading

Students will find and record key information, including main ideas and details, about open ocean and deep sea ecosystems. **[RI.5.1, RI.5.2]**

Students will demonstrate an understanding of the Tier 2 word *regenerates*. **[L.5.4]**

Writing

Students will write multiple paragraphs explaining characteristics of the open sea and the deep sea using precise vocabulary from their reading. **[RI.5.1, W.5.8]**

FORMATIVE ASSESSMENT

Activity Page 8.2	**Paragraph Planning Page: Open Ocean and Deep Sea** Find key information about open ocean and deep sea ecosystems using close reading. **[RI.5.1, W.5.8]**

Teacher Presentation Screens:
all lessons include slides

LESSON AT A GLANCE

	Grouping Recommendations	Time	Materials
Reading (45 min.)			
Read-Aloud: Chapter 8	Whole Group/ Small Group	40 min.	❑ *Life in the Fathoms* ❑ Activity Page 8.1 ❑ colored pencils or highlighters
Word Work: *Regenerates*	Whole Group	5 min.	
Writing (45 min.)			
Planning with a Graphic Organizer	Whole Group/ Independent	20 min.	❑ Activity Pages 8.1, 8.2, 8.3 ❑ Visual Support 2.1
Writing with a Graphic Organizer	Whole Group/ Independent	25 min.	❑ Activity Page 8.3

ADVANCE PREPARATION

Reading

- Provide access to student annotating tools (colored pencils or highlighters).
- Prepare for a jigsaw activity after reading chapter 8.
    - Prepare groups of four or five students, one for each section of the text. The two shortest sections, "Currents and the Deep Sea" and "Food Webs in the Deep," may be combined or assigned to different students.
    - After students have read the entire chapter, assign each student as an "expert" for their section. Ask students to circle their assigned section to avoid confusion.

Writing

- Prepare to allow students who will use the challenge sidebar support to swap out a category for their planning on the back of Activity Page 8.2.

Universal Access

Reading

- Assign jigsaw reading sections purposefully, considering length, text complexity, and the needs of students.

Writing

- Post a copy of Visual Support 2.1 for reference in a visible, accessible place in the classroom.

VOCABULARY PREVIEW

- You may choose to preview the vocabulary words before reading the text.

regenerates, v. to return to a previous form

chemosynthesis, n. the act of using chemicals, instead of light, to make food

chemosynthetic bacteria, n. bacteria that use chemicals, instead of light, to make their own food

Vocabulary Chart for Chapter 8 "The Open Ocean and the Deep Sea"			
Vocabulary Type	**Tier 3 Domain-Specific Words**	**Tier 2 General Academic Words**	**Tier 1 Everyday Speech Words**
Core Vocabulary	chemosynthesis chemosynthetic bacteria	regenerates	
Spanish Cognates	quimiosíntesis bacterias quimiosintéticas	regenerar	
Multiple-Meaning			
Sayings and Phrases			

Start Lesson

Lesson 8: The Open Ocean and the Deep Sea

Reading

45M

Primary Focus

Students will find and record key information, including main ideas and details, about open ocean and deep sea ecosystems. **[RI.5.1, RI.5.2]**

Students will demonstrate an understanding of the Tier 2 word *regenerates*. **[L.5.4]**

READ-ALOUD: CHAPTER 8 (40 MIN.)

Introduce the Chapter

- Tell students they will begin reading and taking notes on chapter 8, "The Open Ocean and the Deep Sea," with their partners. Have students turn to the table of contents, locate the chapter, and then turn to the first page of the chapter.
- Preview the vocabulary words before reading the chapter.
- Ask, "How do you know when you encounter a new vocabulary word in the text?"
  - » The vocabulary word is bolded the first time it appears in the chapter.
- Ask, "Where else can you find these vocabulary words and their definitions?"
  - » These words are also in the glossary.
- Remind students that they may refer to the glossary at any time.

Read "The Open Ocean and the Deep Sea"

- Have one student read The Big Question at the beginning of the chapter. Ensure students understand the meaning of The Big Question before reading the chapter.
  - ◦ How do the unique characteristics of the open ocean and deep sea affect how organisms move and eat in those ecosystems?
- Ask, "Why are moving and eating considered important for many organisms?"
  - » Answers may vary but could include that moving is important for locating food, shelter, and avoiding predators. Eating provides energy for survival.

- Ask, "What are some different ways we have learned organisms in other ecosystems move and eat?"
  - » Answers may vary but could include that some animals, such as fish, use fins or other body parts, such as the paws of a sea otter, to move through the water, while others attach themselves to something and stay stationary, such as coral or kelp. Some animals eat other organisms, such as a shark or octopus, and some make their own food with energy from the sun or chemicals, such as algae or deep sea producers.
- Read the title "The Open Ocean and the Deep Sea" aloud to students.
- Ask, "What adjectives are used in these ecosystem names?"
  - » open and deep
- **Turn and Talk:** What predictions can you make about the unique characteristics of ecosystems being described as "open" and "deep"?
- Remind students to signal when both partners have contributed to the conversation.

Chapter 8

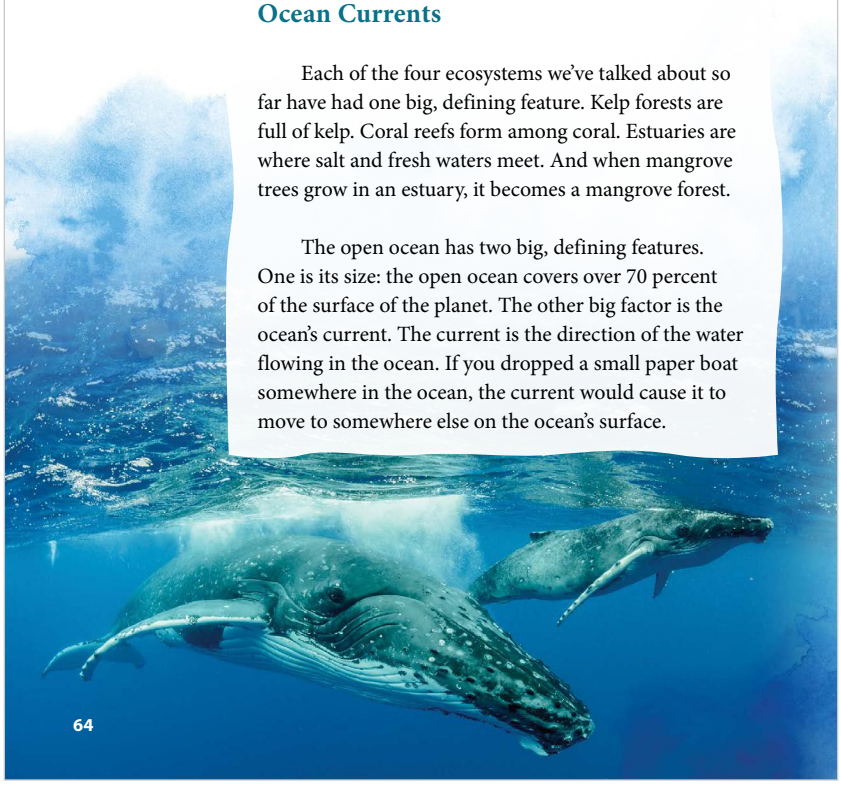
The Open Ocean and the Deep Sea

Out past the kelp forests, mangroves, coral reefs, and estuaries, the open ocean and its creatures have their own story to tell.

Ocean Currents

Each of the four ecosystems we've talked about so far have had one big, defining feature. Kelp forests are full of kelp. Coral reefs form among coral. Estuaries are where salt and fresh waters meet. And when mangrove trees grow in an estuary, it becomes a mangrove forest.

The open ocean has two big, defining features. One is its size: the open ocean covers over 70 percent of the surface of the planet. The other big factor is the ocean's current. The current is the direction of the water flowing in the ocean. If you dropped a small paper boat somewhere in the ocean, the current would cause it to move to somewhere else on the ocean's surface.



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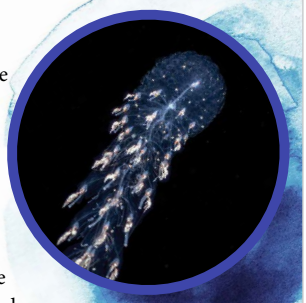
- Ask a few students to share their partner's response and record them on the board.
  - » Answers may vary but could include that both ecosystems are large and that the open ocean is wide without clear boundaries while the deep sea extends far below the surface.
- Have partners read the first segment, "Ocean Currents."

Have you heard the saying "it's easier to swim with the current"? This is very true for organisms in the open ocean. Animals and plants tend to travel with the ocean currents in search of food, resources, and warmer waters. Sometimes they travel great distances. Some humpback whales, for example, use ocean currents to help them swim nearly 5,000 miles with the changing seasons. This is one of the longest migration cycles on our planet.



These two factors, size and currents, combine to make the open ocean a dynamic, or rapidly changing place. Some animals in a coral reef or estuary might live their entire lives in the same ecosystem. Whatever food web they're born into, they stay in. The open ocean, with its currents, is different. You can think of it as the ocean's highway. The animals who live in it are always traveling. Again and again, they have to find their place in different food webs.

Plankton

Some animals ride the ocean current when they choose and swim against it when they don't. Scientists call the open ocean organisms who can't fight the current plankton. Plankton doesn't refer to a single species. Instead, it's a category that refers to many different species of all sizes, from bacteria so tiny you need a microscope to see them to animals as large as jellyfish. Plankton's mode of travel has earned them the scientific name *drifters*.

THE BIG QUESTION

How do the unique characteristics of the open ocean and deep sea affect how organisms move and eat in those ecosystems?

Literal. What are the two defining features of the open ocean?

» Size, covering over 70 percent of the planet, and current, the direction water flows in the ocean.

- Ask the partners to reread the text to answer the following question.

Inferential. What is the main idea of this portion of the text? How do you know?

» Answers may vary but could include that the open ocean is defined by its size and the movement of currents. Most of the details in this portion of the text connect back to size and currents of the open ocean, including the definition of current, how animals use it to travel and find food, making the ocean a dynamic, changing place, and its impact on moving animals between food webs.

- **Turn and Talk:** What other details support the main idea?
- Remind students to signal when both partners have contributed to the conversation.
- Ask a few students to share their partner's response and record them on the board.

» Answers may vary but could include that some humpback whales use ocean currents to help them swim nearly 5,000 miles and that the open ocean is like the ocean's highway.

Activity Page 8.1

- Direct students to Activity Page 8.1.
- Have students record the main idea and corresponding details in their notes.
- Have partners read the next two portions of text, "Plankton" and "Nekton."

The red octopus can change its color to stand out, or blend in with its environment.

Plankton make up the base of the open ocean's food chain. If you think of the open ocean as a highway, plankton are the fuel that keeps everyone going.

Plankton can be found floating near the surface of the ocean where the light is strong. The plants of the plankton world are referred to as phytoplankton, while the animals are called zooplankton. All the different species of phytoplankton require sunlight to survive and photosynthesize, so they aren't as abundant in deeper waters. But when all is right in the marine world, there's enough phytoplankton for open ocean zooplankton to eat.

All zooplankton are born as drifters, weak swimmers at the mercy of the ocean waves. Some, like jellyfish, will stay drifters all their lives, traveling with the currents and catching whatever smaller plankton they come across. But some zooplankton are only drifters when they're babies, or larva. When they grow up, these zooplankton, which include sea stars and octopus, will become strong swimmers, able to fight the current. But to get to their final form, they first have to float where the phytoplankton is flourishing and fuel up.

Nekton

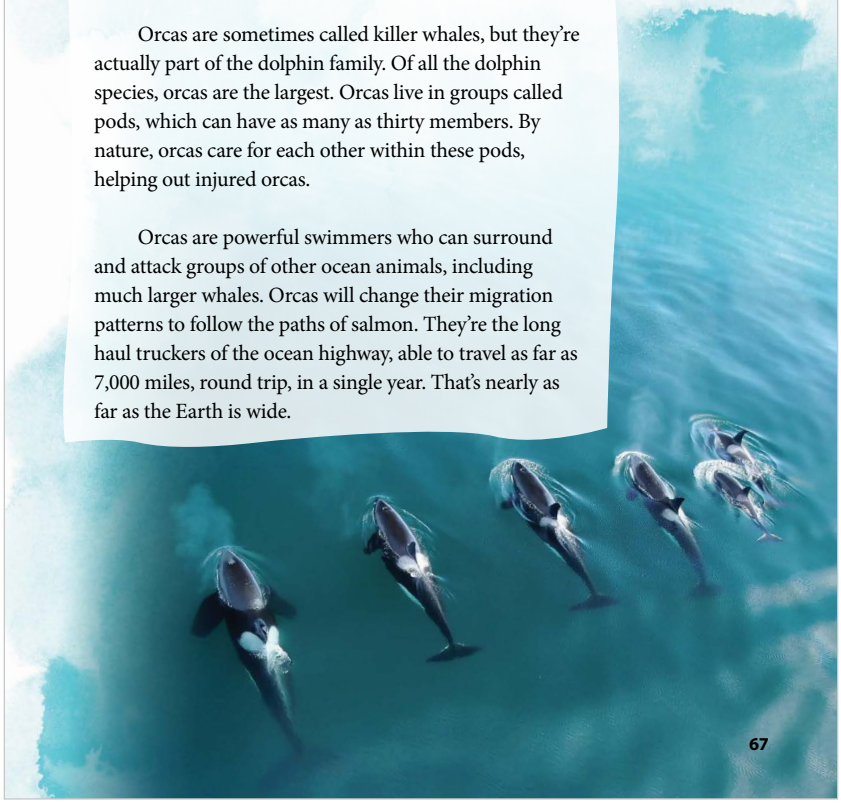
We call the organisms who can swim against the current nekton. These creatures are able to swim hundreds of miles through the ocean's waves and currents in search of food. Because nekton have more freedom to travel the open ocean, their hunting and feeding patterns adapt to their environment. Even the way these

open ocean creatures communicate sometimes changes depending on where they are.

Nekton eat plankton, as you might have guessed, but the open ocean's animals have other dining interests as well. The smaller fish, like cod, who consume plankton are in turn consumed by larger creatures like dolphins. And at the top of the trophic pyramid, of course, are some of the open ocean's most well-known apex predators: orcas.

Orcas are sometimes called killer whales, but they're actually part of the dolphin family. Of all the dolphin species, orcas are the largest. Orcas live in groups called pods, which can have as many as thirty members. By nature, orcas care for each other within these pods, helping out injured orcas.

Orcas are powerful swimmers who can surround and attack groups of other ocean animals, including much larger whales. Orcas will change their migration patterns to follow the paths of salmon. They're the long haul truckers of the ocean highway, able to travel as far as 7,000 miles, round trip, in a single year. That's nearly as far as the Earth is wide.



Some species have dining interests that are difficult to compare to any human highway experience. For example, one of the largest squid in the open ocean is the Humboldt squid. In addition to eating smaller fish, Humboldt squid will also consume other Humboldt squid! At night, these predators rise from the twilight zone, some 2,000 feet down in the ocean. They hunt all night, then return to the depths during the day to hide from larger predators.

Currents and the Deep Sea

The Humboldt squid's eight arms are covered with 100–200 suckers, each with a hook inside.

Up to now, we've only talked about currents that move across the ocean's surface. But there are also currents that move like the Humboldt squid does every night, first rising to the surface, then descending to the deep. When a current moves from the seafloor to the surface, we call it an upwelling current. When it moves from the surface to the seafloor, we call it a downwelling current. These currents connect the open ocean to the deep sea.

Food Webs in the Deep

The huge numbers of phytoplankton and zooplankton in the open ocean support a large number of complicated consumers and predators. In the deep sea, food is much scarcer, and the organisms that live there have to rely on complex adaptations to survive. Some, like the prickly dreamer and other angler fish, rely on bioluminescence to hunt their prey. But in general, there are far fewer large consumers in the deep sea than in the open ocean. Organisms in the deep rely on other food sources.

Literal. What two organism groups are the main topics of this portion of the text?

» plankton and nekton

Literal. What is the difference between plankton and nekton?

» Plankton drift on the current, nekton can swim against it.

- Have partners read the beginning of the next portion of text, "Currents and the Deep Sea."

Literal. How does the current move in the deep sea?

» The current moves up and down from the surface to the sea floor in downwelling and upwelling currents.

- Have partners read the next portion of text "Food Webs in the Deep."

One of the common food sources in the deep is called marine snow. Despite its name, marine snow isn't actually snow, but scraps and waste that animals in the upper zones of the ocean discard. Pulled by downwelling currents and gravity, scraps sink to the lower zones of the ocean, where deep sea detritivores gobble them up. One of these is the sea pig, which is not an actual pig that oinks in the mud, but a type of sea cucumber. Another is the Pacific hagfish. These slick, pink decomposers are covered in a slime that helps them wiggle onto deep sea debris and soak up all the nutrients. Even without eyes, jaws, or even a stomach, hagfish can smell quite well and feel their food in the water.

Another major deep sea detritivore is the brittle star. There are many of them found clinging to the sea floor or crawling over it on their five long arms. By one count, there are around 2,000 different species of brittle star. They get their name because of how they handle predators. When a predator fish or crab grabs a brittle star by its arm, the brittle star lets its own arm break off. The arm **regenerates** later, when the brittle star reaches safety.

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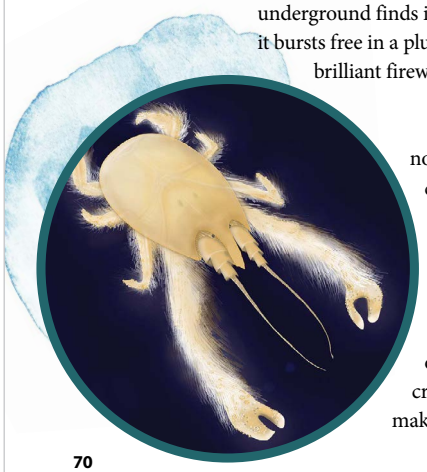
Brittle stars blur the lines between detritivore and consumer. Some are detritivores who filter feed, holding their arms up to catch marine snow and other debris floating down from the open ocean. Others are active consumers who hunt prey, including deep sea crustaceans.

Hydrothermal Vents

Hydrothermal vents form in the deep sea in places with high tectonic activity, including earthquakes. They're most often found in parts of the ocean with active volcanoes, such as the "Ring of Fire" in the Pacific Ocean.

Hydrothermal vents happen when the sea floor cracks. Seawater flows into the crack and becomes trapped inside, close to the magma underneath the earth's crust. The magma heats the water, which causes the water to change into something called a vent fluid. The vent fluid eats away at the metals and minerals buried underground. Eventually, the vent fluid trapped underground finds its way back up to the seafloor, where it bursts free in a plume of colorful smoke. Imagine brilliant fireworks in the deep.

A yeti crab's arms may look furry, but they are really covered with bristles called setae.



The vent fluid is toxic to many, but not all, organisms. Some producers can feed on the metals and minerals drawn up from underground. They perform **chemosynthesis** to turn these into energy. Consumers in the deep sea surround and feed on these **chemosynthetic bacteria** on the ocean floor. One of these is the Yeti crab, a crab with huge, furry arms that makes its home near ocean vents.

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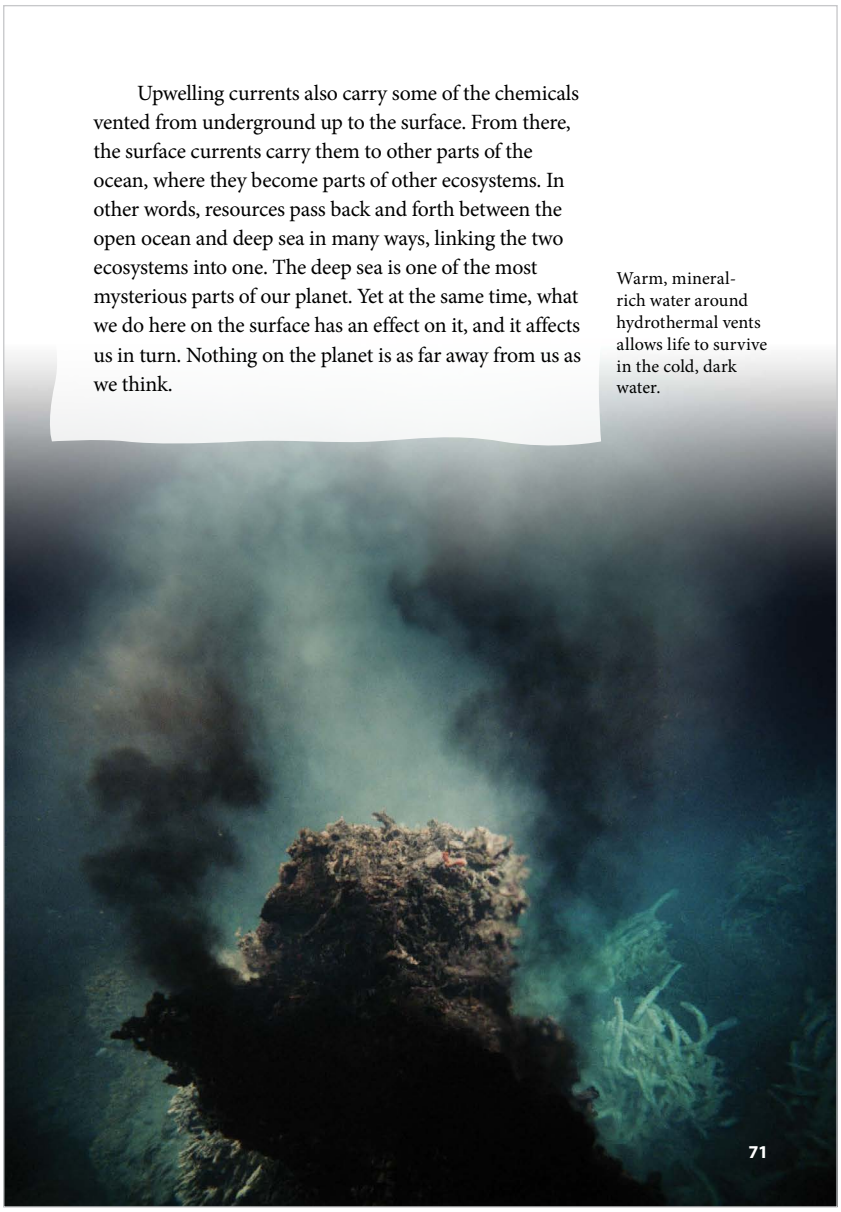
Inferential. Why are many of the examples of animals in the deep sea detritivores?

» Answers may vary but could include that food is scarce in the deep sea but detritus, such as marine snow, is available without the need for sunlight or a large population of primary consumers to prey upon.

- Have students read the last portion of the chapter, "Hydrothermal Vents."

