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NATIONAL GEOGRAPHIC

TCA FOR THE CLASSROOM 2019

Explorer

Ocean Supercrop 10

Whale Sharks 2

Snapshot of Space 18

IN THIS GUIDE:

Educational consultant **Stephanie Harvey** has helped shape the instructional vision for this Teacher's Guide. Her goal is to ensure you have the tools you need to enhance student understanding and engagement with nonfiction text.

LEXILE® Lexile® Framework Levels

Pioneer

Whale Sharks	530
Ocean Supercrop	500
Snapshot of Space	540

Trailblazer

Whale Sharks	680
Ocean Supercrop	630
Snapshot of Space	630

Standards Supported

- Common Core State Standards (CCSS)
- Next Generation Science Standards (NGSS)
- C3 Framework for Social Studies State Standards (C3)

See each lesson for the specific standard covered.

Log in at **ExplorerMag.org** to access additional resources including:

- Interactive Digital Magazine with videos and activities
- Projectable PDF for one-to-one instruction

National Geographic Learning Framework

INTRODUCTION

BACKGROUND
Since 1888, the National Geographic Society has funded scientists and explorers and shared their findings with the world. To support educators who use our resources, we have created a Learning Framework, which lays out what we believe students should learn from their experiences with the Society.

PURPOSE
The Learning Framework was designed to convey the Society's core beliefs and values. It is built around a set of attitudes, skills, and knowledge that embody the explorer mindset.

To determine the learning outcomes within the Learning Framework, we dug deep into national standards in key subject areas. We also sought advice from subject matter and child development experts, along with the combined expertise of NG instructional designers, researchers, and content developers. To learn more, go to: https://www.nationalgeographic.org/education/learningframework/.

IMPLEMENTATION
Each article in this magazine has a knowledge-based link to the Learning Framework.

MINDSET OF AN EXPLORER: KEY FOCUS AREAS

Attitudes (A)

CURIOSITY An explorer remains curious about how the world works throughout his or her life. An explorer is adventurous, seeking out new and challenging experiences.

RESPONSIBILITY An explorer has concern for the welfare of other people, cultural resources, and the natural world. An explorer is respectful, considers multiple perspectives, and honors others regardless of differences.

EMPOWERMENT An explorer acts on curiosity, respect, responsibility, and adventurousness and persists in the face of challenges.

Skills (S)

OBSERVATION An explorer notices and documents the world around her or him and is able to make sense of those observations.

COMMUNICATION An explorer is a storyteller, communicating experiences and ideas effectively through language and media. An explorer has literacy skills, interpreting and creating new understanding from spoken language, writing, and a wide variety of visual and audio media.

COLLABORATION An explorer works effectively with others to achieve goals.

PROBLEM SOLVING An explorer is able to generate, evaluate, and implement solutions to problems. An explorer is a capable decision maker—able to identify alternatives and weigh trade-offs to make a well-reasoned decision.

Knowledge (K)

THE HUMAN JOURNEY An explorer understands where we came from, how we live today, and where we may find ourselves tomorrow.

OUR CHANGING PLANET An explorer understands the amazing, intricate, and interconnected systems of the changing planet we live on.

WILDLIFE AND WILD PLACES An explorer reveals, celebrates, and helps to protect the amazing and diverse creatures we share our world with.

Second Grade Standard Supported

• CCSS Reading Informational Text: Determine the meaning of words and phrases in a text relevant to a grade 2 topic or subject area. (2-4)

• CCSS Reading Informational Text: Describe how reasons support specific points the author makes in a text. (2-8)

Third Grade Standard Supported

• CCSS Reading Informational Text: Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area. (3-4)

What You'll Need

• "Whale Sharks: Sink or Swim?" (Explorer, pages 2–9)

• Think Sheet (Teacher's Guide, page 5)

• Clipboards

• Pencils

CONNECT & ENGAGE (20 minutes)

Kids are in a group on the floor in front of you.

Say: *Does anyone know what it means to infer? Turn and talk about what you think it means to infer.*

Kids turn and talk. Some may have an idea about inferring; others may not.

Say: *We infer when we try to figure out something we don't know for sure. One way we infer while reading is when we come across an unfamiliar word or an unfamiliar idea. There is a kind of equation you can use to help you infer the meaning of an unfamiliar word or idea. You can think about what you already know—that's your background knowledge—and combine that with clues in the text to infer, or figure out, the meaning. A simple way to remember that equation is BK + TC = I (Background Knowledge + Text Clues = Inference).*

Say: *Another thing about inferring is that you have to think about whether or not your inference makes sense. If it doesn't, you can look for more clues or more information. By using the clues in the text and combining that with what you already know, you become someone who infers instead of guesses. Turn and talk about why you think inferring is more helpful than guessing.*

Kids turn and talk and then share out. Kids should mention that inferring is more likely to help you understand what you are reading.

Say: *Great! Inferring also keeps your mind active with good questions and wonderings while you read. A guess isn't based on much, is it? Not much thought is put into a guess, but an inference is based on good thinking that uses what you already know as well as clues you are finding in the text. Remember that good readers are good thinkers!*

MODEL (10 minutes)

Kids sit in a group on the floor, with you in a low chair in front of them.

Say: *Today I'm going to model how I infer the meaning of an unfamiliar word or idea by using clues in the text, or context clues.*

Have kids turn to pages 2–3, the first pages of "Whale Sharks: Sink or Swim?"

Say: *As I read, I'm going to use a chart with three columns. I'll write any unfamiliar words or ideas I come across in the first column. In the second column, I'll write what I infer. In the third column, I'll write the clues I used to help me infer the meaning.*

Say: *Okay, now I'm ready to read and show you how I do this. First of all, there isn't a lot of text on these pages, but since the title is here, I'm going to start with that. The title is "Whale Sharks: Sink or Swim? There is a lot about that title that I'm not sure about. I can see by the picture what a whale shark looks like, but the idea of sink or swim has me puzzled. Plus, there is a question mark at the end of the title. I'm going to read the small text on pages 2–3 to see if I can get any clues.*

Read aloud the text on pages 2 and 3.

Say: *The text gives me a few clues. I understand now that there are two points of view that will be presented in this article, and I'll need to form my own opinion, based on the evidence. I'm inferring that is what "Sink or Swim?" must mean. The question mark is there because I will need to make up my own mind about the different points presented about whale shark tourism in a small Philippine fishing town.*

Say: *Also, I'm not exactly sure what whale shark tourism is. I'll write down the phrase whale shark tourism in the first column of my chart. Then I'm going to look for clues. As I read page 4, I do find some clues. I read about what tourists do when they visit the small fishing village and the whale sharks. I'm going to use my background knowledge (what I already know) and clues in the text to make an inference. I already know that tourism is when tourists travel to and learn about new places. The clues in the text let me know what is involved in tourism that is focused on whale sharks in this fishing town in the Philippines. In the second column of my chart I'll write this inference: "Whale shark tourism is when tourists learn about and swim with whale sharks."*

Say: *In the third column of my chart, I'll write some of the clues in the text: "Tourists learn about whale sharks. . ." "You grab a mask and snorkel." "You see them." (Trailblazer) "You jump in!" "There, you see a huge whale shark swim past." (Pioneer)*

Say: *Can you see how the context clues and my background knowledge helped me infer what* whale shark tourism *means? Turn and talk about that.*

Kids turn and talk.

GUIDE (10 minutes)

Hand out Think Sheets and have kids attach them to their clipboards. Kids remain in a group in front of you on the floor.

Say: *You each have your own three-column chart on your Think Sheet. Now let's try this together. I'm going to keep reading. Let's look at page 6. This page gives us information that is for whale shark tourism.*

Read page 6.

Say: *Hmmm, this idea that whale shark tourism has improved lives is interesting. Turn to a partner and talk about what you infer about this idea that whale shark tourism is a positive thing.*

Kids can share their thoughts with their partners and then with the class.