Upwelling currents also carry some of the chemicals vented from underground up to the surface. From there, the surface currents carry them to other parts of the ocean, where they become parts of other ecosystems. In other words, resources pass back and forth between the open ocean and deep sea in many ways, linking the two ecosystems into one. The deep sea is one of the most mysterious parts of our planet. Yet at the same time, what we do here on the surface has an effect on it, and it affects us in turn. Nothing on the planet is as far away from us as we think.



Warm, mineral-rich water around hydrothermal vents allows life to survive in the cold, dark water.

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Literal. What essential resource for producers is provided by hydrothermal vents?

» Vent fluid, seawater trapped in hydrothermal vents which provide minerals needed for chemosynthesis.

- Have students reread the chapter and take notes on Activity Page 8.1 with a partner.

Differentiation

Support

Have students take notes with partners or small groups with or without guided teacher assistance.

Challenge

Have students underline details on their notes that support the Big Question.

Check for Understanding

Ask students, "How does the current in the open ocean and deep sea contribute to food webs in those ecosystems?"

» Currents move organisms and food sources throughout the water for them to be consumed. Plankton move across the open ocean on currents to feed consumers, and minerals and detritus move up and down towards and from the deep sea to supply food to producers and detritivores.

Discuss "The Open Ocean and the Deep Sea"

- When all students have finished reading and taking notes, discuss the comprehension questions below.

1. **Literal.** What abiotic factor influences how organisms move in the open ocean?

   » current

2. **Literal.** What abiotic factor influences food sources in the deep sea?

   » light

3. **Inferential.** Why does deep sea marine life rely on complex adaptations?

   » Answers may vary but could include that the lack of sunlight in very deep water means organisms have to find and make food in ways that work in the dark.

4. **Evaluative.** Explain how deep sea vents support marine life on the ocean floor by expanding the sentence below. Write three sentences, one for each of the following conjunctions: *because*, *but*, and *so*.

   Deep sea vents support marine life on the ocean floor.

   » Answers may vary but could include sentences such as:

   Deep sea vents support marine life on the ocean floor, because they contain minerals that replace energy from sunlight.

   Deep sea vents support marine life on the ocean floor, but they supply different sources of food from sunlight.

   Deep sea vents support marine life on the ocean floor, so animals there have adapted to create food from chemicals in the vent instead of sunlight.

Jigsaw: Comparing Notes

Small Group

- After students have read and annotated the text, arrange them into small groups of four for a jigsaw activity.
  - Assign each student one portion of the text:

    Part 1: "Plankton"

    Part 2: "Nekton"

    Part 3: "Currents and the Deep Sea," "Food Webs in the Deep"

    Part 4: "Hydrothermal Vents"
  - Each student will share their notes for their assigned section of the text with the group. The group will consult their own notes and check if they are similar.
  - Have students discuss notes that are very different from those being shared. Revise notes as needed.
  - Each student takes a turn sharing their notes until all sections of the text have been reviewed by the group.
- Circulate as students work.
  - Ask students to share how they decided which details to include in their notes.
  - Have students tell each other in their group if they used a similar or different strategy.

WORD WORK: *REGENERATES* (5 MIN.)

1. In the chapter you read, "The arm regenerates later, when the brittle star reaches safety."
2. Say *regenerates* with me.
3. *Regenerates* is when something returns to its previous form.
4. Some marine life regenerates its missing limbs if they are eaten by a predator.

5. What situations would cause an animal to regenerate part of its body?
   - Ask two or three students to use the target word in a sentence. If necessary, guide and/or rephrase students' responses to make complete sentences:

     "A limb regenerates if it is badly injured."

6. What part of speech is the word *regenerates*?
   - » verb

Use a Sharing activity for follow-up. Say, "Turn to the person sitting next to you and share why it may be an advantage when an animal regenerates a body part. Be sure to use the word *regenerates* in your discussion."

Lesson 8: The Open Ocean and the Deep Sea

Writing

45M

Primary Focus: Students will write multiple paragraphs explaining characteristics of the open sea and the deep sea using precise vocabulary from their reading. **[RI.5.1, W.5.8]**

PLANNING WITH A GRAPHIC ORGANIZER (20 MIN.)

- Remind students that in the last lesson they used notes to write about estuary and mangrove forest ecosystems.
- Explain that they will use notes in this lesson to write about open ocean and deep sea ecosystems.
- Direct students to the prompt on Activity Page 8.3. Read the prompt aloud.

Activity Page 8.3

ML/EL **MULTILINGUAL/ENGLISH LEARNERS**

Interacting in Meaningful Ways

Reading closely

Entering/Emerging	Underline key words in the prompt. Define unknown words for students.
Transitioning/ Expanding	Ask students to orally define the key phrases "unique characteristics" and "abiotic factors" before responding to the writing prompt.
Bridging	Direct students to underline key words in the prompt and look up the definitions as needed.

- Explain that students will use the notes on Activity Page 8.1 that were reviewed during the jigsaw group to create a plan on Activity Page 8.2 before writing their response on Activity Page 8.3.
- Ask, "Will every piece of information in their notes support the response they are planning?"
  - » No.
- Tell students that it is okay to skip or skim some notes while gathering the information they need on their planner.
- Direct students to the Paragraph Planning Page on Activity Page 8.2 and read the prompt aloud.
- Ask, "What keywords are in this prompt that tell me about the kind of information I need from my notes?"
  - » Answers may vary but could include the words *unique*, *open sea*, *deep sea*, *abiotic factors* and *impact*.
- Explain that the prompt asks for the abiotic factors in open sea and deep sea ecosystems.
- Ask, "What is an abiotic factor? What would be some examples in these ecosystems? Use your notes to help you, as needed."
  - » An abiotic factor is a nonliving characteristic of an ecosystem, such as current, light, salinity or salt in the water, temperature, and water depth. Examples for the open ocean would include currents that move across the water and sunlight near the surface. Examples for the deep sea include cold temperatures and darkness.
- Ask, "What does it mean for an abiotic factor to be unique to an ecosystem? What could be an example for the deep sea?"
  - » It means that it only applies to one, or very few, ecosystems. Darkness is unique to the deep sea because it is an ecosystem located far from the surface and sunlight cannot reach there.
- Ask what they should do if they find that they have information missing from their finished planner after using the information in their notes.
  - » Answers may vary but could include that it may be necessary to go back and read portions of the text a third time to gather that missing information.
- Explain that students will use this planner to write their response.
- Direct students to fill in Activity Page 8.2 using their notes from Activity Page 8.1.

Activity Page 8.2

Activity Page 8.1

WRITING WITH A GRAPHIC ORGANIZER (25 MIN.)

- Explain that at the end of the unit, students will write about how a marine organism survives in its environment.
- Ask, "How do abiotic factors impact an organism's survival? Explain with an example."
  - » Abiotic factors create certain conditions that an organism is or is not adapted to survive in. Examples may vary but could include: a producer that uses photosynthesis is adapted to survive with plenty of light but not in darkness.
- Tell students that they will use their graphic organizer on Activity Page 8.2 to write about the distinguishing characteristics of the open ocean and the deep sea, including their distinguishing abiotic factors and how those factors impact the organisms that live there. They may also choose to use some of this writing in their work on the final writing assignment later in the unit.
- Remind students that they will use their graphic organizer as a guide to create their writing.
- Ask, "If you choose to use a direct quotation that you wrote in your notes, what punctuation must you include?"
  - » quotation marks
- Ask, "If you choose to create your own sentence from the key words and phrases in your notes, do you need quotation marks?"
  - » no
- Direct students to draft their response on Activity Page 8.3.
- Remind students to use the checklist above their writing to check their work before submitting. As time allows, they should exchange their work with a neighbor to help check for errors.
- Collect Activity Pages 8.2 and 8.3.

End Lesson

D Differentiation

Challenge

Ask students to think of a category about the open and deep sea beyond unique characteristics, abiotic factors, and organisms. Students may swap out their category for one of the headers on Activity Page 8.2 before they begin.

Support

Circle key vocabulary in their notes for students to include in their graphic organizer.

Activity Page 8.3

LESSON

9

Sharing the Seas

PRIMARY FOCUS OF LESSON

Reading

Students will explain information about the work of marine biologists and ocean environments using specific details from the text. **[RI.5.3, SL.5.1a, SL.5.1d]**

Students will demonstrate an understanding of the Tier 2 word *clarity*. **[L.5.4]**

Writing

Students will write a paragraph describing the work of a marine biologist in different ocean ecosystems. **[W.5.2b, W.5.4]**

Language

Students will apply grade-level phonics and word analysis skills to decode and encode targeted spelling words. **[L.5.2e, RF.5.3a]**

FORMATIVE ASSESSMENT

Discussion Rubric	Discuss key ideas about the work of marine biologists. **[RI.5.3, SL.5.1]**
Activity Page 9.2	**Paragraph Planning Page: Sharing the Seas** Plan organized paragraphs that include details from informative texts. **[W.5.2b]**

Teacher Presentation Screens:
all lessons include slides

LESSON AT A GLANCE

	Grouping Recommendations	Time	Materials
Reading (45 min.)			
Read-Aloud: Chapter 9	Whole Group/ Partner/ Independent	40 min.	❑ *Life in the Fathoms* ❑ Discussion Rubric ❑ colored pencils or highlighters
Word Work: *Clarity*	Whole Group	5 min.	
Writing (30 min.)			
Planning and Writing About Marine Biologists	Whole Group/ Independent	30 min.	❑ Visual Support 9.1 ❑ Activity Pages 9.1–9.3
Language (15 min.)			
Spelling: Practice	Whole Group/ Independent	15 min.	❑ Activity Page 9.4

ADVANCE PREPARATION

Reading

- Prepare a copy of the Discussion Rubric, found in the Teacher Resources, for teacher use. You may choose to print enough copies to accommodate your class size and use the clipboard for easy access during the student discussion.

Universal Access

Writing

- Prepare to group students.
- Prepare to support developing writers by providing a small group setting with teacher accessibility while completing Activity Pages 9.1 and 9.3.

VOCABULARY

- You may choose to preview the vocabulary words before reading the text.

water scooter, n. a single-passenger, ride-on water vehicle

hypoxia, n. a lack of enough oxygen in the body

clarity, n. the characteristic of being clear or transparent; **n.** the characteristic of being easily understood

Secchi disk, n. a flattened black and white circle put into water to measure the water's transparency

Vocabulary Chart for Chapter 9 "Sharing the Seas"

Vocabulary Type	Tier 3 Domain-Specific Words	Tier 2 General Academic Words	Tier 1 Everyday Speech Words
Core Vocabulary	water scooter hypoxia Secchi disk	clarity	
Spanish Cognates	hipoxia disco secchi	claridad	
Multiple-Meaning		clarity	
Sayings and Phrases			

Start Lesson

Lesson 9: Sharing the Seas

Reading

45M

Primary Focus

Students will explain information about the work of marine biologists and ocean environments using specific details from the text. **[RI.5.3, SL.5.1a, SL.5.1d]**

Students will demonstrate an understanding of the Tier 2 word *clarity*. **[L.5.4]**

READ-ALOUD: CHAPTER 9 (40 MIN.)

Introduce the Chapter

- Tell students they will read aloud chapter 9, "Sharing the Seas," during today's lesson.
- Have students turn to the table of contents, locate the chapter, and then turn to the first page of the chapter.
- Preview the vocabulary words before reading the chapter.
- Ask, "How do you know when you encounter a new vocabulary word in the text?"
  - » The vocabulary word is bolded the first time it appears in the chapter.
- Ask, "Where else can you find these vocabulary words and their definitions?"
  - » These words are also in the glossary.
- Remind students that they may refer to the glossary at any time.

Read "Sharing the Seas"

- Have one student read The Big Question at the beginning of the chapter. Ensure students understand the meaning of The Big Question before reading the chapter.
  - How does a marine biologist's work impact marine ecosystems?
- **Turn and Talk:** What are some examples of a marine biologist's work from chapter 5, "Marine Biologists"?
- Remind students to signal when both partners have contributed to the conversation.

- Ask a few students to share their partner's response and record them on the board.
    - » Answers may vary but could include observing organisms, measuring water conditions such as clarity and salinity, obtaining samples from the water or ocean floor, helping injured animals, educating the public.
- **Turn and Talk:** What predictions can you make about the impact of work on this list on marine ecosystems?
- Remind students to signal when both partners have contributed to the conversation.
- Ask a few students to share their partner's response and record them on the board.
    - » Answers may vary but could include learning more about ecosystems and improving conservation efforts.

Chapter 9

Sharing the Seas

THE BIG QUESTION

How does a marine biologist's work impact marine ecosystems?

My name is Leena Jung, and I've been passionate about the ocean ever since I was a kid. I grew up swimming, surfing, and snorkeling in the Pacific Ocean that surrounds my island home of O'ahu. I learned so much about respecting and protecting the ocean and its life.

In the end, I loved the ocean so much that I grew up to become a marine biologist. I specialize in both marine mammal science and marine conservation, so my work changes day to day. Some days, I'm out taking samples of coral to make sure it's healthy. Other days, you can catch me riding my **water scooter** out to survey turtle nests, or listening to the melodious song of a humpback whale.

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- Read the title aloud.
- Have students study the image.
- Ask a student to read the first paragraph aloud.
- Ask a student to read the second paragraph aloud.

You can be sure that whatever I'm doing, my job as a marine biologist lets me make incredible discoveries every day. Let me tell you about just one day.

First: Gearing Up for the Dive

At least once a week, I get to spend all day in the water. Yesterday was my day, so I started by heading out on a boat from the eastern coast of O'ahu with the rest of my team to get ready for a dive.

Before getting in the water, I put on my scuba gear. Usually that includes a wetsuit, a mask, a snorkel, and fins. Did you know the word "scuba" is actually an acronym? It stands for "self-contained underwater breathing apparatus." All my gear will help me when I'm in the water, but the most important part of scuba gear is my oxygen tank, or cylinder. Without it, I'd start to suffer from **hypoxia**, or a lack of oxygen. And that is not something I want to do while on a dive.

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- Ask a student to read the third paragraph aloud.

Literal. Who is this chapter about?

  - » This chapter is about Leena Jung, a native Hawaiian marine biologist who lives and works on the island of Oahu.

- Have partners continue to read chapter 9, pausing to discuss the questions provided.

My oxygen tank is attached to a special pack that I wear called a BCD, or buoyancy control device. Buoyancy is how we measure whether something in the water will float or sink. I can use my BCD to help me float higher in the water, or sink lower. It all depends on whether I want to dive deeper or come back up to the surface! My BCD is also a great place to store cutting tools, a compass, and a dive light. Last but not least are weights. Even with all that gear strapped to our BCDs, divers still need weights to help us dive deep.

While I'm getting ready, my team measures the water's **clarity**, or how easy it is to see through. They use a tool called a **Secchi disk** to check this. The Secchi disk is a black and white disk. The team lowers it into the water, and at the point where it's no longer possible to see the disk, they take a measurement. The team also checks other features of the water. One of these is its pH level, or how acidic the water is.

Once I'm geared up and ready, I dive in and get to work! Today, I'm working in the sunlight zone, just 25 feet below the ocean's surface. One part of my job is just to measure the quality of the water.

For the rest of my dive, I work to remove debris that's hazardous to marine life. We collect all kinds of trash on our dives. You'd be shocked by what we find—everything from camera equipment to old toys to plastic bottles.

The most common marine debris we find is plastic, which includes things like lost fishing line, nets, and hooks. These fishing tools can harm and trap sea turtles, birds, and other mammals. Did you know that 70 percent of the turtles rescued in the waters off the coast of Hawaii are tangled in fishing gear? When we find injured turtles, we use our cutting tools to gently help them get free. Plastic is unhealthy in a lot of ways for coral reefs and other marine ecosystems. That's why I like doing debris removal dives. Even though it often makes me sad, I know the work my team and I do directly protects the environment we love.

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Inferential. What could be an impact of the dive Leena describes in this portion of text?

» Answers may vary but could include that the safety of marine life may be improved by removing hazards from the water such as fishing line and hooks.

- Continue reading "Next, Conservation Work."

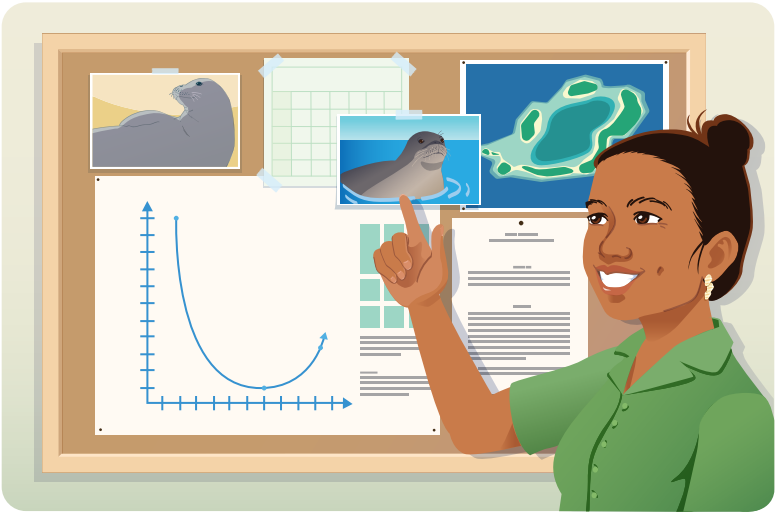
Next, Conservation Work

I love diving, but my favorite part of the job involves working with a majestic seal only found in the waters around Hawaii: the Hawaiian monk seal. When I was younger, it was pretty rare to see monk seals resting on our shores. That's because there were so few of them! Today, monk seals are one of the most endangered species in the world. But it was much worse a few decades ago, when their population was at its lowest.

Part of my work is to help other scientists explain why there were so few monk seals then. One reason is that there were fewer octopus, squid, and eels nearby for them to eat. Sharks also prey on monk seals, which is another reason why we found so few of them in our oceans. In the past, I've worked with teams to help move monk seals from places where lots of sharks live to other nearby islands.

Some of my conservation work also involves measuring atolls, which are ring-shaped coral reefs. At the center of the reefs are islands just below the surface of the water. In the past, monk seals have made their homes on atolls. As environmental patterns shift, some scientists predict that some atolls may be lost because of rising sea levels. And that worries me: after all, if there are changes to a monk seal's habitat, that may have effects on the monk seals.

Lots of different groups in Hawaii have worked together to try to help the Hawaiian monk seal. Thanks to everyone's conservation efforts, they're a much more common sight. But we still need to do more to get **clarity** about how the changes in our ecosystems are affecting these animals I love.

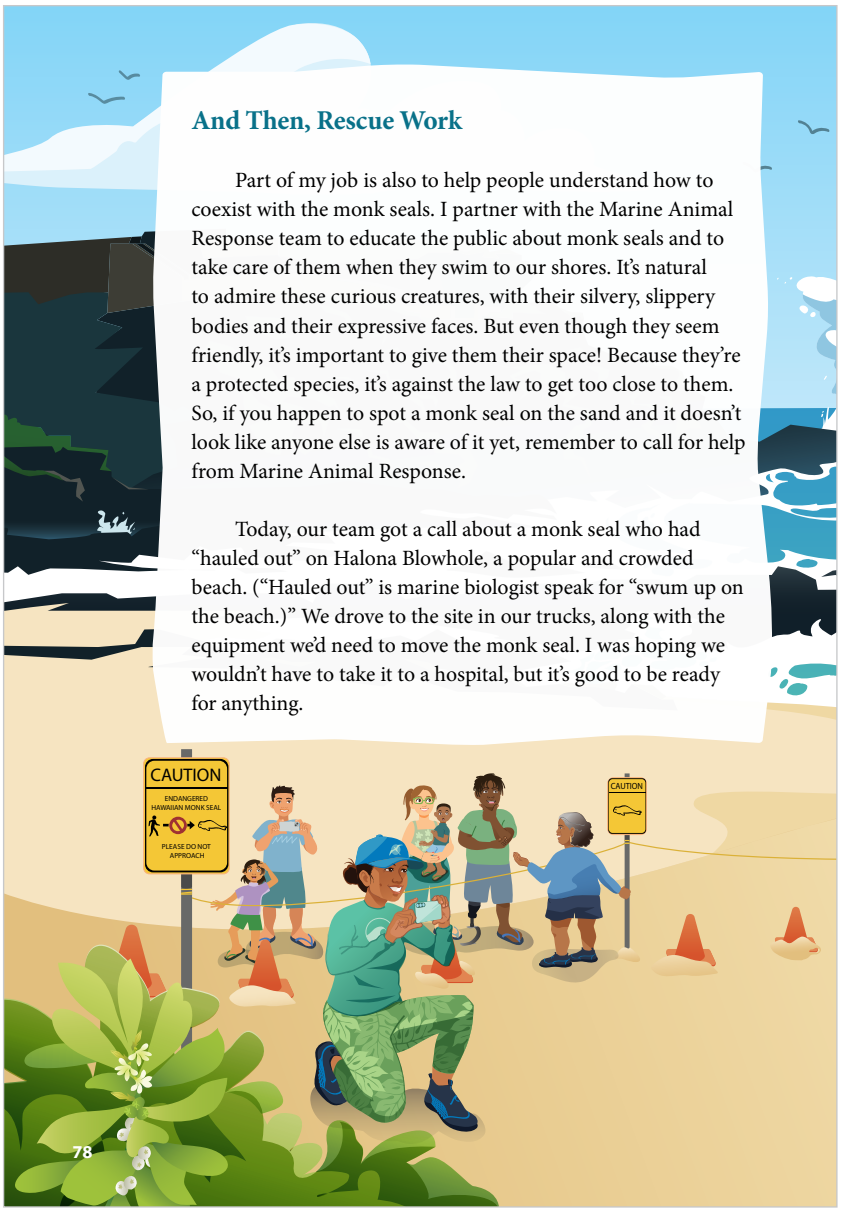


77

Evaluative. Why is Leena's work with monk seals important to her?

» Answers may vary but could include that it is her favorite part of the job because she cares for these animals and improving their population numbers would help them.

- Continue reading "And Then, Rescue Work."



And Then, Rescue Work

Part of my job is also to help people understand how to coexist with the monk seals. I partner with the Marine Animal Response team to educate the public about monk seals and to take care of them when they swim to our shores. It's natural to admire these curious creatures, with their silvery, slippery bodies and their expressive faces. But even though they seem friendly, it's important to give them their space! Because they're a protected species, it's against the law to get too close to them. So, if you happen to spot a monk seal on the sand and it doesn't look like anyone else is aware of it yet, remember to call for help from Marine Animal Response.

Today, our team got a call about a monk seal who had "hauled out" on Halona Blowhole, a popular and crowded beach. ("Hauled out" is marine biologist speak for "swum up on the beach.)" We drove to the site in our trucks, along with the equipment we'd need to move the monk seal. I was hoping we wouldn't have to take it to a hospital, but it's good to be ready for anything.

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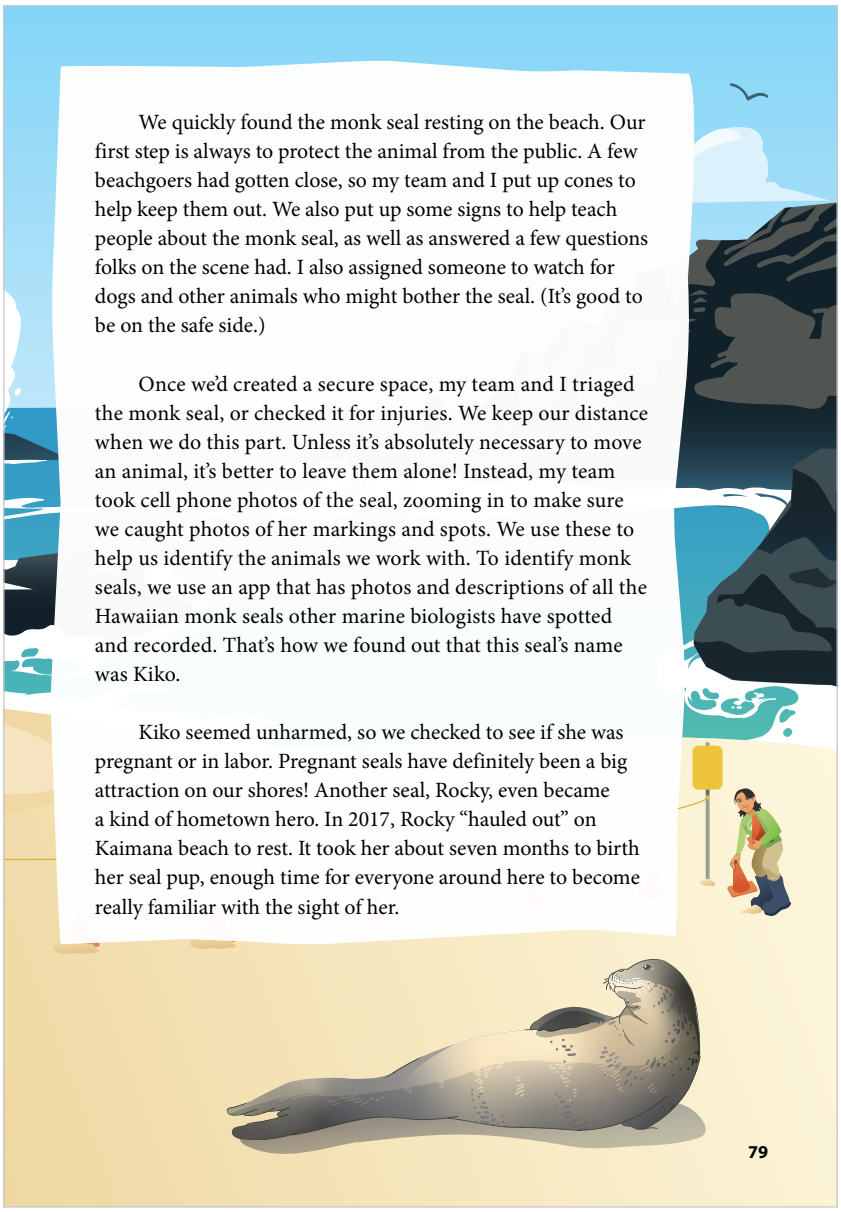

We quickly found the monk seal resting on the beach. Our first step is always to protect the animal from the public. A few beachgoers had gotten close, so my team and I put up cones to help keep them out. We also put up some signs to help teach people about the monk seal, as well as answered a few questions folks on the scene had. I also assigned someone to watch for dogs and other animals who might bother the seal. (It's good to be on the safe side.)

Once we'd created a secure space, my team and I triaged the monk seal, or checked it for injuries. We keep our distance when we do this part. Unless it's absolutely necessary to move an animal, it's better to leave them alone! Instead, my team took cell phone photos of the seal, zooming in to make sure we caught photos of her markings and spots. We use these to help us identify the animals we work with. To identify monk seals, we use an app that has photos and descriptions of all the Hawaiian monk seals other marine biologists have spotted and recorded. That's how we found out that this seal's name was Kiko.

Kiko seemed unharmed, so we checked to see if she was pregnant or in labor. Pregnant seals have definitely been a big attraction on our shores! Another seal, Rocky, even became a kind of hometown hero. In 2017, Rocky "hauled out" on Kaimana beach to rest. It took her about seven months to birth her seal pup, enough time for everyone around here to become really familiar with the sight of her.

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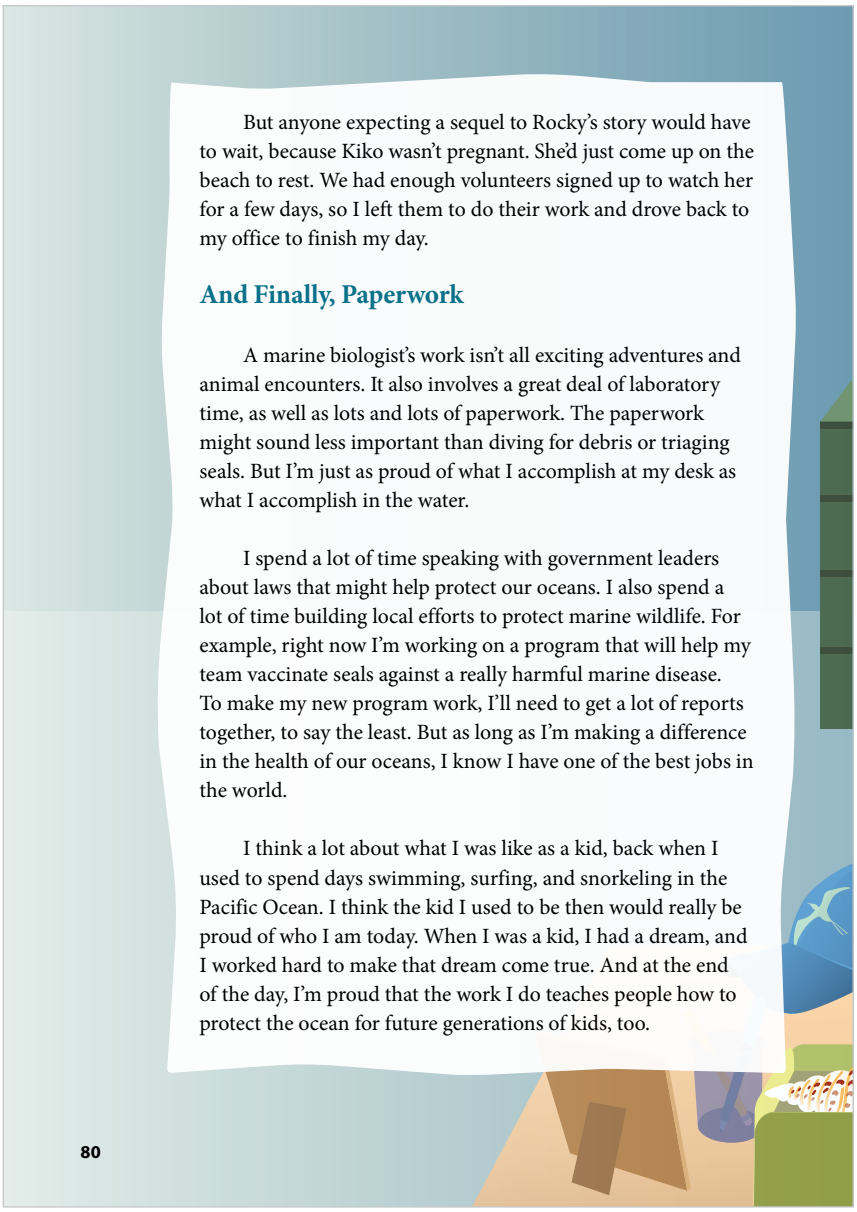


But anyone expecting a sequel to Rocky's story would have to wait, because Kiko wasn't pregnant. She'd just come up on the beach to rest. We had enough volunteers signed up to watch her for a few days, so I left them to do their work and drove back to my office to finish my day.

And Finally, Paperwork

A marine biologist's work isn't all exciting adventures and animal encounters. It also involves a great deal of laboratory time, as well as lots and lots of paperwork. The paperwork might sound less important than diving for debris or triaging seals. But I'm just as proud of what I accomplish at my desk as what I accomplish in the water.

I spend a lot of time speaking with government leaders about laws that might help protect our oceans. I also spend a lot of time building local efforts to protect marine wildlife. For example, right now I'm working on a program that will help my team vaccinate seals against a really harmful marine disease. To make my new program work, I'll need to get a lot of reports together, to say the least. But as long as I'm making a difference in the health of our oceans, I know I have one of the best jobs in the world.

I think a lot about what I was like as a kid, back when I used to spend days swimming, surfing, and snorkeling in the Pacific Ocean. I think the kid I used to be then would really be proud of who I am today. When I was a kid, I had a dream, and I worked hard to make that dream come true. And at the end of the day, I'm proud that the work I do teaches people how to protect the ocean for future generations of kids, too.

80

Literal. How did Leena and her team protect the monk seal on the beach?

» Answers may vary but could include that they kept away people and dogs, checked her health, and watched her until she returned to the water.

- Continue reading "And Finally, Paperwork."

Evaluative. What could be the impact of Leena's work away from marine ecosystems and animals?

» Answers may vary but could include laws and programs that protect wildlife.

- Have students, in a small group or independently, reread the chapter and take notes.

Activity Page 9.1

  - Small Group 1: Students will complete Activity Page 9.1 with your support while they reread the chapter.
  - Small Group 2: These students may work independently to reread the chapter and take notes on Activity Page 9.1 After finishing their notes, students may compare their work.

Check for Understanding

Ask students why the text is read twice.

» Answers may vary but could include that the first time is for understanding and the second is to take notes. Reading twice helps to find all the important information.

Discuss the Chapter

- When all students have finished reading and taking notes, discuss the comprehension questions below.

Discussion Rubric

1. **Literal.** What different kinds of work does Leena do?
   » diving, conservation, rescue, paperwork
2. **Inferential.** Provide an example of Leena Jung's work by expanding the sentence below using *where* and *how*. Use information from the text to support your response.

   Where? _____

   How?_____

   Why? _____

   Leena Jung cares for monk seals.

   » Answers may vary but could include an example such as:

   Where: the Hawaiian island of Oahu

   How: observing them and working with the community

   Why: to conserve their habitat

   Expanded sentence: Leena Jung cares for monk seals on the Hawaiian island of Oahu by observing them and working with the community to conserve their habitat.
3. **Evaluative.** How has Jung's work impacted the ocean ecosystems in her area?
   » Answers may vary but could include that the number of monk seals has increased in the area.

- As students discuss the chapter, use the Discussion Rubric to complete the formative assessment.

D Differentiation

Challenge

Have students add how Jung's work could impact the monk seal's food webs.

Support

Preview the discussion task: Turn and Talk with a neighbor about a question they found interesting or challenging in the text. Encourage students to make note of what they will share ahead of time.

ML/EL MULTILINGUAL/ENGLISH LEARNERS

Speaking and Listening

Exchanging Information and Ideas

Entering/Emerging	Have students select and read details from their notes to add to their peer discussion, as needed.
Transitioning/ Expanding	Provide the following sentence frame to use during peer discussion: I found ___ interesting because___.
Bridging	Have students rephrase, in their own words, their peers' comments to check comprehension.

WORD WORK: *CLARITY* (5 MIN.)

1. In the chapter you read, "While I'm getting ready, my team measures the water's clarity, or how easy it is to see through."
2. Say *clarity* with me.
3. *Clarity* is the characteristic of being clear.

   In this sentence, *clarity* means to become clear or transparent. The word *clarity* is also used in another way. Later, the text says, "[W]e still need to do more to get clarity about how the changes in our ecosystems are affecting these animals I love."
   In this sentence, *clarity* means to be clear as in easily understood.
4. In the first sentence, *clarity* is a characteristic of the water, it is clear and easy to see through. For example, I might say, "The *clarity* of the water lets us see all the way down to the sand."

   In the second sentence, *clarity* is a clear understanding of an idea. For example, I might say, "The teacher's explanation gave me *clarity* about the assignment."
5. What else could we describe as having *clarity*, as in appearing clear or transparent? What else could we describe as having *clarity*, as in being easily understood?
   - Ask one or two students to use the target word in a sentence. If necessary, guide and/or rephrase students' responses to make complete sentences.

6. What part of speech is the word *clarity*?
    - » noun

Use a Multiple-Meaning activity for follow-up. Tell students that the word *clarity* has multiple meanings. Then share the following:

- ◦ Meaning 1: clear; transparent
- ◦ Meaning 2: understood; an idea that is easily understood

Say, "I am going to read several sentences. Listen to the context, or the text surrounding *clarity* in the sentence, for clues as to which meaning is being used. When you think a sentence is an example of meaning 1, hold up one finger. When you think a sentence is an example of meaning 2, hold up two fingers."

- I asked a question to get more clarity about the directions.
    - » meaning 2
- The clarity of the window improved after it was cleaned.
    - » meaning 1
- Good clarity makes a diamond more valuable.
    - » meaning 1
- A complete analysis can give clarity to an issue being researched.
    - » meaning 2

Lesson 9: Sharing the Seas

Writing

30M

Primary Focus: Students will write a paragraph describing the work of a marine biologist in different ocean ecosystems. **[W.5.2b, W.5.4]**

PLANNING AND WRITING ABOUT MARINE BIOLOGISTS (30 MIN.)

Activity Page 9.2

Activity Page 9.2

- Direct students to Activity Page 9.2.
- Ask a student to read the prompt aloud: Select an important part of Leena Jung's work. Describe the work and its importance to the ocean ecosystem of her area.
- **Turn and Talk:** Discuss with a partner what you would write about when responding to this prompt.
- Remind students to signal when both partners have contributed to the conversation.
- Ask a few students to share their neighbor's response.
  - » Answers will vary but may include examples of Jung's work such as attending to a monk seal who hauled out on the beach and examples of environmental impacts such as the increased monk seal population.
- Point out that the prompt calls for information that is important. Ask, "How do we know what is important?"
  - » Answers will vary but could include that important information makes a difference. In this case, the difference would be a change to the environment Jung is working in, specifically marine ecosystems around the island of Oahu in Hawaii.
- Remind students to add notes to their plan that include important information about Jung's work that respond to the prompt.
- Direct students to their notes on Activity Page 9.1.
- **Turn and Talk:** Discuss specific facts from your notes that you will add to your plan on Activity Page 9.2 and why.
- Remind students to signal when both partners have contributed to the conversation.
- Ask a few students to share their neighbor's response.
  - » Answers will vary but could include additional facts from chapter 9, such as working with the community and lawmakers to conserve habitats for monk seals.

D Differentiation

Support

Work one-on-one with students as needed to support and provide guidance while they work. Examples of tasks that may require support include selecting notes for the plan, paraphrasing long quotations, and circling key words to include in the draft.

- Have students fill in Activity Page 9.2 using their notes on Activity Page 9.1.

Activity Page 9.3

- Direct students to Activity Page 9.3.
- Remind students that the prompt asks for evidence that Jung's work is important.
- **Turn and Talk:** How do we write a sentence that explains why something is important? For example, what could be a sentence that explains the importance of wearing a raincoat in a rainstorm?
- Remind students to signal when both partners have contributed to the conversation.
- Ask a few students to share their neighbor's response. Write sentences that include clear examples on the board. Modify sentences, as needed.
  - » Answers may vary but could include sentences with the word *because*, such as, "Wearing a raincoat in a rainstorm is important because it keeps you dry without the wind blowing water on your clothes."
- Tell students that a useful word to use in an explanation sentence is *because*. It links the information, like "wear a raincoat," to the reason why, like "it keeps you dry."
- Circle the word *because* where it applies in the sentences written on the board. If none of the sentences contain *because*, add, "Wearing a raincoat in a rainstorm is important because it keeps you dry."
- Direct students to write their response to the prompt on Activity Page 9.3 using their plan from Activity Page 9.2.
- If time permits, ask a few students to share examples of explanation sentences that use the word *because* from their writing.
- Collect Activity Pages 9.2 and 9.3.

Activity Page 9.3

D Differentiation

Challenge

Ask students to include words and phrases similar to *because* in their writing. Examples could include *such as*, *due to*, and *so*.

Lesson 9: Sharing the Seas

Language

15M

Primary Focus: Students will apply grade-level phonics and word analysis skills to decode and encode targeted spelling words. **[L.5.2e, RF.5.3a]**

SPELLING: PRACTICE (15 MIN.)

Activity Page 9.4

- Tell students they will practice writing the spelling words for this week.
- Have students turn to Activity Page 9.4: Practice Spelling Words, explaining that the spelling words are listed in the box on the activity page and on the board/chart paper from Lesson 7.
- Have students read the sentence for question 1 silently and fill in the blank. After students complete question 1, call on one student to read the sentence aloud with the spelling word in the blank.
- Ask students if anyone has a different answer.
- Discuss the correct answer to ensure students understand why it is correct.
- Have students check their spelling against the spelling in the word bank at the top of the activity page, make corrections if needed, and then turn their page over.
- Have students say, spell, and say the word again with you without looking at their paper. Students may close their eyes, look up at the ceiling, or trace on the back of their paper with their finger to help them visualize the spelling as they spell with you.
- Turn the page over and repeat the steps for the remaining items.
- Complete the "say, spell, say the word again" step for the unused words.
- Then, students may work independently to write their own sentences.

MULTILINGUAL/ENGLISH LEARNERS

ML/EL

Speaking and Listening

Exchanging Information and Ideas

Entering/Emerging	Work with students in a small group to practice pronunciation and complete the activity page. Provide additional one-on-one support to struggling students.
Transitioning/ Expanding	Pair students to practice pronunciation and encourage them to work together to complete the activity page.
Bridging	Have students orally share their sentences with a partner.

- Tell students they will complete their spelling assessments during the next lesson.

End Lesson

LESSON

10

Gyres

PRIMARY FOCUS OF LESSON

Reading

Students will gather information from multiple texts to propose a solution to the Pacific garbage patch problem. **[RI.5.7, RI.5.9]**

Students will demonstrate an understanding of the Tier 2 word *entangled*. **[L.5.4]**

Writing

Students will write several structured paragraphs to explain a strategy for solving the problem of garbage patches in ocean gyres. **[W.5.2b, W.5.4, W.5.9b]**

Language

Students will apply grade-level phonics and word analysis skills to decode and encode targeted spelling words. **[RF.5.3a]**

FORMATIVE ASSESSMENT

Activity Page 10.3	**What to do? Garbage in Ocean Gyres** Write structured paragraphs using text evidence from informative texts **[W.5.9b]**

Teacher Presentation Screens:
all lessons include slides

LESSON AT A GLANCE

	Grouping Recommendations	Time	Materials
Reading (35 min.)			
Read-Aloud: Chapter 10	Small Group /Independent /Whole Group	30 min.	❑ *Life in the Fathoms* ❑ Activity Page 10.1
Word Work: *Entangled*	Whole Group	5 min.	
Writing (40 min.)			
Writing a Multiparagraph Response	Whole Group /Independent	40 min.	❑ Activity Pages 10.2, 10.3
Language (15 min.)			
Spelling: Practice	Whole Group	15 min.	❑ Activity Page 10.4

ADVANCE PREPARATION

Reading

- Prepare for students to take notes on Activity Page 10.1, either with your support or independently as needed during close reading.

Universal Access

Writing

- Allow dictation for drafting, as needed. This may be in the form of dictation to a teacher, peer, or voice typing software.

VOCABULARY PREVIEW

- You may choose to preview the vocabulary words before reading the text.

gyre, n. an area moving in a circular manner, such as those formed in the ocean by currents

North Pacific Subtropical Convergence Zone, n. a gyre located in the northern Pacific Ocean

marine debris, n. pieces of plastic that are found in the ocean

biodegradable, n. the ability to break down over time in nature

digest, v. to break down food inside the body

microplastics, n. extremely small bits of plastics

toxins, n. a substance that is poisonous to living things

entangled, v. became tangled or wrapped up; involved in something complicated

Vocabulary Chart for Chapter 10 "Gyres"

Vocabulary Type	Tier 3 Domain-Specific Words	Tier 2 General Academic Words	Tier 1 Everyday Speech Words
Core Vocabulary	gyre North Pacific Subtropical Convergence Zone marine debris biodegradable microplastics	digest toxins entangled	
Spanish Cognates	giro Zona de Convergencia subtropical del Pacífico Norte biodegradable microplásticos	digerir toxinas	
Multiple-Meaning			
Sayings and Phrases			

Start Lesson

Lesson 10: Gyres

Reading

35M

Primary Focus

Students will gather information from multiple texts to propose a solution to the Pacific garbage patch problem. **[RI.5.7, RI.5.9]**

Students will demonstrate an understanding of the Tier 2 word *entangled*. **[L.5.4]**

READ-ALOUD: CHAPTER 10 (30 MIN.)

Introduce the Chapter

- Tell students they will read aloud chapter 10, "Gyres," in this lesson.
- Have students turn to the table of contents, locate the chapter, and then turn to the first page of the chapter.
- Preview the vocabulary words before reading the chapter.
- Ask, "How do you know when you encounter a new vocabulary word in the text?"
  - » The vocabulary word is bolded the first time it appears in the chapter.
- Ask, "Where else can you find these vocabulary words and their definitions?"
  - » These words are also in the glossary.
- Remind students that they may refer to the glossary at any time.

Read the Chapter

- Have one student read The Big Question at the beginning of the chapter.
- Ensure students understand the meaning of The Big Question before reading the chapter.
  - ◦ How does the North Pacific Garbage Patch impact the Open Ocean ecosystem?
- What abiotic factor of the Open Ocean may play a role in this chapter? Why?
  - » Answers may vary but could include size, because the garbage patch may be large, or current, because the current may move garbage from place to place in the ocean.
- Explain that today they will continue to follow the close reading procedure they have used in previous lessons.

- Review the procedure.
  - Ask students, "How many times will you read the text in our close reading procedure?"
    - » twice
  - What is the reader's purpose during the first read?
    - » to understand the text
  - What is the reader's purpose during the second read?
    - » to record notes
  - Where will you record notes?
    - » on the Activity Page 10.1 T-chart
- Have students in small groups read the first text in chapter 10.
- Allow students to take notes on Activity Page 10.1, either with your support or independently as needed.
  - For example, for students requiring your support, they will complete Activity Page 10.1 with your support while they reread the chapter in their small group.
  - For students who are completing Activity Page 10.1 independently, they will read the chapter in their small group, pausing to discuss the chapter after each heading. Then, students will take notes on Activity Page 10.1 independently.