Say: *Text clues can help us infer meaning, but in nonfiction we have other features, such as photographs, that can give us additional clues. Take a look at the photos on pages 5 and 6 to see if they offer more clues about the idea of what is positive about whale shark tourism. Turn and talk again to discuss how these picture clues give you more information to use to infer.*

Kids turn and talk and further develop their inferences, based on the photos.

Say: *Great thinking and excellent inferences. Let's talk about what should go in the three-column chart. As we discuss this together, you can each fill in the chart on your own Think Sheet.*

With the class, go through the columns in the chart. Fill in words/phrases/ideas in column one and come up with an appropriate inference based on the discussions kids had with one another and with the class. Then spend some time fleshing out the clues they used from the text and photos to determine their inferences.

Name _____   Date _____

THINK SHEET

Use this chart when you come across unfamiliar words, phrases, or ideas.

Word/Phrase/Idea	Inference	Text Clues

COLLABORATE (25 minutes)

Say: *Now it's time for you to work with a partner to read about the information that tells why some people are against whale shark tourism. Read page 7. Then talk about what you infer about this idea that whale shark tourism is a negative thing.*

When you come across unfamiliar words, phrases, or ideas, stop and talk about them and practice using context clues to infer meaning. Remember that context clues can be found in pictures as well as in the text. Use your Think Sheet to record your thinking on the three-column chart. And don't forget the equation: BK +TC = I (Background Knowledge + Text Clues = Inference). Some words/phrases/ideas kids might address:

Pioneer

* Feeding sharks might be bad. (idea)

* Whale sharks might link people and boats with food. (idea)

* Tourists break the rules. (idea)

* propeller (word)

Trailblazer

* Feeding sharks might be disruptive. (idea)

* disruptive (word)

* Sharks might connect boats with food. (idea)

* propeller (word)

* Many tourists break the rules. (idea)

* controversial (word)

Partners work together. Move around the room, conferring with partners.

SHARE THE LEARNING (10 minutes)

Kids join a sharing circle with you and share out, using respectful language.

Say: *Okay, flip through the article and consult your Think Sheet and choose a word, phrase, or idea that you didn't understand and describe how you inferred the meaning. We are going to share using respectful language. After you share, ask if anyone has any comments or questions. Then you can invite someone else to share.*

Kids share out and invite others to share, always using respectful sharing language. There should be time for about 3 or 4 kids to share out with the whole group. Once they are finished, have everyone turn and share with the person next to them, so that all have a chance to be heard.

Say: *We learned so much today about inferring. We also learned that there can be two sides to an issue and that people can be for or against it and present good evidence for their side. Turn and talk about what opinion you formed after reading about shark whale tourism.*

Kids turn and talk and then share out.

Say: *Great work and great thinking today!*

Name _____ Date _____

Use this chart when you come across unfamiliar words, phrases, or ideas.

Word/Phrase/Idea	Inference	Text Clues

What You'll Need
- Nonfiction text
- Think Sheet template
- Clipboards and pencils

> This frame is a kind of template of the lesson we just worked on. It has the instructional moves and language of the lesson, but the specific content has been removed. This way you can use the Lesson Frame for the other articles in the issue or for any nonfiction text you might be teaching.

CONNECT AND ENGAGE (20 minutes)

Kids are in a group on the floor in front of you.

Say: *Does anyone know what it means to infer? Turn and talk about what you think it means to infer.*

Kids turn and talk. Some may have an idea about inferring; others may not.

Say: *We infer when we try to figure out something we don't know for sure. One way we infer while reading is when we come across an unfamiliar word or an unfamiliar idea. There is a kind of equation you can use to help you infer the meaning of an unfamiliar word or idea. You can think about what you already know—that's your background knowledge—and combine that with clues in the text to infer, or figure out, the meaning. A simple way to remember that equation is BK + TC = I (Background Knowledge + Text Clues = Inference).*

Say: *Another thing about inferring is that you have to think about whether or not your inference makes sense. If it doesn't, you can look for more clues or more information. By using the clues in the text and combining that with what you already know, you become someone who infers instead of guesses. Turn and talk about why you think inferring is more helpful than guessing.*

Kids turn and talk and then share out. Kids should mention that inferring is more likely to help you understand what you are reading.