D Differentiation

Support

Direct students to read the text the second time at the end of each paragraph rather than at the end of the entire text.

Challenge

Direct students to note details that support the Big Question in their T-chart.

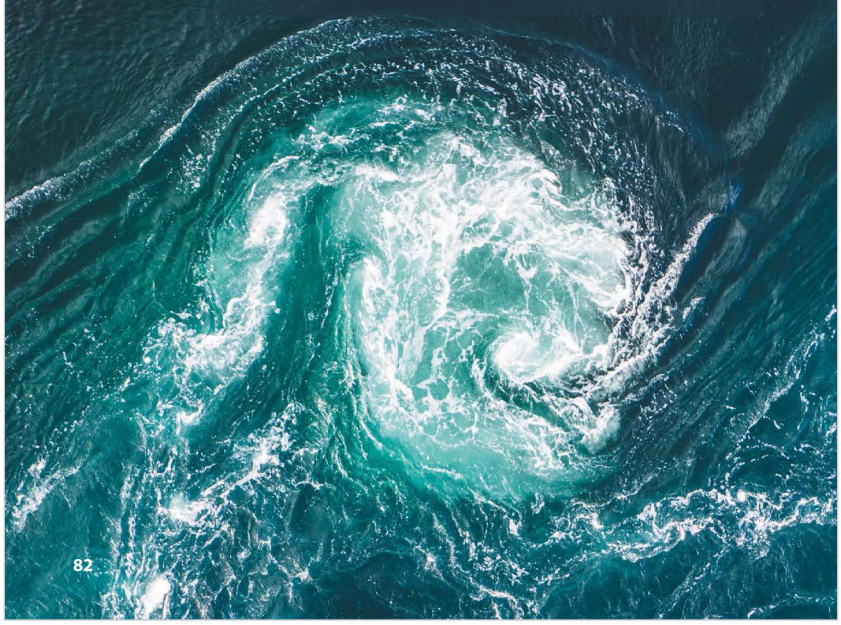
Activity Page 10.1

Chapter 10

Gyres

The open ocean is full of currents, but where do they come from? Many factors come together to create a current. When air temperatures change and the wind blows, this has an effect on the current. The way fresh water and salt water flow into one another also affects the current. The shape of coastlines, ridges and trenches in the seafloor, and the Earth's rotation all play their part. Even earthquakes have an effect on which way a current flows.

The currents that come from wind and weather don't last very long. But when a current results from a



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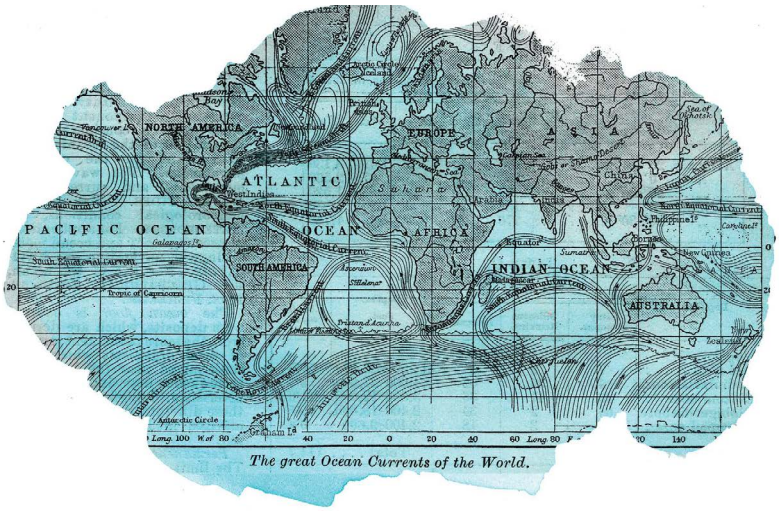


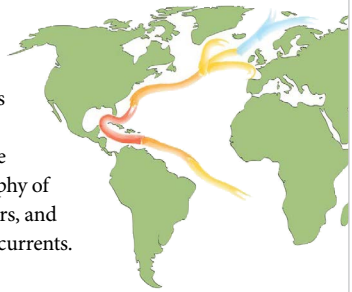
The great Ocean Currents of the World.

deep ocean valley, an underwater temperature change, or from the way fresh and salt water mix, it's likely to stick around for a long time. Many of the currents in the ocean are permanent. For example, the Gulf Stream is a fast-moving, permanent current of warm water. It travels from the Gulf of Mexico and the West Indies, all the way up the United States's East Coast, and onward to Canada and Europe. Sailors have known about the Gulf Stream for over 500 years. (After all, currents carry plankton and nekton around the ocean, but they can also carry boats.)

THE BIG QUESTION

How does the North Pacific Garbage Patch impact the open ocean ecosystem?

Over time, all these permanent currents add up to create a specific geography of the ocean. It's tempting to imagine the ocean as one big, unchanging expanse of seawater. But plankton, nekton, and the sailors who share the ocean with them know differently. The geography of a continent on land is made of mountains, rivers, and coasts. The geography of the ocean is made of currents.



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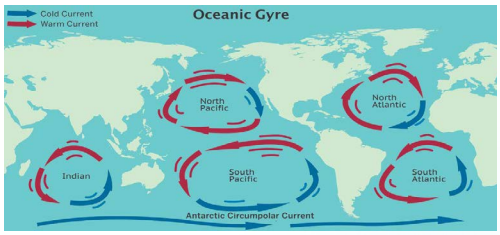
Literal. The Gulf Stream is an example of what?

» a permanent current

- Continue reading "The Five Major Gyres."

The swirling ocean currents that cover the Earth result in gyres in a few places in the world.



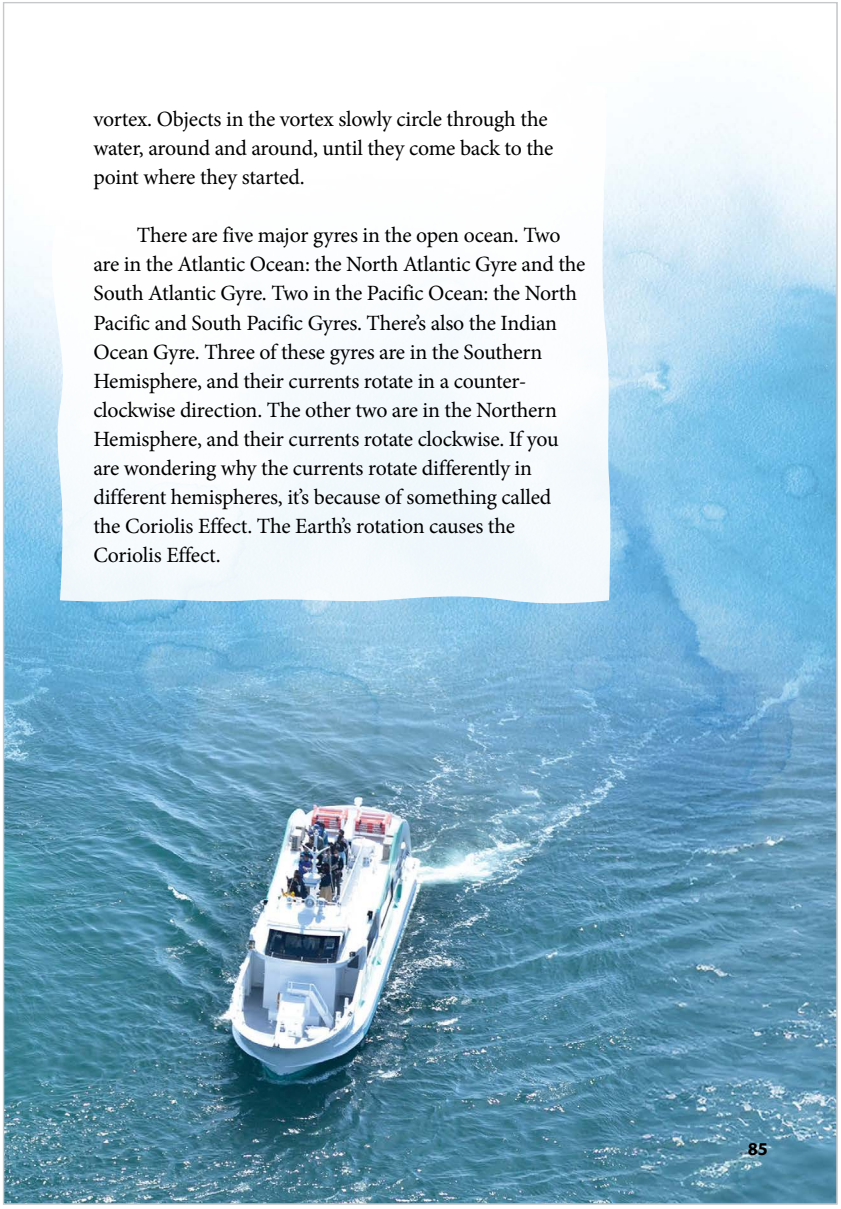
The Five Major Gyres

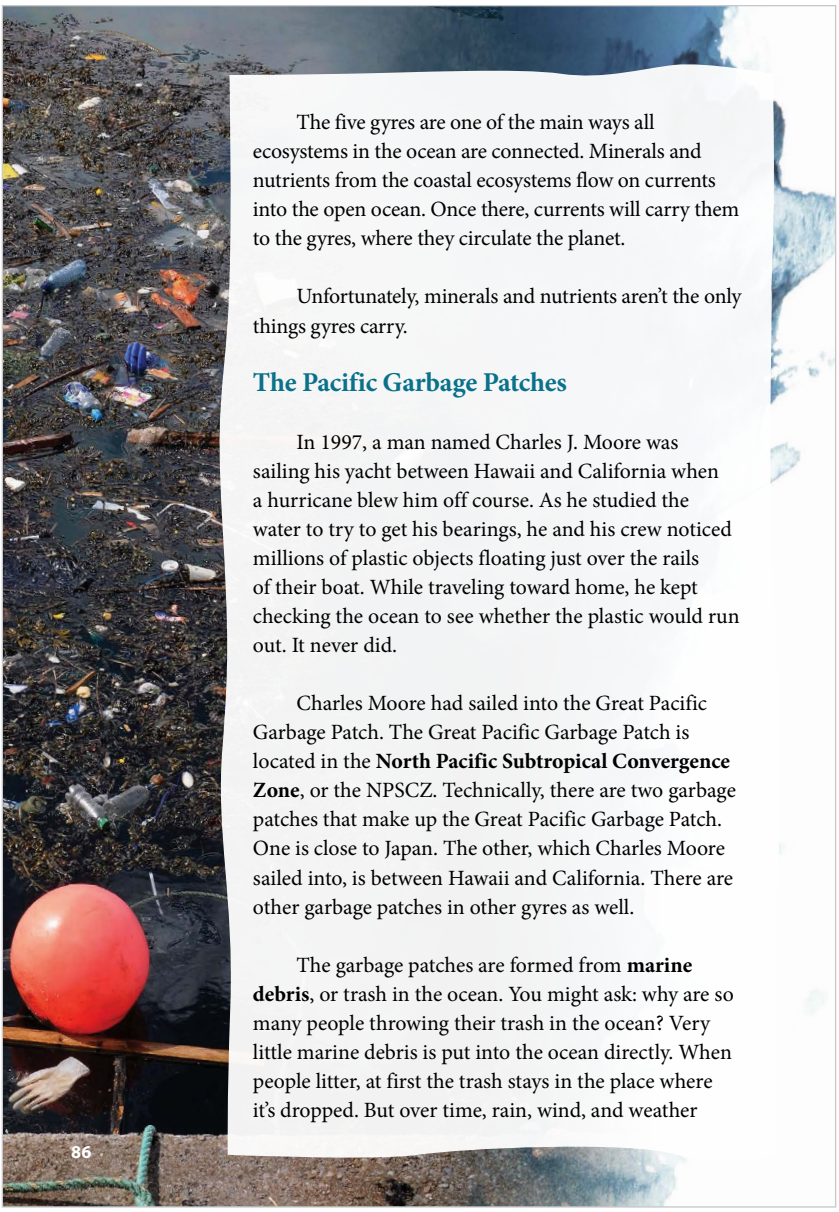
Sometimes permanent currents are linked. When the warm water of the Gulf Stream flows toward Europe, it pushes out the colder water around the European coast. This forms a new current that travels south. On its way, that cold water current starts to push areas of warm water aside, which forms other currents.

When permanent currents form a stable cycle, they create a **gyre**. Gyres are systems of large, swirling ocean currents. All the currents in a gyre feed into one another, which makes the gyre move in a circular path called a

vortex. Objects in the vortex slowly circle through the water, around and around, until they come back to the point where they started.

There are five major gyres in the open ocean. Two are in the Atlantic Ocean: the North Atlantic Gyre and the South Atlantic Gyre. Two in the Pacific Ocean: the North Pacific and South Pacific Gyres. There's also the Indian Ocean Gyre. Three of these gyres are in the Southern Hemisphere, and their currents rotate in a counter-clockwise direction. The other two are in the Northern Hemisphere, and their currents rotate clockwise. If you are wondering why the currents rotate differently in different hemispheres, it's because of something called the Coriolis Effect. The Earth's rotation causes the Coriolis Effect.





The five gyres are one of the main ways all ecosystems in the ocean are connected. Minerals and nutrients from the coastal ecosystems flow on currents into the open ocean. Once there, currents will carry them to the gyres, where they circulate the planet.

Unfortunately, minerals and nutrients aren't the only things gyres carry.

The Pacific Garbage Patches

In 1997, a man named Charles J. Moore was sailing his yacht between Hawaii and California when a hurricane blew him off course. As he studied the water to try to get his bearings, he and his crew noticed millions of plastic objects floating just over the rails of their boat. While traveling toward home, he kept checking the ocean to see whether the plastic would run out. It never did.

Charles Moore had sailed into the Great Pacific Garbage Patch. The Great Pacific Garbage Patch is located in the **North Pacific Subtropical Convergence Zone**, or the NPSCZ. Technically, there are two garbage patches that make up the Great Pacific Garbage Patch. One is close to Japan. The other, which Charles Moore sailed into, is between Hawaii and California. There are other garbage patches in other gyres as well.

The garbage patches are formed from **marine debris**, or trash in the ocean. You might ask: why are so many people throwing their trash in the ocean? Very little marine debris is put into the ocean directly. When people litter, at first the trash stays in the place where it's dropped. But over time, rain, wind, and weather

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- Continue reading "The Pacific Garbage Patches."

carry it into water systems, including rivers and coastlines. Once it's in the water, the currents take it, and eventually it finds its way into one of the gyres. There, the vortex motion of the gyre captures it, and it continues to circle. After this has happened to many pieces of debris, they form a patch.

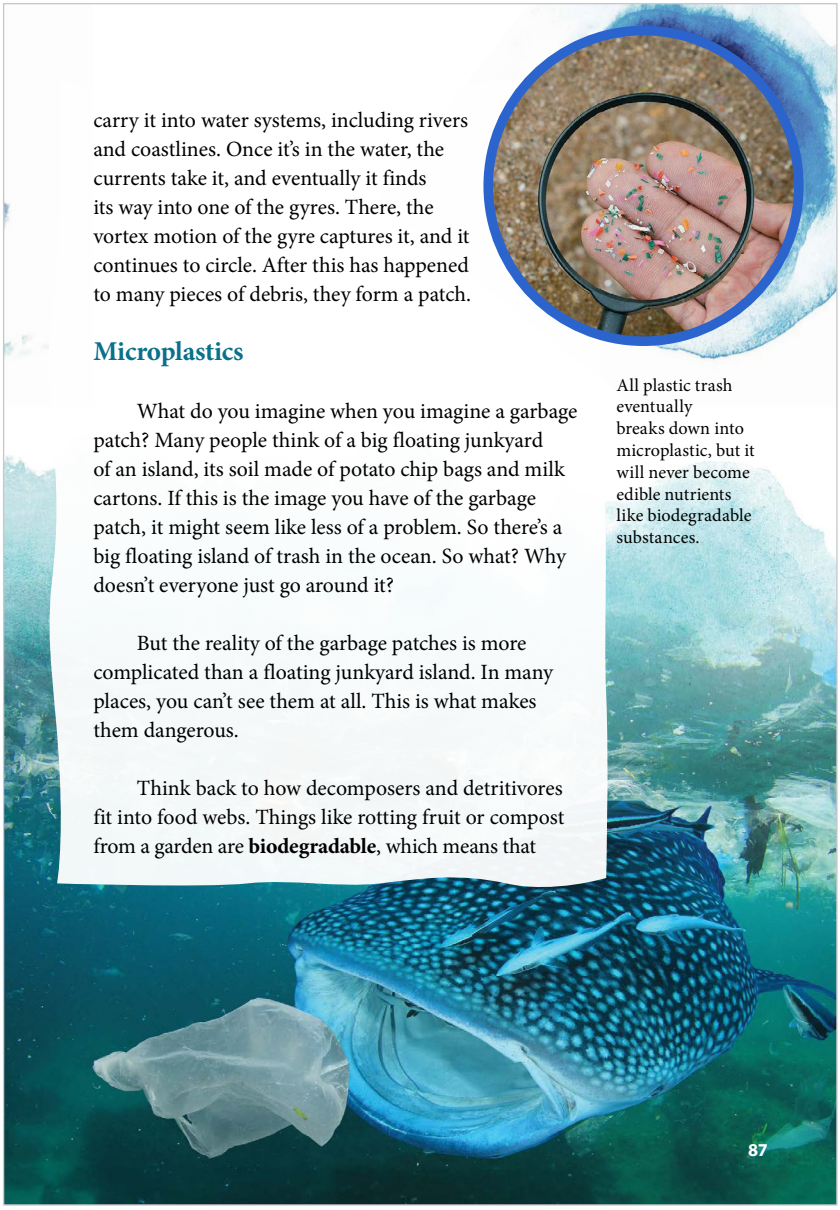
All plastic trash eventually breaks down into microplastic, but it will never become edible nutrients like biodegradable substances.

Microplastics

What do you imagine when you imagine a garbage patch? Many people think of a big floating junkyard of an island, its soil made of potato chip bags and milk cartons. If this is the image you have of the garbage patch, it might seem like less of a problem. So there's a big floating island of trash in the ocean. So what? Why doesn't everyone just go around it?

But the reality of the garbage patches is more complicated than a floating junkyard island. In many places, you can't see them at all. This is what makes them dangerous.

Think back to how decomposers and detritivores fit into food webs. Things like rotting fruit or compost from a garden are **biodegradable**, which means that



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Inferential. How do gyres connect ocean ecosystems?

» Gyres move water and minerals in a large circular path from different ocean ecosystems around the world between each other.

- Continue reading "The Pacific Garbage Patches."

Evaluative. Could other sailors find new garbage patches?

» Answers may vary but could include that it is possible because there are many ocean gyres and litter will continue to find its way into the ocean water.

- Continue reading "Microplastics."

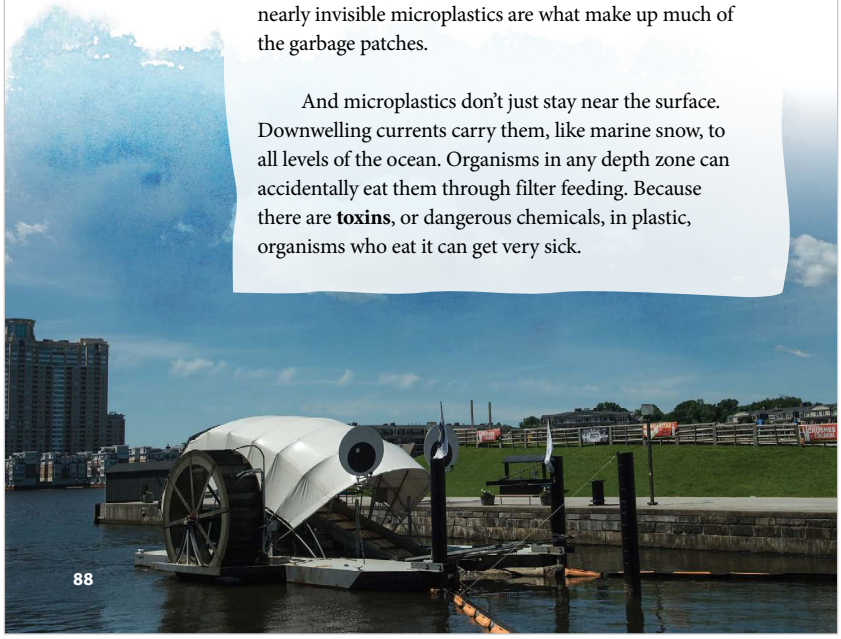
Mr. Trash Wheel can collect thousands of plastic bottles each month.

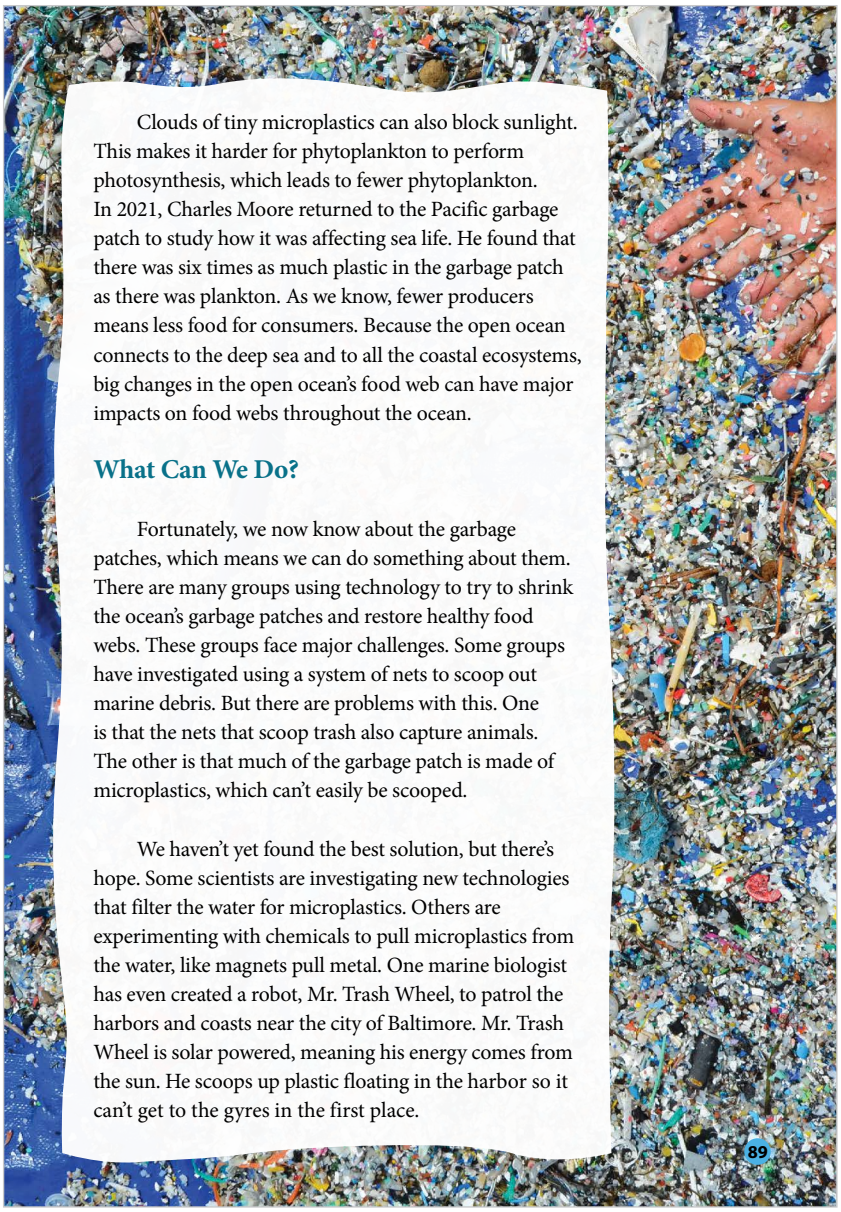
decomposers can break them into nutrients and edible detritus. In the end, biodegradable things all find their way back into the food web.