Say: *Great! Inferring also keeps your mind active with good questions and wonderings while you read. A guess isn't based on much is it? Not much thought is put into a guess, but an inference is based on good thinking that uses what you already know as well as clues you are finding in the text. Remember that good readers are good thinkers!*

MODEL (10 minutes)

Kids sit in a group on the floor, with you in a low chair in front of them.

Say: *Today I'm going to model how I infer the meaning of an unfamiliar word or idea by using clues in the text, or context clues.*

Have kids turn to page(s) _____.

Say: *As I read, I'm going to use a chart with three columns. I'll write any unfamiliar words or ideas I come across in the first column. In the second column, I'll write what I infer. In the third column, I'll write the clues I used to help me infer the meaning.*

Say: *Okay, now I'm ready to read and show you how I do this. The title is "_____." There are some things about the title that I'm not sure about. I'm going to read the text on page(s) _____ to see if I can get any clues.*

Read aloud the text on page(s) _____.

Say: *The text gives me a few clues. I understand now that _____.*

Say: *Also, I'm not exactly sure what _____ is. I'll write down the word/phrase _____ in the first column of my chart. Then I'm going to look for clues. As I read page _____, I do find some clues. I read about _____ _____. I'm going to use my background knowledge (what I already know) and clues in the text to make an inference. I already know _____ _____.*

Say: *The clues in the text let me know_____. In the second column of my chart I'll write this inference: "_____."*

Say: *In the third column of my chart, I'll write some of the clues in the text.*

Say: *Can you see how the context clues and my background knowledge helped me infer what _____ means? Turn and talk about that.*

Kids turn and talk.

GUIDE (10 minutes)

Hand out Think Sheets and have kids attach them to their clipboards. Kids remain in a group in front of you on the floor.

Say: *You each have your own three-column chart on your Think Sheet. Now let's try this together. I'm going to keep reading. Let's look at page(s) _____. This gives us information about _____.*

Read page(s) _____.

Say: *Turn to a partner and talk about what you infer about this.*

Kids can share their thoughts with their partners and then with the class.

Say: *Text clues can help us infer meaning, but in nonfiction we have other features, such as photographs, that can give us additional clues. Take a look at the photos on page(s) _____ to see if they offer more clues about _____. Turn and talk again to discuss how these picture clues give you more information to use to infer.*

Kids turn and talk and further develop their inferences, based on the photos.

Say: *Great thinking and excellent inferences. Let's talk about what should go in the three-column chart. As we discuss this together, you can each fill in the chart on your own Think Sheet.*

With the class, go through the columns in the chart. Fill in words/phrases/ideas in column one and come up with appropriate inferences based on the discussions kids had with one another and with the class. Then spend some time fleshing out the clues they used from the text and photos to determine their inferences.

COLLABORATE (25 Minutes)

Say: *Now it's time for you to work with a partner to read about _____. Read page(s) _____. Then talk about what you infer about _____.*

Say: *When you come across unfamiliar words, phrases, or ideas, stop and talk about them and practice using context clues to infer meaning. Remember that context clues can be found in pictures as well as in the text. Use your Think Sheet to record your thinking on the three-column chart. And don't forget the equation: BK +TC = I (Background Knowledge + Text Clues = Inference).*

Partners work together. Move around the room, conferring with partners.

SHARE THE LEARNING (10 minutes)

Kids join a sharing circle with you and share out, using respectful language.

Say: *Okay, flip through the article and consult your Think Sheet and choose a word, phrase, or idea that you didn't understand and describe how you inferred the meaning. We are going to share using respectful language. After you share, ask if anyone has any comments or questions. Then you can invite someone else to share.*

Kids share out and invite others to share, always using respectful sharing language. There should be time for about 3 or 4 kids to share out with the whole group. Once they are finished, have everyone turn and share with the person next to them, so that all have a chance to be heard.

Kids turn and talk.

Say: *Great work and great thinking today!*

Whale Sharks

SCIENCE

Standards Supported

- **NGSS Crosscutting Concepts: Planning and Carrying Out Investigations:** Make observations (firsthand or from media) to collect data which can be used to make comparisons. (2-LS4-1)
- **NGSS Science and Engineering Practices: Engaging in Argument from Evidence:** Construct an argument with evidence, data, and/or a model.. (3-LS2-1)

Resources

- Projectable PDF or interactive digital magazine
- Content Assessment Master (page 10)
- Article Test (page 15)

Science Background

Measuring up to 9.8 meters (32 feet) long and weighing up to 9 metric tons (20,000 pounds), whale sharks are the largest fish in the ocean. But these gentle giants feed on the tiniest prey. They are filter feeders that scoop in plankton, one colossal mouthful at a time.

Whale sharks are an endangered species that live in tropical waters all over the world. While fishing has greatly reduced their numbers, whale sharks have recently become the object of another potential threat: tourism.

The whale shark's size, striped and spotted body, and calm demeanor make it an alluring attraction for tourists eager to experience the world around them. Whale shark-viewing has become a growing industry that supports local economies. However, many scientists discourage the practice. Feeding whale sharks may disrupt their natural behaviors, such as migration. It also puts them in harm's way as they learn to approach boats looking for food.

ENGAGE

Encourage students to flip through the article and turn and talk with a partner to discuss what they see. Invite students to ask questions or share what they already know about whale sharks.

EXPLORE

Display the **"Whale Sharks: Sink or Swim" article** with the projectable PDF or the interactive digital magazine. Poll the class to see how many students would want to swim with the biggest fish in the world. Encourage them to explain why.

EXPLAIN

After reading, discuss what whale shark tourism is and how it got started. Remind students that people disagree about whether or not tourists should be allowed to swim with these giant fish. **Ask:** *Why do some people think whale shark tourism is good?* (It supports the local economy. Students reading the TRAILBLAZER edition may also note that it raises awareness of whale sharks as an endangered species.) *Why are other people against it?* (It may change whale sharks' natural behaviors and put them at risk when they approach boats to get food.) Have students turn and talk to discuss the issue in small groups. Rejoin as a class and guide students as they debate the merits on each side of the issue.

ELABORATE

Remind students that before people dive in to swim with whale sharks, local guides teach them about whale sharks. Divide the class into small groups. Have groups review the **"What Are Whale Sharks?" feature** in their student magazines. If you wish, have them conduct research to learn more about whale sharks. Then have each group create a tutorial about whale sharks to share with the class.

EVALUATE

Have students complete the **Content Assessment** for this lesson. Then have them take the **Article Test**. Encourage them to share and compare their results in small groups.

Name _____   Date _____

CONTENT ASSESSMENT: Whale Sharks

List reasons why people are for or against whale shark tourism.
Record evidence that supports each position.

	For	Against
Reasons		
Evidence		

Which side do you support? Why?

_____

_____

_____

_____

_____

Ocean Supercrop

SCIENCE

Science Background

In the 1990s, Bren Smith earned his living fishing cod along the Atlantic seaboard. When overfishing depleted fish stocks, he started farming shellfish in the Long Island Sound. And when a duo of powerful hurricanes wiped out his business, he knew it was time for a change.

Searching for new crops to raise in the ocean—and a new way to grow them—Smith contacted a marine scientist who suggested he grow seaweed.

Wanting to take full advantage of the ocean's depth, Smith created a method of vertical aquaculture that he calls 3D ocean farming. Using a system of ropes and buoys, he grows kelp, scallops, mussels, clams, and oysters on a 40-acre plot in the Long Island Sound. Smith's approach has been so successful that in 2013, he started a nonprofit organization to train and support others as they get their own ocean farms started.