But plastic isn't biodegradable. There are no decomposers who can get energy from breaking it down, and there are no detritivores who can **digest** it. For weeks, for months, sometimes for years, it floats over the ocean currents. Eventually, it deteriorates, or breaks down, from sun, from wind, and from collisions with other ocean debris.

Much of the ocean's plastic eventually breaks all the way down into tiny pieces called **microplastics**. Pieces of microplastic can be as large as the tip of a little finger or so small that you'd need a microscope to see them. These nearly invisible microplastics are what make up much of the garbage patches.

And microplastics don't just stay near the surface. Downwelling currents carry them, like marine snow, to all levels of the ocean. Organisms in any depth zone can accidentally eat them through filter feeding. Because there are **toxins**, or dangerous chemicals, in plastic, organisms who eat it can get very sick.





Clouds of tiny microplastics can also block sunlight. This makes it harder for phytoplankton to perform photosynthesis, which leads to fewer phytoplankton. In 2021, Charles Moore returned to the Pacific garbage patch to study how it was affecting sea life. He found that there was six times as much plastic in the garbage patch as there was plankton. As we know, fewer producers means less food for consumers. Because the open ocean connects to the deep sea and to all the coastal ecosystems, big changes in the open ocean's food web can have major impacts on food webs throughout the ocean.

What Can We Do?

Fortunately, we now know about the garbage patches, which means we can do something about them. There are many groups using technology to try to shrink the ocean's garbage patches and restore healthy food webs. These groups face major challenges. Some groups have investigated using a system of nets to scoop out marine debris. But there are problems with this. One is that the nets that scoop trash also capture animals. The other is that much of the garbage patch is made of microplastics, which can't easily be scooped.

We haven't yet found the best solution, but there's hope. Some scientists are investigating new technologies that filter the water for microplastics. Others are experimenting with chemicals to pull microplastics from the water, like magnets pull metal. One marine biologist has even created a robot, Mr. Trash Wheel, to patrol the harbors and coasts near the city of Baltimore. Mr. Trash Wheel is solar powered, meaning his energy comes from the sun. He scoops up plastic floating in the harbor so it can't get to the gyres in the first place.

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Literal. Explain how microplastics impact marine organisms' food supply.

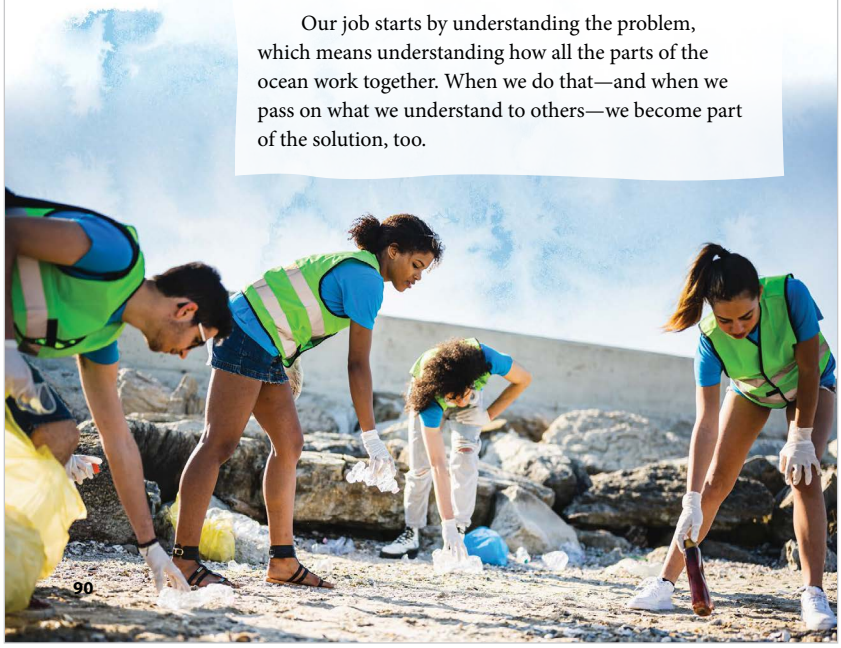
» Answers may vary but could include that detritivores eat and become sick from microplastic that finds its way to the ocean floor and producers may find it harder to use photosynthesis as microplastics floating on the surface block sunlight.

- Continue reading "What Can We Do?"

It's clear that marine biologists play a key role. Part of that role is studying the health of the ocean and its food webs. But the greater part might be their work to teach communities more about how the ocean connects all ecosystems.

Marine debris is a major problem for our planet. It's not just scientists who're working to solve the problem. Community groups work to organize beach cleanups and to raise awareness. The companies that produce plastic are researching new ways to make safe and biodegradable materials. And the governments of different countries have passed laws that make it harder to use unsafe plastic. All these groups, working together, will make up part of the solution.

Our job starts by understanding the problem, which means understanding how all the parts of the ocean work together. When we do that—and when we pass on what we understand to others—we become part of the solution, too.



A beach cleanup is a simple way to take care of our shorelines.

90

Literal. What are some solutions being used to remove marine debris from the ocean?

» Answers may vary but could include new technologies developed by marine biologists that remove debris by attracting it with a chemical and a solar-powered machine that scoops plastic out of the water before it can reach a gyre.

Inferential. What are some of the challenges when trying to remove marine debris from the ocean?

» Scooping out debris can endanger marine life and some debris is too small to remove by scooping.

Check for Understanding

Why is the connection between ecosystems important to consider when trying to understand the issue of marine debris in ocean gyres?

» Answers may vary but could include that understanding the source of the marine debris and whether or not it started in the ocean helps marine biologists try to stop it at the source, such as scooping trash from coastal areas by Mr. Trash Wheel.

Discuss "Gyres"

- After students have finished reading and taking notes, lead a whole group discussion using the questions below.

MULTILINGUAL/ENGLISH LEARNERS
ML/EL
Speaking and Listening
Exchanging Information and Ideas

Entering/Emerging	Have students select and include words and phrases marked in the text in their responses.
Transitioning/ Expanding	Provide sentence frames based on the question to support responses: Garbage patches result from ___
Bridging	Have students use the word *because* to expand their answers by repeating a partial response using a sentence frame such as: I hear you saying, "____,-" Could you please add more using *because*?

1. **Literal.** Expand the sentence by adding details to describe where and how to the following sentence stem: Gyres are _____.
   » Expanded sentence: Gyres are permanent currents in the open ocean caused by rotating water.
2. **Inferential.** What are some of the causes of garbage patches in ocean gyres? Use evidence from the text in your answer.
   » Answers may vary but could include supporting details from the text including the role of ocean currents and humans disposing of plastic waste.

3. **Inferential.** What impact does a gyre make on ocean ecosystems?
    - » Answers may vary but could include that floating organisms, such as nekton and plankton, could become stuck in one location because the current in a gyre does not traverse the open ocean.
4. **Evaluative.** How does "work to teach communities more about how the ocean connects all ecosystems" reduce marine debris in gyres?
    - » Answers may vary but could include that litter may be reduced if people understand that, even if they do not leave it on a beach or in the water, "the ocean connects to all ecosystems" and trash can end up in the ocean through rain runoff and the waterways that connect to the ocean.

Discuss "Gyres"

- Direct students to the second text in chapter 10, The Great Pacific Garbage Patch infographic.
- Have students study the image and read its captions independently.
- **Turn and Talk:** What additional information about marine debris in ocean gyres is in this text?
- Remind students to signal when both partners have contributed to the conversation.
- Ask a few students to share their partner's response and record them on the board.
    - » Answers may vary but could include size statistics such as that 80 percent of plastic comes from litter dropped on land, where the debris is located such as that 70 percent of debris sinks to the ocean floor, what the patch looks like such as having islands and a soup mix of water and microplastic, and the phenomenon of ghost fishing where animals become entangled in nets left in the water.
- Have students add notes from the board onto their own notes on Activity Page 10.1.

WORD WORK: *ENTANGLED* (5 MIN.)

1. In the chapter you read, "Thousands of larger mammals get entangled, or stuck in synthetic fishing nets that float in the garbage patch."
2. Say *entangled* with me.
3. *Entangled* means became tangled or wrapped up.

4. What else could we describe as being entangled?
   - Ask two or three students to use the target word in a sentence. If necessary, guide and/or rephrase students' responses to make complete sentences:

     "The dog's leash entangled my legs as it ran around me."

5. What part of speech is the word entangled?
   - » verb
   - Use a Discussion Activity for follow-up.

Discussion Activity

Tell students to talk with their partners about situations in which something might become entangled. Make sure students use the word *entangled* in complete sentences as they discuss the word.

Lesson 10: Gyres

Writing

40M

Primary Focus: Students will write several structured paragraphs to explain a strategy for solving the problem of garbage patches in ocean gyres.
[W.5.2b, W.5.4, W.5.9b]

WRITING A MULTIPARAGRAPH RESPONSE (40 MIN.)

- Direct students to Activity Page 10.2. Explain that in this lesson they will respond to the prompt in three paragraphs. To help plan this longer informative text, they will use an outline.
- Direct student to the Outline: Gyres on Activity Page 10.2. Point out that there are three sections, the introduction, body and conclusion. Remind students that they already know these parts from writing a single paragraph.
- Ask:
  - Which paragraph introduces the topic to the reader?
    - » paragraph 1
  - Which paragraph supports the topic with details?
    - » paragraph 2
  - Which paragraph wraps up the topic for the reader?
    - » paragraph 3

Activity Page 10.2

Activity Pages 10.3

- Ask, "How will writing this three-paragraph response be similar to writing the paragraphs you have been practicing?"
  - » Answers could include: starting each paragraph with a main idea sentence, using evidence from the text in the detail sentence, using planning tools to help know what to write, using the checklist before finalizing.
- Direct students to their outline template. Explain that they will fill in key words and phrases to plan writing. Remind students that they should not write full sentences until they begin to draft.

Check for Understanding

Ask students why they do not write full sentences in an outline.

- » Answers may vary but could include that the focus during this stage of the writing process, planning, is to collect and organize information. Writing clear sentences occurs during drafting.

D Differentiation

Challenge

Encourage students to include transition words and phrases to start each paragraph. Ask students to consider the best transition word for each part of the essay. For example, *first* fits the start of the essay, as opposed to *in addition*, which is more appropriate for later in the writing.

Support

Allow students to fill in the outline template with full sentences. Review the outline for errors before students transfer the text to the draft.

- Direct students to plan and draft their essays using Activity Pages 10.2 and 10.3.

ML/EL **MULTILINGUAL/ENGLISH LEARNERS**

Writing

Interacting in Meaningful Ways

Entering/Emerging	Allow students to orally rehearse their essay with a partner using the completed outline as a guide.
Transitioning/ Expanding	Provide sentence stems and sentence frames to support writing. Examples: One solution could be to _____. This idea could work by_____.
Bridging	Have students ensure all details have been included by crossing off information on their outline as they write.

Lesson 10: Gyres

Language

15M

Primary Focus: Students will apply grade-level phonics and word analysis skills to decode and encode targeted spelling words. **[RF.5.3a]**

SPELLING: PRACTICE (15 MIN.)

- Tell students that they will practice writing the spelling words.
- Have students turn to Activity Page 10.4, explaining that the spelling words are listed in the box on the activity page and on the board/chart paper from Lesson 7.
- Have students work with a partner to complete #1.
- After students complete #1, call on one student to read their sentence aloud.
- Discuss the proper spelling of the word in the sentence, referencing the list of spelling words. Have students compare their spelling with the spelling in the box.
- Have students work independently or with a partner to complete the rest of Activity Page 10.4.
- Collect Activity Page 10.4 to review and grade later.
- Remind students that they will have the spelling assessment in the next lesson.

Activity Page 10.4

End Lesson

LESSON

11

Ecosystem: Main Idea and Supporting Details

PRIMARY FOCUS OF LESSON

Language

Students will apply grade-level phonics and word analysis skills to decode and encode targeted spelling words. **[RF.5.3a]**

Reading

Students will identify the main idea and supporting details about animals in an ecosystem while reading informational texts. **[RI.5.2, SL.5.1b, SL.5.2]**

Students will demonstrate an understanding of the Tier 2 word *foundations*. **[L.5.4]**

Writing

Students will complete an outline with relevant information about a specific animal from informational texts using summary and paraphrasing. **[W.5.5, RI.5.2]**

FORMATIVE ASSESSMENT

Discussion Rubric	**Notes:** Discuss how energy moves between organisms in ocean ecosystems. **[RI.5.2, SL.5.1, SL.5.2]**
Activity Page 11.3	**Animal and Ecosystem Outline** Gather relevant information about a specific animal in an ocean ecosystem. **[W.5.5, RI.5.2]**

Teacher Presentation Screens:
all lessons include slides

LESSON AT A GLANCE

	Grouping Recommendations	Time	Materials
Language (15 min.)			
Spelling Assessment	Independent	15 min.	❑ Activity Page 11.1
Reading (40 min.)			
Small Group Reading	Whole Group/ Small Group	25 min.	❑ *Life in the Fathoms* ❑ Visual Supports 11.1, 11.2 ❑ Group Recording Page ❑ Discussion Rubric ❑ Activity Page 11.2
Discuss the Chapters	Whole Group	10 min.	
Word Work: *Foundations*	Whole Group	5 min.	
Writing (35 min.)			
Planning with an Outline	Whole Group/ Independent	35 min.	❑ Visual Supports 2.1, 11.3 ❑ Activity Page 11.3

ADVANCE PREPARATION

Reading

Visual Support 11.1 and 11.2

- Prepare to display Visual Supports 11.1 and 11.2.
- Prepare small groups of three for students to work in for the next two lessons.
- Plan to assign small group roles: manager, recorder, and reader. These roles may be chosen initially by students or assigned by the teacher. Roles will rotate over two lessons.
- Provide access to a shared digital document or a large piece of chart paper for the small groups to record their notes. Group notes should be accessible to students throughout Lessons 11–14.
- Prepare a copy of the Discussion Rubric for use during Lessons 11 and 12.

Writing

- Prepare to display or direct students to Visual Support 2.1 posted in the classroom.

Visual Support 11.1

- Prepare to display Visual Support 11.1.
- Prepare to collect Activity Page 11.3 at the end of this lesson and return it next lesson.

Universal Access

Writing

- Allow dictation for drafting, as needed. This may be in the form of dictation to a teacher, peer, or voice typing software.

VOCABULARY PREVIEW

- You may choose to preview the vocabulary words before reading the text.

ability, n. the state of being able to do something

foundations, n. the bases of buildings

particles, n. very small pieces of something

crevices, n. narrow openings or cracks

specimens, n. examples of something

Vocabulary Chart for Chapter 11 "Organisms of the Coral Reef and Kelp Forest"			
Vocabulary Type	**Tier 3 Domain-Specific Words**	**Tier 2 General Academic Words**	**Tier 1 Everyday Speech Words**
Core Vocabulary	specimens	ability foundations particles crevices	
Spanish Cognates	especímenes	habilidad partículas	
Multiple-Meaning			
Sayings and Phrases			

Start Lesson

Lesson 11: Ecosystem: Main Idea and Supporting Details

Language

15M

Primary Focus: Students will apply grade-level phonics and word analysis skills to decode and encode targeted spelling words. **[RF.5.3a]**

SPELLING ASSESSMENT (15 MIN.)

Activity Page 11.1

- Direct students to Activity Page 11.1 for the spelling assessment.
- Using the list below, read the words one at a time in the following way: say the word, use it in a sentence, and then repeat the word.
- Tell students that you will review the list once more at the end.
- Remind students to pronounce and spell each word syllable by syllable.

Spelling Words

1. biotic
   - The living parts of an ecosystem are the biotic factors.
2. debris
   - A shipwreck's debris may leave treasure on the ocean floor.
3. microorganism
   - Plankton is a microorganism that provides good to many consumers.
4. clarity
   - Excellent clarity creates crystal-clear water that you can easily see through.
5. crevice
   - Kelp may use the crevices in rocks for holdfasts.
6. rigid
   - Even rigid rock can be worn away by ocean waves over time.
7. biologist
   - Marine biologists study for many years before starting their careers.
8. chemical
   - Bioluminescent organisms use chemicals to produce light.

9. biodegradable
   - Using biodegradable products is one way to help ocean conservation.
10. entangle
   - Ocean gyres entangle trash together in their currents.

- After reading all the words, review the list slowly, reading each word once more.
- Collect all spelling assessments to grade later. Use of the outline provided at the end of this lesson to identify and analyze students' errors is highly recommended.

Lesson 11: Ecosystem: Main Idea and Supporting Details

Reading

40M

Primary Focus

Students will identify the main idea and supporting details about animals in an ecosystem while reading informational texts. **[RI.5.2, SL.5.1b, SL.5.2]**

Students will demonstrate an understanding of the Tier 2 word *foundations*. **[L.5.4]**

SMALL GROUP READING (25 MIN.)

Small Group

Read the Chapter

- Have one student read The Big Question at the beginning of chapter 11.
- Tell students that this question will guide their thinking for chapters 11–13.
- Ensure students understand the meaning of The Big Question before reading the chapters.
  - How do organisms obtain energy and food from a specific ecosystem?
- Explain that for the next few lessons they will read and annotate chapters 11–13 in small groups.
- Tell students that they will continue to use the same close reading procedure, reading each text twice, once for understanding and once to take notes.
- Tell students that they will work in small groups to read chapters 11–13.

- During today's lesson they should complete chapter 11 and may read a portion of chapter 12, depending on their group's pace. Each group may be reading and discussing the text at a slightly different pace.

Visual Support 11.1

- Display Visual Support 11.1. Tell students that they will work in small groups using the following roles:
  - Manager: Keeps the group on task and on time.
  - Recorder: Writes the group's work on the recording sheet.
  - Reader: Reads text aloud to the group.
- Direct students to rotate roles after reading each chapter.
- Explain that each role will support the work of discussing the chapter by keeping the group focused on their task.
- Tell students that in this lesson they will read one or more chapters and finish the rest during the next lesson. After they have read a chapter, as a group, they will record their notes on the group's recording page
- Before starting, model the tasks for each role.
  - Say, "As the Manager I would remind everyone to turn to the correct chapter."
  - Direct students to chapter 11.
  - Say, "As the Manager, I would make sure everyone is ready before the group starts reading."
  - Say, "The Manager will also remind the Reader to pause when the group arrives at a discussion question. The Manager will read the discussion questions to the group."
  - Say, "The Reader's job is to read so that everyone can follow along. First, I would check that the group is on the correct page."
  - Look to a student's Reader and point to the page number so the class can observe checking the page.
  - Read a few sentences and then pause to look around the room, checking that everyone is following along during the reading.
  - Direct students to the glossary. Say, "During the reading, I could also help the group by looking up vocabulary words in the glossary or vocabulary activity pages."
  - Say, "After each group of discussion questions, the Recorder will record notes on the recording sheet."

Visual Support 11.2

- Display Visual Support 11.2 and point to where they should record their notes. (Please see advanced preparation for details about format options for recording notes.)

- Ask, what is the purpose of keeping notes for these chapters? What are they being used for?
  - » Answers may vary but could include that they will be used for their final writing assignment.
- Answer any clarifying questions from students. Then, direct students to join their groups and begin reading chapter 11.

ML/EL **MULTILINGUAL/ENGLISH LEARNERS**

Speaking and Listening

Interacting in Meaningful Ways

Entering/Emerging	Provide sentence frames to support cooperative group work: I notice ___ in the text. I think we should write ___. ___ is an important detail because ___.
Transitioning/ Expanding	Have students use the word *because* to support their suggestions for details to include in the notes. For example, "We should include ___ because ___.
Bridging	Have students paraphrase text details when identifying information to include in their notes.

- Circulate throughout the room, listening to groups as they discuss the questions on Activity Page 11.2.
- Ask students to show the information they found in the text to support their answers.
- Encourage students to summarize their support instead of reading quotations directly from the text.

Check for Understanding

Ask for examples of essential characteristics of an ecosystem in these chapters.

- » Answers may vary but could include habitats to live in and food to eat.

D Differentiation

Support

Assign group work roles purposefully to meet student needs.

Activity Page 11.2

Differentiation

Challenge

Prompt students to use key vocabulary from prior chapters in their responses, when applicable.

Discussion Rubric

DISCUSS THE CHAPTER (10 MIN.)

- Pause the groups after they have all finished reading and taking notes on chapter 11.
- Remind groups that they will continue reading chapters 12 and 13 in the next class.
- Acknowledge that some groups have started reading chapter 12 and others will start during the next lesson. Assure students that they will have the next lessons to finish reading chapters 12 and 13.
- Lead a discussion using the questions below.
- As students participate in the discussion, use the Discussion Rubric as formative assessment. Students who are not assessed during this lesson may be assessed in Lesson 12.

1. **Literal.** What essential role does coral play in this ecosystem?
    - » Answers may vary but could include that coral provides shelter for other organisms.
2. **Inferential.** What are some examples of producers, consumers, and decomposers in a coral reef?
    - » Answers may vary but could include, producers: phytoplankton and red coralline algae; consumers: dugong and whale shark; decomposer: bat star.
3. **Evaluative.** The text says, "While coral reefs make up less than 1 percent of the ocean, they're home to a quarter of all marine life." Expand the sentence below using the conjunctions *because, but,* and *so* to explain why this is important for the study of marine biology and conservation.

    Coral reefs are important to the study of marine biology.