ENGAGE

Encourage students to flip through the article and turn and talk with a partner to discuss what they see. Invite students to ask questions or share what they already know about how plants and animals live in the ocean.

EXPLORE

Display the **"Ocean Supercrop" article** with the projectable PDF or the interactive digital magazine. As a class, brainstorm ideas about what a supercrop is and how someone might grow one in the ocean.

EXPLAIN

After reading, remind students that people have been harvesting food from the ocean for a long time. **Ask:** *How is Bren Smith's ocean farm different?* (He built a system of buoys, ropes, cages, and nets to grow different foods in rows in a specific place in the ocean.) **Ask:** *If Smith wanted to get food from the ocean, why didn't he just go fishing?* (People are overfishing in some places. Too many fish are being taken out of the ocean.) Have students turn and talk to discuss how and why Smith became an ocean farmer. (He wanted to work in a sustainable way. A scientist suggested he try growing seaweed.) Encourage partners to explain to each other how Smith's 3D ocean farm works. Challenge them to identify how it is good for food, business, and the planet.
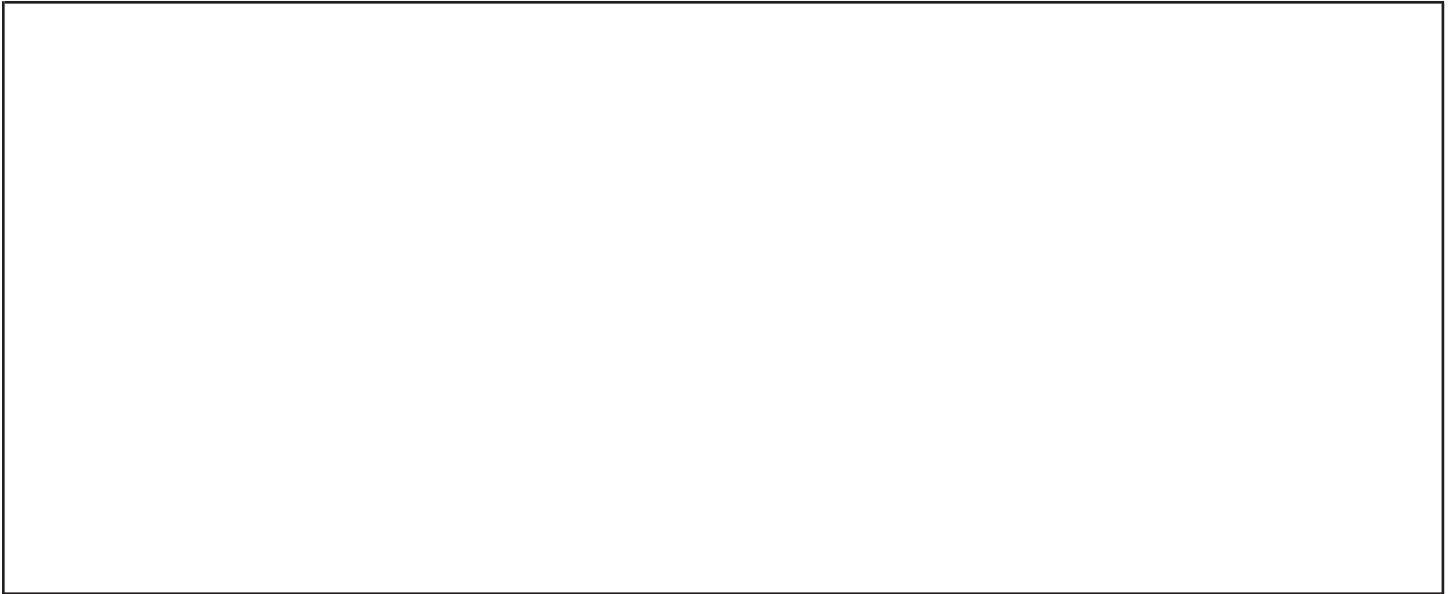
ELABORATE

Point out to students that seaweed is a common part of some people's diets. But it might seem like a strange ingredient to others. As a class, conduct research to find recipes that include seaweed in their list of ingredients. Encourage students to create a menu that lists a seaweed-inspired dish for each course.