    - » Answers may vary but could include sentences such as:
        - ◦ Coral reefs are important to the study of marine biology, because they are home to a quarter of all marine life.
        - ◦ Coral reefs are important to the study of marine biology, but they only make up less than 1 percent of the ocean.
        - ◦ Coral reefs are important to the study of marine biology, so many organisms would benefit from efforts to conserve coral.

WORD WORK: *FOUNDATIONS* (5 MIN.)

1. In the chapter you read, "These massive corals have the ability to grow very strong, which makes them great *foundations*, or building blocks, for reefs."
2. Say *foundations* with me.
3. *Foundations* are the bases of buildings.
4. The school building's foundations were made of bricks.
5. What else could be used to build foundations?

   Ask two or three students to use *foundations* in a sentence. If necessary, guide and/or rephrase students' responses to make complete sentences.

6. What part of speech is the word *foundations*?
   - » noun

   Use a Making Choices activity for follow-up. Say, "I will say a material for building a foundation. After I read the statement, you will say, 'That is a strong foundation' or 'That is not a strong foundation.'"

   - cement
     - » That is a strong foundation.
   - cinder blocks
     - » That is a strong foundation.
   - modeling clay
     - » That is not a strong foundation.
   - sand
     - » That is not a strong foundation.
   - boulders
     - » That is a strong foundation.

Lesson 11: Ecosystem: Main Idea and Supporting Details

Writing

35M

Primary Focus: Students will complete an outline with relevant information about a specific animal from informational texts using summary and paraphrasing. **[W.5.5, RI.5.2]**

PLANNING WITH AN OUTLINE (35 MIN.)

- Remind students that in Lesson 10 they used an outline to plan their response.
- Tell them that they will use an outline to plan their final writing assignment.
- Ask, "How is an outline organized?"
  - » Answers may vary but could include correctly identifying the locations of the main idea and detail areas of the outline.

Visual Support 11.3

- Display Visual Support 11.3 or write the prompt on the board.

  Explain how [your chosen animal] survives in and contributes to the ecosystem where it lives.

- Direct students to Activity Page 11.3.
- Explain that this is the outline they will fill in with information from the chapters in *Life in the Fathoms* to write their response.
- Ask, "What needs to be filled in to finish the writing prompt?"
  - » the animal chosen
- **Think-Pair-Share:** Allow students to think about and discuss the following question with a partner: What should you consider when choosing an animal?
- Remind students to signal when both partners have contributed to the conversation.
- Allow a few student volunteers to share their responses.
  - » Answers will vary but could include whether the animal inhabits an ecosystem of interest, if the organism has interesting adaptations, whether enough information about it is included in the text to plan a response to the prompt.
- Explain that they are choosing an animal from chapters 11–13.
- Remind students that they have access to all the information in *Life in the Fathoms* to use in their response, not only chapters 11–13, such as earlier chapters about different ocean ecosystems and food webs.

Activity Page 11.3

D Differentiation

Support

Prompt students to review the chapter names and chapter subheadings to help recall the content of earlier chapters in *Life in the Fathoms* that is available to use in their outline.

- Tell students that they will fill in key words and phrases to plan their informative essays.
- Ask, "Why should you use key words and phrases instead of quotations?"
  - » Information needs to be put into the writer's own words.
- Ask, "How should longer quotations, such as several sentences or paragraphs, be used in the outline?"
  - » Answers will vary but could include to summarize or paraphrase longer quotations to be used in the outline in the writer's own words.

Check for Understanding

Ask, "What makes a word or phrase a key word or phrase?"

- » Answers may vary but could include that they are essential to understanding the topic or detail.

- Direct students to fill in the animal they have chosen in the prompt on Activity Page 11.3 and fill in the outline.

ML/EL **MULTILINGUAL/ENGLISH LEARNERS**
Writing
Structuring Cohesive Texts

Entering/Emerging	Have students discuss words or phrases with a partner that they will use to complete the outline.
Transitioning/ Expanding	Have students underline key words and phrases that they will use to complete the outline.
Bridging	Have students use their completed outline from Lesson 10 as a model for their work.

- When five minutes remain, gather the whole group to share their chosen topics. Ask:
  - What animal have you chosen and why?
    - » Answers may vary but could include an animal featured in *Life in the Fathoms* chapters 11–13 with supporting reasons from those texts.
- Collect Activity Page 11.3.

End Lesson

D Differentiation

Challenge

Ask students to connect the reason they chose their animal to the ecosystem where the animal can be found.

LESSON

12

Ecosystem Exhibition: You Are the Writer!

PRIMARY FOCUS OF LESSON

Reading

Students will identify facts and make inferences about animals in a specific ecosystem while reading multiple informative texts. **[RI.5.1, SL.5.1b]**

Students will demonstrate an understanding of the Tier 2 word *contradict*. **[L.5.4]**

Writing

Students will draw evidence from their outline to develop introduction, body, and conclusion paragraphs explaining a specific ecosystem using relevant vocabulary. **[W.5.2a, W.5.2b, W.5.2e]**

Students will use a word processor to draft an informative text. **[W.5.6]**

FORMATIVE ASSESSMENT

Discussion Rubric

Notes Discuss key ideas about relationships between animals and their environments in ocean ecosystems. **[RI.5.1, SL.5.1b, SL.5.2]**

Teacher Presentation Screens:
all lessons include slides

LESSON AT A GLANCE

	Grouping Recommendations	Time	Materials
Reading (35 min.)			
Small Group Reading: Chapters 12–13	Whole Group/ Small Group	25 min.	❑ Visual Support 11.1 ❑ Activity Page 11.2 ❑ *Life in the Fathoms* ❑ Group Recording Page ❑ Discussion Rubric
Discuss the Chapters	Whole Group	5 min.	
Word Work: *Contradict*	Whole Group	5 min.	
Writing (55 min.)			
Writing with an Outline	Whole Group/ Independent	55 min.	❑ Visual Supports 2.1, 11.3, 12.1 ❑ Activity Pages 11.3, 12.1

ADVANCE PREPARATION

Reading

- Prepare to place students in the same small groups as the last lesson. Students will continue to rotate through the cooperative group roles.

Writing

- Prepare to return Activity Page 11.3.
- This lesson is designed to fulfill standard W.5.6, which asks students to use technology and digital tools to publish work. If your classroom is not conducive to using technology, you may have students complete the assignments on paper.
- Prepare to display or direct students to Visual Support 2.1 posted in the classroom.

Visual Support 11.1

- Prepare to display Visual Support 11.1.

Universal Access

- Provide an individual copy of Visual Support 2.1 for students to follow at their seats. An annotated copy that matches the instruction may be used for additional support.

VOCABULARY PREVIEW

- You may choose to preview the vocabulary words before reading the text.

flourish, v. to thrive or to experience health and growth

unison, adj. at the same time

contradict, v. to appear as the opposite

fluke, n. wing-shaped part of a whale's tail

Vocabulary Chart for Chapter 12 "Organisms of Estuaries and Mangrove Forests"			
Vocabulary Type	**Tier 3 Domain-Specific Words**	**Tier 2 General Academic Words**	**Tier 1 Everyday Speech Words**
Core Vocabulary		flourish unison contradict fluke	
Spanish Cognates		florecer unísono contradecir	
Multiple-Meaning			
Sayings and Phrases			

Start Lesson

Lesson 12: Ecosystem Exhibition: You Are the Writer!

Reading

35M

Primary Focus

Students will identify facts and make inferences about animals in a specific ecosystem while reading multiple informative texts. **[RI.5.1, SL.5.1b]**

Students will demonstrate an understanding of the Tier 2 word *contradict*. **[L.5.4]**

SMALL GROUP READING: CHAPTERS 12–13 (25 MIN.)

Read the Chapter

Small Group

- Ask students to review the Big Question for chapters 11–13. You may have them refer to it in the Reader if needed.
  - » How do organisms obtain energy and food from a specific ecosystem?
- Tell students that they will revisit this question after reading today.
- Direct students to Activity Page 11.2.
- Ask students, "What were these questions used for in the last lesson?"
  - » to discuss the chapter after reading as a group
- Remind students to use their close reading procedure with the rest of chapter 12 and with chapter 13.

Activity Page 11.2

Visual Support 11.1

- Display Visual Support 11.1.
- Tell students that they will continue to work in small groups using the following roles being displayed.
- Ask students to identify which role they performed last lesson by holding up one finger (Manager) two fingers (Recorder) or three fingers (Reader).
- Remind students that they will rotate roles after reading each chapter.
- Ask students to point to where they should record their work after reading each chapter as a group, based on the last lesson's directions.

Check for Understanding

What will your notes be used for after reading these chapters in *Life in the Fathoms*?

» As information in the final writing assignment.

- Direct students to meet in their groups and pick up their work where they left off.
- Tell students that they should read and take notes on what remains of chapter 12 and chapter 13.
- Circulate throughout the room, listening to and supporting students as they discuss the questions on Activity Page 11.2.
  - Ask students how these chapters answer the Big Question.
  - Have students show each other details that support the Big Question in the text, then work together to summarize those details.

DISCUSS THE CHAPTERS (5 MIN.)

- After students have finished reading and taking notes, lead a discussion using the questions below.
- Use the Discussion Rubric to assess student participation in the discussion. Students who were not assessed during lesson 11 should be assessed in lesson 12.

1. **Literal.** What do the two ecosystems in chapter 12 have in common?
   » Answers may vary but could include that both estuaries and mangrove forests are located on coastlines.
2. **Inferential.** What are some examples of producers, consumers, and decomposers in an estuary? How do they obtain energy or food?
   » Answers may vary but could include, producer: eelgrass, uses the sun's energy to make food; consumer: sea otters, eat other animals such as shellfish; decomposer: Dungeness crabs, eat detritus on the seafloor.
3. **Inferential.** What are some examples of producers and consumers in this mangrove forest?
   » Answers may vary but could include, producers: guianan mangroves and consumers: west indian manatee.

D Differentiation

Support

Have students preview the discussion questions on Activity Page 11.2 prior to reading each chapter.

Challenge

Have students build on their peers' comments during the discussion.

Discussion Rubric

4. **Evaluative.** The text says, "While coral reefs make up less than 1 percent of the ocean, they're home to a quarter of all marine life." Expand the sentence below using the conjunctions *because, but,* and *so* to explain why this is important for the study of marine biology and conservation.

   Coral reefs are important to the study of marine biology.

   » Answers may vary but could include sentences such as:

   Coral reefs are important to the study of marine biology, because they are home to a quarter of all marine life.

   Coral reefs are important to the study of marine biology, but they only make up less than 1 percent of the ocean.

   Coral reefs are important to the study of marine biology, so many organisms would benefit from efforts to conserve coral.

ML/EL **MULTILINGUAL/ENGLISH LEARNERS**
Writing
Structuring Cohesive Texts

Entering/Emerging	Provide sentence frames to support responses: Both ecosystems have ___. Some examples are ___.
Transitioning/ Expanding	Have students include key words from the questions in their response, such as *ecosystems*, *producers*, *consumers*, and *organisms*.
Bridging	Have students paraphrase quotations from the text in their discussion question responses using the following sentence stem: The text says ___, in other words ___.

WORD WORK: *CONTRADICT* (5 MIN.)

1. In the chapter you read, "What's a paradox? It's something—often a common saying—that seems to contradict, or disagree with itself."
2. Say *contradict* with me.
3. *Contradict* means to appear as the opposite.
4. The crowded sidewalks seemed to contradict the expectation that only a few people would watch the parade on a rainy day.
5. Have you ever encountered something that seemed to contradict your expectations?

Ask two or three students to use *contradict* in a sentence. If necessary, guide and/or rephrase students' responses to make complete sentences.

6. What part of speech is the word *contradict*?
    - » verb

Use a Discussion activity for follow-up. Ask students to talk with their partners about a time they noticed that something seemed to contradict something else. Make sure students use *contradict* in complete sentences as they discuss.

Lesson 12: Ecosystem Exhibition: You Are the Writer!

Writing

55M

Primary Focus

Students will draw evidence from their outline to develop introduction, body, and conclusion paragraphs explaining a specific ecosystem using relevant vocabulary. **[W.5.2a, W.5.2b, W.5.2e]**

Students will use a word processor to draft an informative text. **[W.5.6]**

WRITING WITH AN OUTLINE (55 MIN.)

- Remind students that in lesson 11, they completed an outline for their writing.
- Tell students that today, after adding any additional information from today's reading, they will use their outline to draft their writing.
- Display Visual Support 11.3 or refer to the prompt on the board from the last class.

  Explain how [your chosen animal] survives and contributes to the ecosystem where it lives.

Visual Support 11.3

- Direct students to Activity Page 11.3. Ask:
    - How will you get started?
        - » By correctly identifying the introduction section of the outline and information about turning key words and phrases into sentences.

D Differentiation

Support

Provide an individual copy of the prompt on Visual Support 11.1 for students to refer to at their seats.

Activity Page 11.3

- What happens if you realize you don't have enough supporting details for your body paragraphs?
  - » Answers may vary but could include revisiting the text or referring back to small group notes for additional information.
- **Turn and Talk.** How should your writing end?
- Remind students to signal when both partners have contributed to the conversation.
- Allow a few volunteers to share their responses.
  - » Answers may vary but could include writing a conclusion that restates the main idea. Students may also refer to the model essay.

- Display and direct students to Visual Support 12.1 Model Essay.
- Ask students to identify the locations of the introduction *(paragraph 1)*, body paragraphs *(paragraphs 2, 3, and 4)*, and conclusion *(paragraph 5)* on the model.
- Tell students that they may refer to this model over the next few lessons as they go through the writing process.
- Explain that the model can be used as an example, but students need to select a topic other than the vampire squid for their own writing.

Check for Understanding

Ask what information the model can give a writer while they are working.

» Answers may vary but could include how to phrase an introduction or conclusion sentence, what order to place the paragraphs in, the estimated length of the text.

- Tell students that if they would like to add additional details from today's reading, they may add them to their outline before drafting.
- Direct students to begin drafting their writing using Activity Page 12.1.
- Circulate and support students, as needed. Support may include:
  - Directing students to applicable examples in the model.
  - Clarifying directions.
  - Working with students in small groups, as needed.

Activity Page 12.1

ML/EL	MULTILINGUAL/ENGLISH LEARNERS **Writing** Structuring Cohesive Texts
Entering/Emerging	Have students orally rehearse their writing before moving on to each paragraph.
Transitioning/ Expanding	Review the following key words in the directions prior to writing on Activity Page 12.1: full sentences, main idea, detail, conclusion.
Bridging	Have students rephrase the task directions in their own words before writing.

- When five minutes remain, gather the whole group to share their progress. Ask:
  - How did you use your outline to help you draft?
    - » Answers may vary but could include using the outline to assist with organization and sentence writing.

End Lesson

D Differentiation

Challenge

Prompt students to think about how their outline might compare in length and complexity to an outline used to write a longer text, such as a chapter in *Life in the Fathoms*.

LESSON

13

Ecosystem Exhibition: You Are the Editor!

PRIMARY FOCUS OF LESSON

Reading

Students will find facts and make inferences about animals in a specific ecosystem while reading multiple informative texts. **[RI.5.1]**

Students will identify important relationships and ideas based on key details and specific information in informative texts. **[RI.5.3]**

Students will demonstrate an understanding of the Tier 2 word *detach*. **[L.5.4]**

Writing

Students will plan for revisions to their drafts using peer feedback to clarify information about a specific ecosystem and its inhabitants. **[W.5.2b, W.5.5]**

Language

Students will demonstrate a command of the conventions of standard English capitalization and punctuation when writing. **[L.5.2]**

FORMATIVE ASSESSMENT

Activity Page 12.1 — **Animal and Ecosystem Draft** Write several developed paragraphs about a specific animal and ecosystem. **[W.5.2]**

Teacher Presentation Screens:
all lessons include slides

LESSON AT A GLANCE

	Grouping Recommendations	Time	Materials
Reading (35 min.)			
Independent Reading: Chapters 11–13	Independent	25 min.	❑ *Life in the Fathoms* ❑ Activity Page 11.3
Discuss the Chapters	Whole Group	5 min.	
Word Work: *Detach*	Whole Group	5 min.	
Writing (40 min.)			
Peer Review	Whole Group/ Partner	40 min.	❑ Activity Page 13.1
Language (15 min.)			
Use an Editing Checklist	Independent/ Whole Group	15 min.	❑ Activity Page 13.2

ADVANCE PREPARATION

Universal Access

Reading

- Provide an individual copy of the group notes, as needed.

Writing

- Allow access to dictation during peer review. This may be in the form of dictation to a teacher, peer, or voice typing software.
- Prepare to collect Activity Page 12.1 and return students' work in Lesson 14. If additional time is needed for assessment, this work may be collected after Lesson 15.

VOCABULARY PREVIEW

- You may choose to preview the vocabulary words before reading the text.

detach, v. to remove

embark, v. to begin

Vocabulary Chart for Chapter 13 "Organisms of the Deep Sea and the Open Ocean"			
Vocabulary Type	**Tier 3 Domain-Specific Words**	**Tier 2 General Academic Words**	**Tier 1 Everyday Speech Words**
Core Vocabulary		detach embark	
Spanish cognates		embarcar	
Multiple-Meaning			
Sayings and Phrases			

Start Lesson

Lesson 13: Ecosystem Exhibition: You Are the Editor!

Reading

35M

Primary Focus

Students will find facts and make inferences about animals in a specific ecosystem while reading multiple informative texts. **[RI.5.1]**

Students will identify important relationships and ideas based on key details and specific information in informative texts. **[RI.5.3]**

Students will demonstrate an understanding of the Tier 2 word *detach*. **[L.5.4]**

INDEPENDENT READING: CHAPTERS 11–13 (25 MIN.)

Revisit the Chapters

- Tell students that today they will work largely independently, though they may consult with group members for assistance, as needed.
- Direct students to review their group's notes for information they can use to add to their writing about their chosen marine animal.
- Tell students to add useful information to their own outline on Activity Page 11.3.
- Circulate and support students as they work.
    - Ask students to summarize what their writing will say based on their outline.
    - Help students find additional details for their outline in their notes, as needed.

Check for Understanding

What will make information useful for their outline?

» Answers may vary but could include new information about an organism or habitat and information that adds to organisms and habitats they have already recorded.

D Differentiation

Support

Allow students to work in supportive partnerships, as needed.

DISCUSS THE CHAPTERS (5 MIN.)

- When 15 minutes remain, bring the whole group together to engage in discussion.
- Ask what was the Big Question for chapters 11–13.
  - » How do organisms obtain energy and food from a specific ecosystem?
- **Think-Pair-Share:** Discuss the Big Question with your neighbor. What characteristics does the animal you are writing about have to help it thrive in its ecosystem? Use evidence from the text in your discussion.
- Remind students to signal when both partners have contributed to the conversation.
- Ask a few students to share what they discussed with their neighbor.
  - » Answers may vary but could include sources of food, salinity, currents, sunlight, heat, and a balance of producers, consumers, and decomposers.

ML/EL **MULTILINGUAL/ENGLISH LEARNERS**

Interacting in Meaningful Ways

Supporting Opinions

Entering/Emerging	Provide students with sentence starters and sentence frames to construct their response. 1. I chose the ____ that lives ____ that is ____. 2. I believe ____ is essential because ____.
Transitioning/ Expanding	Have students include key words from the question in their response, such as *organism*, *ecosystem*, *essential*, and *contribute*.
Bridging	Have students build on other students' comments by reusing their sentence stem. For example, "You said ____. I think ____."

1. **Literal.** In one sentence, describe the organism, its ecosystem, and an interesting fact about it.
   - » The vampire squid lives in the deep sea and is so different from a squid or octopus that it has a category of its own.
2. **Evaluative.** After having spent the last few weeks investigating ocean ecosystems, what do you now believe is the most essential part of these systems?
   - » Answers may vary but could include biotic factors such as a balance of producers, consumers, and decomposers, and abiotic factors such as salinity temperature, current, and sunlight.

3. **Evaluative.** How does the animal you have chosen contribute to its ecosystem?
    - » Answers will vary but could include information about the animal's role as a producer, consumer, or decomposer. For example, the vampire squid prevents a build-up of debris on the ocean floor by feeding on marine snow.
4. **Evaluative.** Expand the sentence using the conjunctions *because* and *and* to explain why your animal is essential to its ecosystem.

    (Vampire squids) are essential to the (deep sea) ecosystem.

    - » Answers may vary but could include sentences such as: "Vampire squids are essential to the deep sea ecosystem, because they prevent detritus from piling up on the ocean floor." "Vampire squids are essential to the deep sea ecosystem, and they teach scientists important information about ancient ocean life."

WORD WORK: *DETACH* (5 MIN.)

1. In the chapter you read, "The California sun star has a feature common to many starfish, including the deep sea brittle star: it can detach, or remove, its arms!"
2. Say *detach* with me.
3. *Detach* means to remove.
4. The girl used the perforated edge to detach the page from the workbook.
5. What else can be detached? Ask two or three students to use *detach* in a sentence. If necessary, guide and/or rephrase students' responses to make complete sentences.
6. What part of speech is the word *detach*?
    - » verb

    Use a Making Choices activity for follow-up. Say, "I will name an item that can either detach or not detach. After I name the item, you will say, 'will detach" or "will not detach.'"

    - lid of a jar
        - » will detach
    - clip-on keychain
        - » will detach
    - wall tiles
        - » will not detach

- snap-on coat hood
  - » will detach
- library book pages
  - » will not detach

Lesson 13: Ecosystem Exhibition: You Are the Editor!

Writing

40M

Primary Focus: Students will plan for revisions to their drafts using peer feedback to clarify information about a specific ecosystem and its inhabitants. **[W.5.2b, W.5.5]**

PEER REVIEW (40 MIN.)

Activity Page 12.1

- Have students turn to their drafts on Activity Page 12.1.
- Tell students that today they will use a peer review checklist to improve their work. Ask:
  - What is the difference between revising and editing?
    - » Revisions are changes made to improve the writing, such as organization or word choice. Edits correct English language convention errors such as spelling, grammar, and punctuation.

D Differentiation

Support

Ask students to identify ways that they would like to improve or correct their writing. Explain that these are revision and editing opportunities.

Check for Understanding

Ask students if each item is an example of revision or editing.

Correcting a misspelled word

- » editing

Replacing a verb

- » revision

Adding a descriptive detail

- » revision

Correcting verb tense

- » editing

- Explain that it is often helpful to get a reader's feedback on a draft before making revisions.
- Direct students to Activity Page 13.1. Explain that this tool will be used to help give review and give their peers feedback.
- Read directions to students.
- Remind students that when they give feedback, they should provide a clear explanation in the Explain column on Activity Page 13.1.