EVALUATE

Have students complete the **Content Assessment** for this lesson. Then have them take the **Article Test**. Encourage them to share and compare their results in small groups.

CONTENT ASSESSMENT: Ocean Supercrop

Draw a picture of Bren Smith's 3D ocean farm. Label each type of food he grows.

Use details from the article to answer each question.

1. Why did Bren Smith decide to become an ocean farmer instead of a fisher?

_____

_____

_____

2. Pick one thing he grows. How does he grow it in on his farm?

_____

_____

_____

3. How does his ocean farm help the ocean habitat?

_____

_____

_____

Snapshot of Space

SCIENCE

Standards Supported

- **NGSS Connections to the Nature of Science: Science Addresses Questions About the Natural and Material World:** Scientists study the natural and material world. (2-ESS2-1)
- **NGSS Connections to Nature of Science: Science is a Human Endeavor:** Science affects everyday life. (3-ESS3-1)

Resources

- Projectable PDF or interactive digital magazine
- Beyond Our Solar System poster (Teacher's edition)
- Test the Science: Stomp Rocket poster (Teacher's edition)
- Content Assessment Master (page 14)
- Article Test (page 17)

Science Background

It has been 50 years since man first stepped on the moon. Since then, a combination of curiosity, determination, and ingenuity, have taken mankind beyond the moon, through the solar system, and into the vast unknown of interstellar space.

People haven't made most of these journeys themselves. Rather, they have built spacecraft that can land on asteroids and orbit planets. Components on the spacecraft take samples and shoot photos. They transmit the data or bring actual samples back to Earth for scientists to study. The results teach us about the universe so we better understand our tiny place within it.

ENGAGE

Encourage students to flip through the article and turn and talk with a partner to discuss what they see. Invite students to ask questions or share what they already know about exploring outer space.

EXPLORE

Display the **"Snapshot of Space" article** with the projectable PDF or the interactive digital magazine. As a class, brainstorm a list of objects the person in the photo might see as he looks through his telescope. Challenge students to list items people could see with a stronger telescope.

EXPLAIN

After reading, remind students that it's been 50 years since humans first walked on the moon, but people began exploring space long before that. **Say:** *As people have invented new technologies, they have been able to explore space in new ways. Satellites and other spacecraft have helped us explore further out and closer up than ever before.* Have students turn and talk to discuss how technology has allowed people to observe the moon, Mars, asteroids, Jupiter, Pluto, and beyond. Challenge them to identify what and how technology has helped us learn about each space object.

ELABORATE

Display and review the **"Beyond Our Solar System" poster**. Have students identify each spacecraft and discuss what the images, data, and other information it sent back helped scientists discover about space. Then display and review the "**Test the Science: Stomp Rocket" poster**. Provide supplies and have students conduct the experiment in small groups. Rejoin as a class to analyze the results. Encourage students to explain how their rockets performed under different conditions. Discuss how understanding how forces work helps scientists create rockets that blast off into outer space.

EVALUATE

Have students complete the **Content Assessment** for this lesson. Then have them take the **Article Test**. Encourage them to share and compare their results in small groups.

Name _____   Date _____

Make a checkmark to show if you think each sentence is true or false.
Use information from the article to explain your answers.

Sentence	True	False	Explanation
1. People know more about the near side of the moon than they do about the far side.			
2. Like moons, asteroids orbit the sun.			
3. A spacecraft took photos that show there are gas belts on Jupiter's north and south poles.			
4. Spacecraft can help us figure out what space objects are made of.			

Name _____   Date _____

Read each question. Fill in the circle next to the correct answer and then write your response on the lines.

1. Why do people want to see whale sharks?

    Ⓐ They are deadly.

    Ⓑ They are huge.

    Ⓒ They are fast.