Activity Page 13.1

Visual Support 12.1

- Display Visual Support 12.1.
- Read the model essay aloud.
- **Think-Pair-Share:** Have students discuss with a neighbor suggestions they would offer to improve this essay, based on the revision checklist from Activity Page 13.1.
- Remind students to signal when both partners have contributed to the conversation.
- Ask a few students to share the feedback they would offer for the model essay, using language from the revision section of the peer review Activity Page 13.1.
- Model a think-aloud of revising using Visual Support 12.1.
  - Say, "Suppose a reader didn't understand why the period of time in the introduction, 165 million years, is important. Adding some detail to explain would make this more clear."
  - Say, "This number is important because it shows that the vampire squid is an organism that has existed for an extremely long time."
  - "To make that clear, I am going to add the phrase, 'extremely long time,' to my sentence."
  - Add the phrase to the last sentence of the introduction on the board so it now reads, "Scientists say vampire squids have lived in the deep sea for an extremely long time, over 165 million years!"
  - Say, "I also changed the sentence from declarative to exclamatory with the end punctuation to emphasize the extreme length of time."
- Have students exchange drafts with the classmates from their small reading groups from Lessons 11 and 12.
- Tell students that they will use the checklist on Activity Page 13.1 to give feedback to each other as writers.

D Differentiation

Challenge

Have students provide specific alternatives when giving peer feedback. For instance, instead of telling their peers that they need to add supporting details, provide the missing details.

ML/EL MULTILINGUAL/ENGLISH LEARNERS

Interacting in Meaningful Ways

Supporting Opinions

Entering/Emerging	Define the labels on the activity page before beginning; sentence variety, clarity, and complements.
Transitioning/ Expanding	Have students use sentence starters and sentence frames to construct peer feedback. The sentences sounded ___ because ___. The writing was ___ to understand because ___.
Bridging	Have students compare the model essay to their peers' work when giving feedback on sentence variety and clarity.

- Direct students to meet with their small groups to exchange papers.
- When students finish their peer review, direct them to revisit their own writing and make changes as needed. Students may revisit their group notes, outlines, and model essay to assist them with their revisions.
- Tell students that they will edit their writing during the next lesson.
- Collect Activity Page 12.1.

Lesson 13: Ecosystem Exhibition: You Are the Editor!

Language

15M

Primary Focus: Students will demonstrate a command of the conventions of standard English capitalization and punctuation when writing. **[L.5.2]**

USE AN EDITING CHECKLIST (15 MIN.)

- Direct students to Activity Page 13.2 for the editing checklist.
- Ask, "What do we look for when we edit our writing, as opposed to revising it?"
  - » We use English language rules to correct mistakes.
- "What are some rules we need to follow when we write a sentence?"
  - » Answers may include initial capital letters, ending punctuation, sentences that include subject and a predicate.

- "What other punctuation marks could you use in your writing?"
  - » Answers may vary but could include commas, apostrophes, parentheses, and quotation marks.
- Tell students that they will use a checklist to help them correct mistakes in their writing. Direct students to Activity Page 13.2.

End Lesson

LESSON

14

Ecosystem Exhibition: You Are the Producer!

PRIMARY FOCUS OF LESSON

Writing

Students will produce multimedia presentations to support their writing, demonstrating knowledge of a specific ecosystem and its inhabitants. **[SL.5.5]**

Students will edit several developed paragraphs using peer and teacher feedback, and knowledge of English language conventions to inform changes. **[W.5.2d, W.5.5]**

FORMATIVE ASSESSMENT

Informative Writing **Notes** Revise several developed paragraphs about a specific animal and ecosystem. **[W.5.5]**

Teacher Presentation Screens:
all lessons include slides

LESSON AT A GLANCE

	Grouping Recommendations	Time	Materials
Writing (90 min.)			
Create a Display	Independent	60 min.	❏ Visual Support 14.1 ❏ drawing supplies such as markers or colored pencils ❏ Activity Pages 13.2, 14.1
Edit and Reflect	Whole Group/ Independent	30 min.	

ADVANCE PREPARATION

Writing

Visual Support 14.1

- Prepare to display Visual Support 14.1.
- You may choose to display Activity Page 13.2 as students work.
- Return Activity Page 12.1 to students, if needed. This work may also be collected after Lesson 15.

Universal Access

Reading

- Allow access to guided drawing tutorials for students with fine motor needs who would like to create drawings. A large variety of options are available online using the key words "guided drawing" or "directed drawing."
- Provide accessible craft tools such as left-handed scissors and thick-barrel markers, as needed.

Writing

- To ensure all students have the opportunity to contribute during Turn and Talk and Think-Pair-Share exchanges, provide students with a signal such as folding their hands or raising a hand to indicate when both partners have added to the conversation.

Start Lesson

Lesson 14: Ecosystem Exhibition: You Are the Producer!

Writing

90M

Primary Focus

Students will produce multimedia presentations to support their writing, demonstrating knowledge of a specific ecosystem and its inhabitants. **[SL.5.5]**

Students will edit several developed paragraphs using peer and teacher feedback, and knowledge of English language conventions to inform changes. **[W.5.2d, W.5.5]**

CREATE A DISPLAY (60 MIN.)

- Tell students that during the next lesson they will share their writing.
- During today's lesson they will create a display to go with their writing. The display will include additional information that supports their writing. Examples could include images of animals or diagrams of the environment.

Visual Support 14.1

- Display Visual Support 14.1. Read the directions to students.

Check for Understanding

Ask for examples of multimedia images that would support the reader's understanding of their informative text.

» Answers may vary but could include images of their organism, maps of the ecosystem, diagrams of adaptations or behaviors.

- Direct students to the image of the remora on page 18 of chapter 2 in *Life in the Fathoms*.
- Ask, "What is the label beneath the image called? Why is it there?"
  - » A caption, it describes the image or adds additional information for the reader.

Visual Support 14.2

- Display Visual Support 14.2.
- Explain that this is an excerpt from the Unit 2 Reader and it does not have a caption.

- Ask, "What do you see in the image?"
  - » Answers may vary but could include animals in the foreground and a mountain in the background.
- Ask, "What do you wonder about this image?"
  - » Answers may vary but could include: "What are the animals? What are the animals doing? Where is the place?"
- **Turn and Talk:** Discuss what information would be useful to include in the image caption.
- Remind students to signal when both partners have contributed to the conversation.
- Ask a few students to share their partner's ideas.
- Model writing a caption using a think aloud.
  - I know from the text that these animals are llamas and I see a couple of them bent down eating the grass.
  - The text mentions the Andes Mountains, so I am going to infer that the mountain in the background is part of the Andes.
  - My caption could combine the information from the text with the additional information about what I can see the llamas doing.
  - My caption might say, "Llamas graze on grass near the Andes Mountains."
- Remind students that they have a great deal of information to draw from in their notes, their outline, their writing, and the Reader that should be used to write their captions.
- Provide any directions regarding materials that are specific to your classroom. Answer any outstanding questions and direct students to begin creating their displays.

D Differentiation

Support

Provide an individual copy of Visual Support 14.1 for students to refer to while working.

Challenge

Direct students to include multimedia support for why their animal is well adapted to its ecosystem.

ML/EL **MULTILINGUAL/ENGLISH LEARNERS**

Interacting in Meaningful Ways

Interacting via Written English

Entering/Emerging	Allow students to use previously identified keywords from their notes as image captions.
Transitioning/ Expanding	Provide students with sentence frames to construct their captions, such as: This is a _____ from _____.
Bridging	Have students reword captions found in their image captions for their own use.

EDIT AND REFLECT (30 MIN.)

Using the Editing Checklist

- Remind students that during the last class they revised their writing. Today they will have time to correct errors by editing.
- Direct students to write four sentences, one of each type (declarative, imperative, interrogative, exclamatory), about the organism they've been writing about.
  - » Answers may vary but could include examples such as:

    (declarative) The vampire squid lives in the deep ocean.

    (imperative) Watch out for vampire squid if you're swimming in deep oceans.

    (interrogative) What does a vampire squid eat?

    (exclamatory) Vampire squids are unique!
- Direct students to Activity Page 13.2.
- Show students that the left column is a list of categories and the right column has specific items to check.
- Model checking the text for errors using Visual Support 12.1.

Visual Support 12.1

- Display Visual Support 12.1.
- Beginning at the last sentence of the introduction paragraph, point to the end punctuation of the sentence.
- Tell students that an editing trick to find mistakes is to check each sentence backwards. This prevents the editor from being distracted by what the sentence says and helps them focus only on what is being checked, in this case, punctuation and capitalization.
- Move a finger or pointer from the period at the end of the sentence to the capital letter at the beginning.
- Remind students that after checking for end punctuation, they should follow the sentence to its start and check for capitalization.
- Tell students that they also need to think about whether something else, such as quotation marks, are needed.

- Remind students to be careful checking for all items on the list.

D Differentiation

Support

Highlight or underline errors in students' work. Then direct students to diagnose the error and correct it independently.

Check for Understanding

Ask for examples of items, in addition to punctuation and capitalization, that they should check and correct.

» Answers may vary but could include correct spelling and quotation marks.

- Tell students to find, check and correct their work on Activity Page 12.1 for the items on the editing checklist.

Unit Reflection

Activity Page 14.1

- Direct students to Activity Page 14.1 and instruct them to complete the reflection questions.
- You may choose to bring the whole group together after students have completed Activity Page 14.1 to discuss their responses.

MULTILINGUAL/ENGLISH LEARNERS
Interacting in Meaningful Ways
Writing

Entering/Emerging	Allow students to answer the reflection orally with a teacher.
Transitioning/ Expanding	Provide students with sentence frames to construct their response, such as: _____ was a challenge because _____.
Bridging	Provide a list of keywords and phrases to be included in the reflection response, such as: *ocean*, *ecosystem*, *my strength*, *my challenge*.

D Differentiation

Challenge

During their reflection, direct students to include possible strategies for how to improve areas in which they want to grow.

- End the lesson with a reminder that they will display and share their multimedia displays during the next class.
- Collect Activity Page 12.1.

End Lesson

LESSON

15

Ecosystem Exhibition: Celebration of Learning

PRIMARY FOCUS OF LESSON

Speaking and Listening

Students will report what they have learned using relevant, descriptive details in a multimedia display. **[SL.5.4, SL.5.5, SL.5.6]**

Writing

Students will write summaries of their peers' work, including the identification of main ideas and supporting details. **[RI.5.2, W.5.10]**

Teacher Presentation Screens:
all lessons include slides

LESSON AT A GLANCE

	Grouping Recommendations	Time	Materials
Speaking and Listening (60 min.)			
Celebration of Learning	Whole Group/ Small Group	60 min.	❑ student writing and multimedia presentations ❑ Activity Page 15. 1
Writing (30 min.)			
Celebration Summary	Independent	30 min.	❑ Activity Page 15.2

ADVANCE PREPARATION

Speaking and Listening

- Arrange student work for display throughout the room.
- Create small groups of four to six students to share their work.
- Determine any additional guidelines for moving around the room and sharing in small groups necessary for this activity in the classroom.

Writing

- Prepare a blank outline template for students utilizing the supports.

Universal Access

Speaking and Listening

- Allow students to rehearse reading their writing aloud before presenting.

Start Lesson

Lesson 15: Ecosystem Exhibition: Celebration of Learning

Speaking and Listening

60M

Primary Focus: Students will report what they have learned using relevant, descriptive details in a multimedia display. **[SL.5.4, SL.5.5, SL.5.6]**

CELEBRATION OF LEARNING (60 MIN.)

Small Group

Gallery Walk

- Direct students to arrange their writing and multimedia displays in the classroom.
- Provide 10–15 minutes for students to circulate around the room and see each other's displays.

Small Group Share

- Direct students to Activity Page 15.1.
- Explain that as they listen to their peers' presentations they will take notes.
- Tell students that their notes will be used to write a summary of one of their peers' work.
- Explain that the summary will retell the important information from their peers' writing.
- Remind students that the directions on Activity Page 15.2 ask for the summary to include the *what*, *where* and *why*.

Check for Understanding

Ask students, "What should your summary show?"

» It should show your understanding by retelling the information in your own words.

- Explain that, while the kind of information they will record is the same as they practiced as readers, it will be a challenge to take notes while listening. They cannot go back and listen again.

Activity Page 15.1

Differentiation

Challenge

Direct students to take their notes entirely in paraphrase form, with the exception of key vocabulary, such as the animal or ecosystem names.

Support

Allow students to take notes directly on a blank outline to support their writing later in the lesson.

- Direct students to their assigned small groups for sharing. Remind students to take their writing with them to their group.
- Direct students to take turns reading their writing. They may ask each other clarifying questions, if time allows.

Check for Understanding

Ask students to identify if the example is or is not a clarifying question.

- How do you pronounce the name of your animal?
  - » clarifying
- Do you like your animal?
  - » not clarifying
- What zone does your animal live in?
  - » clarifying
- That is my favorite animal!
  - » not clarifying

ML/EL

MULTILINGUAL/ENGLISH LEARNERS

Interacting in Meaningful Ways

Exchanging Information and Ideas

Entering/Emerging	Allow students to answer their peers' questions by reading direct quotes from their writing.
Transitioning/ Expanding	Provide students with sentence starters to ask questions, such as: Could you tell me more about_____?
Bridging	Direct students to use words and phrases from their writing when speaking about their work.

Lesson 15: Ecosystem Exhibition: Celebration of Learning

Writing

Primary Focus: Students will write a summary of a peer's work, including the identification of main ideas and supporting details. **[RI.5.2, W.5.10]**

CELEBRATION SUMMARY (30 MIN.)

- Direct students to Activity Page 15.2 where they recorded notes from their peers' work.
- Ask:
  - What do you notice about your notes? Are there some places where you have more detail than others?
    - » Answers may vary but could include details such as animals, adaptations and trophic pyramid roles.
  - **Turn and Talk.** What information do you need to write a summary?
  - Remind students to signal when both partners have contributed to the conversation.
  - Have a few student volunteers share their responses.
    - » Answers may vary but could include the main idea and details of what is being summarized.

ML/EL **MULTILINGUAL/ENGLISH LEARNERS**

Interacting in Meaningful Ways

Exchanging Information/Ideas

Entering/Emerging	Have students answer questions using "yes/no, because" responses.
Transitioning/ Expanding	Allow students to point out and read from their paper in response to the discussion, as needed.
Bridging	Prompt students to discuss supporting details from their work with a partner.

- Tell students to select the classmate's work from their notes that contains the most information needed to write a summary. Then, direct students to Activity Page 15.2, on which they will write a sentence about an organism they learned about, along with details about the organism's ecosystem that describe where and how it lives.
- Read the directions and point out the brief editing checklist at the bottom of the page.
- Answer any questions from students and direct them to complete Activity Page 15.2.

End Lesson

D Differentiation

Challenge

Ask follow-up questions such as, "What makes you notice that? Why are details important?"

D Differentiation

Support

Highlight or underline errors in students' work. Then direct students to diagnose the error and correct it independently.

Activity Page 15.2

LESSON

16

Teacher Presentation Screens:
all lessons include slides

Unit Assessment

LESSON AT A GLANCE

	Grouping Recommendations	Time	Materials
Unit Assessment (90 min.)			
Reading and Language	Independent	60 min.	❑ Student Assessment Page 5.1
Writing	Independent	30 min.	

Digital Assessment

To access the digital assessment, please log on to Amplify and assign the assessment to your students.

ADVANCE PREPARATION

Unit Assessment

Note: The time provided for this assessment is 90 minutes, but if students finish early, you may wish to ask them to use the additional time to reread excerpts or draw accompanying illustrations for their unit writing project once they have completed the assessment.

- Ensure each student has a copy of Student Assessment Page 5.1.

Start Lesson

Lesson 16: Unit Assessment

Unit Assessment

90M

READING AND LANGUAGE (60 MIN.)

- Inform students that they will work independently to answer questions about *The Deep Blue World: Oceans.*
- Distribute Student Assessment Page 5.1.
- Inform them that they will have 60 minutes to work on this task. Write the time on the board.
- Once students have finished the assessment, encourage them to review their papers quietly, rereading and checking their answers carefully.
- Circulate around the room as students complete the assessment to ensure that everyone is working individually. Assist students as needed, but do not provide them with answers.

Student Assessment Page 5.1

WRITING (30 MIN.)

- Inform students that they will continue working on Student Assessment Page 5.1 independently to answer a writing prompt about *The Deep Blue World: Oceans.*
- Inform them that they will have 30 minutes to work on this task. Write the time on the board.
- Once students have finished their writing task, encourage them to review their papers quietly, rereading and checking their writing carefully.
- Circulate around the room as students complete the assessment to ensure that everyone is working individually.

ASSESSMENT ANALYSIS

Correct Answers and Rationales—Reading

Items	Correct Answers	Points	Standard(s)
1	Biotic factors are living. Examples may vary but could include plants and animals. Abiotic factors are nonliving. Examples may vary but could include light, salinity, temperature, depth, and currents.	2 points	[RL.5.1]
2	currents	1 point	[RL.5.1]
3	Answers may vary but could include trash, plastic, and fishing equipment. Objects in the ocean currents become stuck in the flow of the water and accumulate into masses of marine debris.	1 point	[RL.5.1]
4	producers: sunlight and chemicals consumers: other organisms including producers, other consumers, and decomposers decomposers: detritus such as marine snow and other particles in the water	2 points	[RL.5.1]
5	sunlight zone	1 point	[RL.5.1]
6	minerals from deep sea vents	1 point	[RL.5.1]
7	making laws about the ocean	1 point	[RL.5.1]
8	bioluminescence	1 point	[RL.5.1]
9	two	1 point	[RL.5.1]
10	coastlines	1 point	[RL.5.1]
11	This coral reef is found in the sunlight zone.	1 point	[RL.5.1]
12	This coral reef is found in the sunlight zone. Answers may vary but could include sea urchins, shrimp, clownfish and moray eel.	1 point	[RL.5.1]
13	Answers may vary but could include that a moray eel, a consumer and possible clownfish predator, is swimming nearby.	2 points	[RI.5.1]
14	Answers will vary but could include study, measure, or observe the samples.	1 point	[RI.5.1]
15	Answers may vary but could include that the coral is healthy because a variety of organisms are living there including producers, consumers, and a decomposer. The coral has a vibrant color which shows healthy algae which provide food for other organisms in the food web.	2 points	[RI.5.3]
16	light	1 point	[L.5.4b]
17	life	1 point	[L.5.4b]
18	small	1 point	[L.5.4b]
19	microbiology	1 point	[L.5.4]
20	phytoplankton	1 point	[L.5.4]

Total: _____/24 points

Writing Scoring

Fifth Grade Writing Rubric: Narrative Writing			
Write informative/explanatory texts to examine a topic and convey ideas and information clearly. **[W.5.2]** a) Introduce a topic clearly, provide a general observation and focus, and group related information logically; include formatting (e.g., headings), illustrations, and multimedia when useful to aid comprehension. **[W.5.2a]** b) Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic. **[W.5.2b]** c) Link ideas within and across categories of information using words, phrases, and clauses (e.g., in contrast, especially). **[W.5.2c]** d) Use precise language and domain-specific vocabulary to inform about or explain the topic. **[W.5.2d]** e) Provide a concluding statement or section related to the information or explanation presented. **[W.5.2e]**			
	Advanced (2 points)	**Proficient (1 point)**	**Basic (0 points)**
Ideas	The composition • provides a general observation that leads to a specific area of focus, • develops the topic with a combination of relevant facts, accurate definitions, concrete and specific details, quotations from multiple sources, or other appropriate information and examples, • makes sophisticated connections between ideas, and • demonstrate awareness of audience and purpose.	The composition • provides a general observation and focus, and • develops the topic with facts, definitions, concrete details, quotations, or other information and examples.	The composition does not do one or more of the following: • provide a general observation and focus • develop the topic with facts, definitions, concrete details, quotations, or other information and examples
Organization	The composition • introduces a topic clearly and in an engaging fashion, • groups related information logically and explains connections between groups, • includes a combination of formatting, illustrations, and multimedia that explain the ideas, and • provides a concluding statement or section that connects the topic to a big question or the purpose for writing.	The composition • introduces a topic clearly, • groups related information logically, • includes formatting, illustrations, and multimedia when useful, and • provides a concluding statement or section related to the topic.	The composition does not do one or more of the following: • introduce a topic clearly • group related information logically • include formatting, illustrations, and multimedia when useful • provide a concluding statement or section related to the topic
Conventions	The composition • links ideas within and across categories of information using words, phrases, and clauses, • uses precise language and domain-specific vocabulary, and • uses language to add subtlety through connotative meanings through connotative meanings.	The composition • links ideas within and across categories of information using words, phrases, and clauses, and • uses precise language and domain-specific vocabulary.	The composition does not do one or more of the following: • link ideas within and across categories of information using words, phrases, and clauses • use precise language and domain-specific vocabulary

Total: _____/6 points

Grade 5 | Unit 5

Pausing Point

NOTE TO TEACHER

You may use a day to address students' performance in this unit. Use your observations of students' performance in class and the completion of the informative writing project pages to informally evaluate their strengths and weaknesses. It is recommended that you spend a day reviewing, reinforcing, or extending the materials taught. You may do the activities in any order or combination, either with the whole class or in small groups, to meet the needs of your students.

ACTIVITIES

If students have mastered the skills taught in *The Deep Blue World: Oceans* unit, you may use the following enrichment activities.

Vocabulary News Article

- Students may choose ten vocabulary words from the unit and write an original informative article about an ocean topic of their choosing. Students should use all ten vocabulary words in their short article, and highlight the words when finished.

Food Web Reader's Theater

- Students may use their Readers and information they have read about ocean food webs to write a short script that involves a producer, consumer, and decomposer character. Students will work in small groups and their scripts should consider problems that may come up for each character and how they help each other in the food web.

Ecosystem Compare and Contrast Slideshow

- Based on what students have learned about ocean ecosystems and how physical adaptations help animals to relate to their environments, have them select two ocean ecosystems to compare and contrast. Students will create a 4–5 slide presentation. The slideshow should consist of facts about each ecosystem including an animal that has physically adapted to the ecosystem, an explanation of what the two ocean ecosystems have in common and how the ecosystems differ. Students may present their slideshow to the class upon completion.

Ocean Zone Art Wall with Captions

- Students will work in a small group to illustrate different ocean zones on a large piece of bulletin board paper to create an Ocean Zone Art Wall. To do this, they will need large pieces of bulletin paper, markers, crayons, or colored chalk and their Readers. Each student will be responsible for illustrating a different ocean zone on the bulletin board paper. Students must include captions that describe their illustrated depictions, including descriptions of cause and effect relationships in the zone. Instruct students to refer to their Readers as needed to include information from the text.

Research a Marine Biologist

- Students learned about discoveries in the field of marine biology during this unit. Have students choose a particular discovery or marine biologist covered in their Reader to research further. Students may use the internet or school library resources to gather information about their selected marine biology topic to create 4–5 slide presentations of their findings. Students may include images, captions, and an original informative writing about their researched topic.