2. Where can they go to see whale sharks?

    Ⓐ Asia

    Ⓑ Philippines

    Ⓒ Australia

3. What do people use to attract whale sharks?

    Ⓐ noise

    Ⓑ paddles

    Ⓒ shrimps

4. Who thinks whale shark tourism is a bad idea?

    Ⓐ local fishers

    Ⓑ tourists

    Ⓒ some scientists

5. What are four rules people are supposed to follow when they swim with whale sharks?

    _____

    _____

    _____

    _____

ARTICLE TEST: Ocean Supercrop

Read each question. Fill in the circle next to the correct answer and then write your response on the lines.

1. What happens when people overfish the ocean?

   Ⓐ Fish populations get larger.

   Ⓑ Fish populations get smaller.

   Ⓒ Fish populations grow too fast.

2. Why did Bren Smith want to grow seaweed?

   Ⓐ It grows underwater.

   Ⓑ He knew a lot about it.

   Ⓒ It is a sustainable crop.

3. What else does Smith grow on his ocean farm?

   Ⓐ cows

   Ⓑ chickens

   Ⓒ shellfish

4. What does seaweed grow from?

   Ⓐ seeds

   Ⓑ spores

   Ⓒ larvae

5. Why can seaweed be described as the ocean's supercrop?

   _____

   _____

   _____

   _____

ARTICLE TEST: Snapshot of Space

Read each question. Fill in the circle next to the correct answer and then write your response on the lines.

1. How long has it been since humans first walked on the moon?

   Ⓐ 30 years

   Ⓑ 40 years

   Ⓒ 50 years

2. What is a spacecraft currently testing on Mars?

   Ⓐ rocks

   Ⓑ quakes

   Ⓒ gases

3. What did asteroids build?

   Ⓐ rocky planets

   Ⓑ gas planets

   Ⓒ the sun

4. How does the U.S. spacecraft named Juno study Jupiter?

   Ⓐ It takes samples on Jupiter's surface.

   Ⓑ It takes photos as it orbits the planet.

   Ⓒ Astronauts living on the satellite do experiments.

5. What is one thing scientists have learned from studying space?

   _____

   _____

   _____

   _____

Pioneer and Trailblazer

ANSWER KEY

Whale Sharks

Assess Content, page 10

For: Whale shark tourism helps the economy. Evidence includes the fact that wages have increased and people now make enough money to feed their families and send their children to school.

Against: Scientists worry that feeding whale sharks may be bad for them. Evidence includes changes in how far whale sharks travel to get food and the potential that they will be hurt by propellers when they approach boats to get food.

Position: Responses will vary, but students should use ideas from the article to support their opinions.

Article Test, page 15

1. B; 2. B; 3. C; 4: C; 5. Keep your distance. No touching. No riding. No sunscreen.

Ocean Supercrop

Assess Content, page 12

Students should draw a picture similar to the one on pages 14-15 of the article. They should label mussels, scallops, oysters, clams, and kelp.

Question 1: Bren Smith stopped fishing because too many fish were being taken out of the ocean in some places. It was being overfished. He wanted to work on the ocean in a sustainable way.

Question 2: Answers will vary depending on which item students choose to write about. Details should come from the article.

Question 3: Seaweed soaks up carbon dioxide (CO_2) gas as it grows. This makes the ocean less acidic. That keeps wildlife healthy.

Article Test, page 16

1.B; 2. C; 3. C; 4. B; 5: Possible response: Seaweed is nutritious, good for the environment, and a good business to be in because the market is growing.

Snapshot of Space

Assess Content, page 14

1. True: People know more about the near side of the moon because all but one of the moon landings have taken place on the near side of the moon.
2. False: Asteroids orbit the sun, but moons orbit planets.
3. False: The photos showed that there were storms at the poles.
4. True: Some spacecraft take samples that are sent back to Earth for study. This helps us figure out what space objects are made of.

Article Test, page 17

1. C; 2. B; 3. A; 4: B; 5. Answers will vary.