Extended Writing Prompts

Ecosystem Writing

- Students learned about various animals and ecosystems in the unit. Have students write an informative text that demonstrates their understanding of the domain knowledge. Encourage students to use precise vocabulary from their reading. Some examples may include:
  - Select an ocean zone you have learned about in this unit. Write an informative text that explains some cause and effect relationships existing in different ocean zones.
  - Select an animal you learned about in this unit. Write an informative text explaining how the animal's physical adaptations relate to its environment.
  - Select an ocean ecosystem, such as open ocean, deep ocean, estuary, mangrove forest, coral reef, or kelp forest. Write an informative text that includes specific facts and details that you have learned about the ecosystem.

Formative Writing Prompt

- Have students choose a text of interest from their Reader. Instruct students to write their own short summary of the text conveying key ideas and information drawn from the reading. **[W.5.2]**
- Allow students to orally share their writing with a partner once they are done.

Grade 5 | Unit 5

Teacher Resources

In this section, you will find:

- Discussion Rubric
- Paragraph Frame
- Sentence Frames
- Activity Book Answer Key
- Glossary for *Life in the Fathoms*

Grade 5 Speaking and Listening Rubric: Discussion

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.

a) Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion.

b) Follow agreed-upon rules for discussions and carry out assigned roles.

c) Pose and respond to specific questions by making comments that contribute to the discussion and elaborate on the remarks of others.

d) Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions.

	Advanced	Proficient	Basic
Ideas	The student consistently and eagerly participates in a range of collaborative discussions without prompting.	The student participates in a range of collaborative discussions without prompting.	The student does not participate in a range of collaborative discussions or participates only with prompting or additional support, such as sentence starters.
Organization	The student demonstrates preparation by making meaningful reference to the required material and other information to probe or reflect on ideas under discussion.	The student demonstrates preparation by referencing the required material and other information to explore ideas under discussion.	The student does not demonstrate preparation by referencing the required material to explore ideas under discussion.
Conventions	The student follows agreedupon rules for discussion, carries out assigned roles, and helps define individual roles as needed.	The student follows agreedupon rules for discussion and carries out assigned roles.	The student does not follow agreed-upon rules for discussion and/or does not carry out assigned roles.

Flow of Conversation	The student does all of the following: • makes comments that contribute to the discussion • elaborates on others' remarks • makes comments that contribute to the topic, text, or issue under discussion	The student does some of the following: • makes comments that contribute to the discussion • elaborates on others' remarks • makes comments that contribute to the topic, text, or issue under discussion	The student does neither of the following: • makes comments that contribute to the discussion • elaborates on others' remarks
Asking Questions	The student asks and responds to specific questions with elaboration and detail to clarify or follow up on information.	The student asks and responds to specific questions to clarify or follow up on information.	The student does not ask and respond to specific questions to clarify or follow up on information.
Explaining Ideas	The student reviews key ideas, demonstrates understanding of multiple perspectives, and draws conclusions in light of the discussion.	The student reviews key ideas and draws conclusions in light of the discussion.	The student does not review key ideas and draw conclusions in light of the discussion.

PARAGRAPH FRAME

Paragraph Frame

Topic sentence: _____

_____

_____

Detail sentence: _____

_____

_____

Detail sentence: _____

_____

_____

Detail sentence: _____

_____

_____

Conclusion: _____

_____

_____

SENTENCE FRAMES

Informational Writing

Sentence Frames

Topic Sentence:

Did you know that _____ ?

_____ is a fascinating _____.

Detail Sentence:

An important detail about _____ is _____.

_____ is important because _____.

Conclusion Sentence:

This is _____.

Now you know _____.

ACTIVITY BOOK ANSWER KEYS

NAME: _____

DATE: _____

1.1 Activity Page

Characteristics of Ocean Ecosystems

Using information from Life in the Fathoms, *record characteristics of the ocean biome. Sort these characteristics by those that are similar between ocean ecosystems and those that describe unique characteristics of an ocean ecosystem.*

- *Refer back to the text as needed.*
- *Remember to put direct quotes (exact words from the text) in quotation marks. You may also paraphrase, or put information from the chapter in your own words.*
- *Record notes only. Complete sentences are not needed and will use up too much space.*

Answers may vary but could include the following:

Similar Characteristics of Ocean Ecosystems	Unique Characteristics of Ocean Ecosystems	
• Organisms need each other for survival. • "Each ecosystem includes producers, consumers, and decomposers." • biotic factors (living) • abiotic factors (not living)—salt, temperature	coral reef	• "Most coral reefs grow close to the coastline." • biotic factor—coral • "a coral reef needs salt water at very specific temperatures"
	mangrove forest	• "temperature is warm enough to support mangrove trees" • trees adapted to saltwater • "helps limit erosion of the coastline"

Similar Characteristics of Ocean Ecosystems	Unique Characteristics of Ocean Ecosystems	
	estuary	• "where fresh water from rivers and lakes meets salt water from the ocean" • abiotic factor—salt • animals act differently depending on tides • "wide variety of temperatures" • habitat and migration stop for animals
	kelp forest	• "kelp, a type of alga that shelters and feeds other living organisms" • "grows best in cooler waters" • abiotic factor—sunlight for photosynthesis.
	open ocean	• most animals live close to surface for sunlight • plankton—producers • consumers eat plankton
	deep ocean	• "most remote of all the ocean ecosystems" • almost 4 miles deep • no sunlight on bottom • "hydrothermal vents release chemicals" • producers use chemicals instead of sun • "bottom feeders that consume decomposing plants and animals"

NAME: _____

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2.1 Activity Page

Writing About Food Webs

Using information from Life in the Fathoms, *take notes on the graphic organizer below.*

Chapter 2 Notes	
Main Topics	**Supporting Details**
Trophic Pyramid	• "how animals get their energy" • contains producers, consumers, and decomposers • "relationships between these organisms" • "how the biotic factors in each ecosystem work"
Producers	• on bottom of trophic pyramid • "energy directly from sunlight" • "don't need to eat other organisms"
Consumers	• •mostly animals • "primary, secondary, tertiary, and even quaternary consumers" • "classify consumers based on how many steps away from producers" • "Primary consumers eat producers" • "Secondary consumers mostly eat primary consumers."

Main Topics	Supporting Details
	• "Tertiary consumers mostly eat secondary consumers." • "Quaternary consumers mostly eat tertiary consumers." • "consumers who eat other consumers predators" • apex predators are highest on pyramid
Decomposers	• "organisms like bacteria and fungus that get nutrients from breaking down other organisms" • "leave behind remnants and waste products called detritus"
Detritivores	• "eats detritus" (waste) • "help recycle energy and nutrients back into the trophic pyramid" • "Some have symbiotic relationships with carnivores."

NAME: _____

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2.1 CONTINUED **Activity Page**

Main Topics	Supporting Details
Food webs	• "helps us understand more about how different organisms in an ecosystem behave" • "helps us understand how energy moves between different organisms when one eats another" • "more complete picture that includes decomposers" • "help us notice symbiotic relationships"

Using the notes above, write an informational paragraph about food webs. Please include:

- a simple definition of a food web,
- the different levels of a food web, using the new vocabulary, and
- examples of animals at each food web level.

NAME: _____

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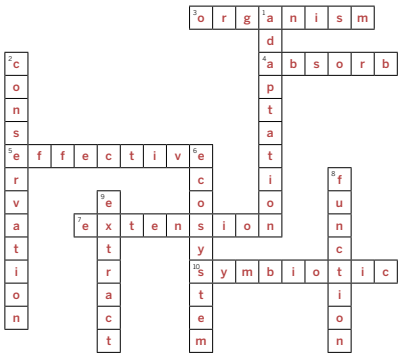
2.4 **Activity Page**

Spelling Word Crossword Puzzle



Definition

ACROSS	DOWN
3. a living structure made up of systems working together	1. a characteristic that adjusts to the environment or situation
4. to take in	2. the protection of species and their environments
5. working well, as intended	6. a system formed by the interaction of communities of organisms with their environments
7. an additional amount of length in time or space	8. the use something is made for
10. close, cooperative	9. to take out

NAME: _____

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3.1 **Activity Page**

In the Zone Flowchart

Answers may vary but could include the following:

Ocean Zone: Sunlight Zone		
Ecosystem characteristic Sunlight makes water warm.	→	Corresponding animal characteristic or behavior Phytoplankton make food from sunlight
Ocean Zone: Twilight Zone		
Ecosystem characteristic dark	→	Corresponding animal characteristic or behavior Lanternfish uses bioluminescence to create light from its nose.
Ecosystem characteristic	→	Corresponding animal characteristic or behavior

NAME: _____

DATE: _____

5.1 **Activity Page**

Two Texts: Main Idea and Details

Answers may vary but could include the following:

Text 1: "Marine Biologists"

Topic: marine biologists

Main Idea: Marine biologists do challenging, rewarding work to improve ocean ecosystems.

Supporting Details

- "often spend hours on boats or on long underwater dives to observe species"
- "record their observations on waterproof tablets and take photographs with waterproof cameras" to "monitor the health of our coral reefs"
- use geographic information systems, or GIS, to "better understand the behavior of animals in some ocean zones" and "observe reefs that might be in danger of disappearing"
- "work with people who live in coastal areas to protect marine life"
- "teach people how to make and use fishing nets that don't cause problems for organisms in an ecosystem"

Two Texts: Main Idea and Details

Text 2: "Joan Murrell Owens: A Marine Biologist Who Broke Barriers"
Topic: Joan Murrell Owens **Main Idea:** Although Joan Murrell Owens faced many challenges, she became a groundbreaking marine biologist.
Supporting Details • returned to college at age thirty-seven to "pursue her dream of becoming a marine biologist" • "first Black woman in the United States to receive a doctorate degree in geology" • "Owens had a disease called sickle cell anemia, which prevented her from diving"; instead, she "studied the Smithsonian Museum's collection of button corals" • "Through cataloging and dissecting these coral, Owens identified three new species." • "first to identify an entirely new genus of button coral, changing how these corals are studied altogether"

NAME: _____
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5.3 Activity Page

Spelling Sort and Practice

Read the list of spelling words. Notice the similarities in the spelling patterns of some words in the list. Sort the list into two categories. In the space provided, explain what spelling patterns each group has in common.

adaptation	extension	effective	ecosystem
conservation	extract	symbiotic	
function	absorb	organism	

Answers may vary but could include words with *–ion* ending and words with *ex–* prefix.

Explain what the words in each group have in common in the space below.

Group 1	Group 2

Group 1: _____

Group 2: _____

NAME: _____
DATE: _____

6.2 Activity Page

Chapter 6 Notes

Answers may vary but could include the following:

Main Idea	Supporting Details
Life in kelp forests and coral reefs is as diverse as it is abundant. Kelp is a protist.	These ecosystems provide shelter for the sea life around them. doesn't have roots like a plant attaches itself to rocks with a noodle-like structure called a holdfast uses sunlight in euphotic zone for photosynthesis

NAME: _____
DATE: _____

7.1 Activity Page

Chapter 7 Notes

Answers may vary but could include the following:

Main Idea	Supporting Details
Eastern oysters are important to the Chesapeake Bay ecosystem.	Oysters are "filter feeders" that "remove algae and chemicals from the water, making it very clear and clean." Oyster shells "form into hard habitats called oyster reefs. Other animals in the Chesapeake use these for shelter, and they also help protect coasts." The Chesapeake Bay Foundation is working to restore the oyster population by creating artificial reefs using old shells and adding oyster spat to them.

NAME: _____

DATE: _____

8.1 Activity Page

Chapter 8 Notes

Main Idea	Supporting Details
Plankton drift through the open ocean and make up the base of the open ocean's food chain.	Plankton includes various species, from microscopic bacteria to large jellyfish, all of which drift with the ocean currents. "If you think of the open ocean as a highway, plankton are the fuel that keeps everyone going." "When all is right in the marine world, there's enough phytoplankton for open ocean zooplankton to eat."

NAME: _____

DATE: _____

9.1 Activity Page

Chapter 9 Notes

Answers may vary.

Main Idea	Supporting Details
Introduction: Leena Jung is a marine biologist who has always been passionate about the ocean.	grew up loving the ocean in O'ahu, Hawaii; daily tasks vary from sampling coral to surveying turtle nests and listening to whale songs
First: Gearing Up for the Dive: Preparing for and conducting underwater dives is a key part of Leena's work.	oxygen tank helps breathe under water; the Buoyancy Control Device (BCD) helps adjust buoyancy and stores tools needed for the dive; team measures water clarity and pH level before diving.
Second: Removing Debris from the Ocean: Leena conducts debris removal dives to protect marine life from harmful trash.	debris, especially plastic, is dangerous to sea turtles and marine ecosystems; divers remove hazardous items like fishing lines and nets; the team rescues turtles
Next: Conservation Work: Leena protects the endangered Hawaiian monk seal.	monk seal population has been low due to sharks and lack of food; conservation work includes relocating seals and measuring coral atolls

Chapter 9 Notes

Answers may vary. (continued)

Main Idea	Supporting Details
And Then, Rescue Work: Leena is responsible for educating the public and rescuing monk seals.	Leena and the Marine Animal Response team work to protect monk seals and educate beachgoers; they handle situations by securing areas and assessing seals without causing stress; monk seals are identified using an app that records their markings and sightings.
And Finally, Paperwork: Leena's work as a marine biologist also requires her to work from a desk.	Leena does lab work and paperwork; spends "a lot of time speaking with government leaders about laws that might help protect our oceans"

NAME: _____

DATE: _____

9.4 Activity Page

Practice Spelling Words

Write the correct word to complete each sentence. Words will not be used more than once.

chemical	crevice	microorganism
biodegradable	rigid	clarity
biotic	biologist	
debris	entangle	

1. Colorful fish are some of the _____biotic_____ life found in coral reefs.
2. After a storm, the beach was littered with _____debris_____ washed up by the waves.
3. _____Microorganisms_____, like plankton and bacteria, form the base of many ocean food chains.
4. The water with good _____clarity_____ allows snorkelers to see marine life more easily.
5. An octopus may hide in a _____crevice_____ between rocks on the ocean floor.
6. Many coral species have a _____rigid_____ skeleton.

7. The marine biologist spent years studying organisms in their natural ocean habitats.

8. Some species of algae in the ocean produce chemicals that change the color of the water.

9. The biodegradable sunscreen won't harm the ocean life if it washes off in the water.

10. Dolphin-safe nets prevent the animals from becoming entangled in them.

NAME: _____
DATE: _____

10.1 Activity Page

Chapter 10 Notes

Answers may vary.

Main Idea	Supporting Details
The Five Major Gyres: There are five major gyres, or swirling systems of currents, that move in a circular path.	North Atlantic, South Atlantic, North Pacific, South Pacific, and Indian Ocean Gyres; gyres in the Southern Hemisphere rotate counterclockwise while gyres in the Northern Hemisphere rotate clockwise.
The Pacific Garbage Patches: Garbage patches are formed by marine debris trapped in gyres.	rain, wind, and weather carry garbage into water systems; "vortex motion of the gyre captures it, and it continues to circle"
Microplastics: Microplastics are particularly harmful as they can contaminate all ocean layers.	"All plastic trash eventually breaks down into microplastic"; "Organisms in any depth zone can accidentally eat them through filter feeding."
What Can We Do?: Although we haven't found the best solution, people are trying various approaches to clean oceans.	nets to scoop out marine debris, water filters and chemicals for microplastics, Mr. Trash Wheel; groups, companies, and governments work together to reduce plastic usage and clean shorelines

NAME: _____
DATE: _____

11.3 Activity Page

Animal and Ecosystem Outline

- ***Organize a three- to five-paragraph response*** *to the prompt below using information gathered on your* ***group's recording page****.* ***Fill in the outline template*** *provided to help you.*

  Explain how _____ *survives and contributes to the ecosystem where it lives.*

Outline: Answers may vary but could include:

- *Fill in the spaces below with key words and phrases to plan your response. You will write in full sentences in the next step, drafting.*

Introduction Paragraph

Topic Sentence: The vampire squid is a unique creature from the deep sea.

Introduction detail sentence 1: The vampire squid is not really a vampire or a squid because it has its own category.

Introduction detail sentence 2: Vampire squid may have lived in the deep sea for over 165 million years.

Body Paragraph

Main Idea Sentence: The word *vampire* in its name comes from a movement it can do with its arms.

Supporting detail sentence 1: Vampire squid have webbed arms.

Supporting detail sentence 2: They use their arms to cover themselves like a cape.

Supporting detail sentence 3: Vampire squid cover up when they are startled.

Supporting detail sentence 4: If that happens they can hide inside these webbed arms.

Body Paragraph

Main Idea Sentence: Vampire squid are decomposers

Supporting detail sentence 1: They eat marine snow which falls through the water to the ocean floor.

Supporting detail sentence 2: Marine snow is detritus from other organisms floating in the water.

Supporting detail sentence 3: Vampire squid are detritivores because they clean the ocean floor by eating marine snow.

Supporting detail sentence 4: Detritivores don't need sunlight for photosynthesis, so they have food in the deep ocean ecosystem.

NAME: _____
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11.3 CONTINUED Activity Page

Body Paragraph

Main Idea Sentence: The vampire squid is a unique animal.

Supporting detail sentence 1: Its name has the word vampire but a vampire squid does not drink blood or even hunt.

Supporting detail sentence 2: Scientists called it a squid but later thought it was a kind of octopus.

Supporting detail sentence 3: The vampire squid is actually not an octopus.

Supporting detail sentence 4: Scientists gave it its own category.

Conclusion Paragraph

Main Idea Sentence: Vampire squid are unique and fascinating animals.

Conclusion detail sentence 1: Vampire squid may have existed for over 165 million years.

Conclusion detail sentence 2: Vampire squid are detritivores that are adapted to survive in the deep dark water for many more years.

NAME: _____
DATE: _____

15.2 Activity Page

Celebration Summary

Using the notes recorded during your peers' presentations, select a classmate's work to summarize in your own words.

Retell what they taught about their animal by answering the questions what, where, *and* why. *Then, write an expanded sentence to retell what your peer taught about their animal by answering the questions* what, where, *and* why.

Remember to include other supporting details from your notes in your summary.

Answers may vary but could include the following: What: vampire squid. Where: the deep sea, Why: Its name sounds like a consumer that hunts, but it is really a peaceful detritivore.

Example of an expanded sentence: *I learned about the organism vampire squid that lives in the deep sea, and it is a peaceful detritivore.*

Students should add additional sentences to their summary that include supporting details from their notes.

Quick Check:

Capitals ☐ Punctuation ☐ Spelling ☐ Verb Tense ☐

Grade 5 | Unit 5

Glossary

A

ability, **n.** the state of being able to do something

abiotic factors, n. characteristics of an ecosystem that are not connected to living things

absorb, v. to take in

abyssal zone, n. the area of the ocean between 4000 and 6000 meters in depth

adaptation, **n.** a characteristic that adjusts to the environment or situation

affect, v. how something is impacted

agile, adj. the characteristic of moving with speed and grace

aquatic, adj. related to being in or on water

aquatic organism, n. a living thing whose habitat is in or around water

amphipod, **n.** a type of animal with a shell and flat body that lives in the water

B

biodegradable, n. the ability to break down over time in nature

bioluminescence, n. the ability for an organism to generate light

biotic factors, n. characteristics connected to living things

C

characteristic, n. a trait or property that describes something

chemosynthesis, **n.** the act of using chemicals, instead of light, to make food

chemosynthetic bacteria, n. bacteria that use chemicals, instead of light, to make their own food

clarity, 1.**n.** the characteristic of being clear or transparent, 2.**n.** the characteristic of being easily understood

clusters, n. groups positioned close together, or clumps

conservation, **n.** the protection of species and their environments

constant, **adj.** occurring all the time

contradict, v. to appear as the opposite

crevice, **n.** a narrow opening or crack

D

detritus, n. loose or broken down natural material

detach, v. to remove

detritivore, n. an organism that feeds on dead matter

digest, v. to break down food inside the body

E

ecosystem, n. a system formed by the interaction of communities of organisms with their environments

effect, n. the result of an affect, or impact

embark, v. to begin

entangled, v. became tangled or wrapped up; involved in something complicated

erosion, n. process in nature where land is worn away by water running over it, again and again, over a period of time

estuary, **n.** an area where saltwater and freshwater meet

euphotic, adj. relating to water with enough sunlight for photosynthesis

expedition, n. a trip for the purpose of exploration

extinct, adj. no longer living or existing

F

flourish, **v.** to thrive or to experience health and growth

fluctuate, v. to change back and forth

fluke, n. wing-shaped part of a whale's tail

food web, n. an interconnected system of food sources between producer, consumer, and decomposer organisms

foundations, n. the bases of buildings

G

genus, n. a group that contains living organisms with common characteristics

gyre, **n.** an area moving in a circular manner, such as those formed in the ocean by currents

H

hadal zone, n. trench areas of the ocean, located below the abyssal plain and between 6000 and 11000 meters in depth

hydrothermal vents, n. cracks in the ocean floor that release hot water

hypoxia, **n.** a lack of enough oxygen in the body

M

mangrove tree, **n**. a type of tree or shrub with roots that provide a place for underwater ecosystems

marine biologist, **n.** someone who studies living organisms in the ocean

marine debris, n. pieces of plastic that are found in the ocean

microbe, **n.** an extremely small organism that can be seen under a microscope

microorganisms, n. organisms that are too small to be seen without a microscope

microplastics, n. extremely small bits of plastics

midnight zone, **n.** the area of the ocean between 1000 and 4000 meters in depth

migration, n. the act of traveling from one location to another

mollusks, n. animals with soft bodies that live in shells

N

North Pacific Subtropical Convergence Zone, n. a gyre located in the northern Pacific Ocean

O

organisms, n. living structures made up of systems working together

P

particle, **n.** a very small piece of something

polyp, n. a soft growth

primary, adj. first in order or importance

Q

quaternary, adj. fourth in order or importance

R

regenerates, v. to return to a previous form

remote, adj. far away from civilization, isolated

S

Secchi disk, n. a flattened black and white circle put into water to measure the water's transparency

secondary, adj. second in order or importance

specimen, **n.** a single example of something

symbiotic, adj. having a close, cooperative relationship

sunlight zone, n. the area of the ocean between the surface and 200 meters in depth

T

terrestrial organism, n. a living thing whose habitat is in or around land

tertiary, adj. third in order or importance

toxins, n. a substance that is poisonous to living things

trophic level, n. a level of food web where all the organisms are the same level away from the primary producers

twilight zone, **n.** the area of the ocean between 200 and 1000 meters in depth

U

unison, adj. at the same time

W

water scooter, n. a single-passenger, ride-on water vehicle

Z

zones, n. areas

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