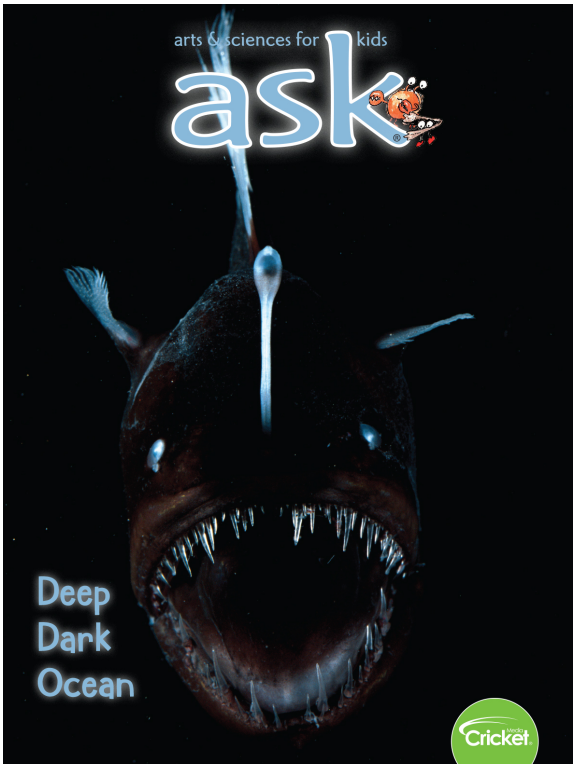
Ask® Teacher Guide: October 2019

Deep Dark Ocean

Dive into this issue of ASK and study the world that exists in the depths of our oceans. Students will examine the strange creatures, the poisonous chimneys, and the miles of internet cable that adorn the floors of the deep, dark sea.



CONVERSATION QUESTION

What can be learned from studying the deep sea?

TEACHING OBJECTIVES

- **Students will learn how animals that live in the deep sea are able to survive in such a harsh environment.**
- **Students will learn the "secrets of the sea vents" (hydrothermal) from the ocean floor.**
- **Students will learn how cables under the sea allow us to access the internet.**
- **Students will obtain specific information from a science-based text.**
- **Students will study the structure and function of hydrothermal vents.**
- **Students will demonstrate the ability to properly sequence and explain a studied process.**
- **Students will research land and air animals that utilize bioluminescence.**
- **Students will write a personal essay.**
- **Students will approximate the length of the first ocean (telegraph) cable and create Morse code messages.**

In addition to supplemental materials focused on core STEM skills, this flexible teaching tool offers vocabulary-building activities, questions for discussion, and cross-curricular activities.

SELECTIONS

- **Life in the Deep**

Expository Nonfiction, ~650L

- **Secrets of the Sea Vents**

Expository Nonfiction, ~750L

- **Internet Ocean**

Expository Nonfiction, ~950L

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Life in the Deep

pp. 16–19, Expository Nonfiction

Ready, Set…GLOW! Young readers will explore the behaviors and characteristics of sea animals that exist far below the ocean's surface. This article discusses adapted senses and the magical phenomenon of bioluminescence.

RESOURCES

- Let's Get Glowing

OBJECTIVES

- Students will learn how animals that live in the deep sea are able to survive in such a harsh environment.
- Students will obtain specific information from a science-based text.
- Students will research land and air animals that utilize bioluminescence.

KEY VOCABULARY

- ***deep sea* (p. 16)** the lowest layer in the ocean where little or no light penetrates; the part of the ocean below 200m depth
- ***robot submarine* (p. 19)** a remotely operated vehicle that is pre-programmed to collect data from particular parts of the deep ocean
- ***water pressure* (p. 16)** the weight of the water that pushes down on any object below it

ENGAGE

Conversation Question: What can be learned from studying the deep sea?

Put the word *light* in the center of a word web, and have students brainstorm ways that we can illuminate something. Discuss the properties of glow-in-the-dark objects, and if possible present the class with glow-in-the dark glue, slime/putty, or stickers to use as a motivational activity prior to reading.

INTRODUCE VOCABULARY

Review the key words and definitions. Guide students to notice that the terms are two-word phrases rather than single words. Explain why understanding the terms is critical to comprehending the article's content. Challenge them to underline other important phrases as they read.

READ & DISCUSS

Read the article with the class. Reinforce the deep-sea concepts by using the following prompts to direct discussion.

- Explain the four reasons that animals in the deep create their own light (glow).
- How do animals in the deep conserve their energy?
- What purpose do huge eyes and large teeth serve sea animals living in the deep?
- How were many of the photos in the article obtained?

CONCEPT/SKILL FOCUS: Obtaining Information

INSTRUCT: This article presents the reader with an abundance of detailed information regarding the characteristics of animals living in the deep sea. Distribute the graphic organizer, *Let's Get Glowing*, and allow students to work with a partner to consult the text and to collect relevant facts about the sea creatures listed in the word bank.

ASSESS: Be available to help remedial students reread the article and complete their charts. Collect the *Let's Get Glowing* worksheet from all students when finished to further evaluate their ability to obtain accurate information.

EXTEND

Science Review the meaning of the word *bioluminescence* on page 16. (Definition: the biochemical emission of light by living organisms) Inform students that although this article only discusses the bioluminescence of deep-sea animals, there are land and air animals that also possess this characteristic. Have students conduct research and create a mini-report, including graphics that will teach their classmates about a "glowing" creature. Bind all completed reports into a class book to be kept in your science center.

Let's Get Glowing

Obtain information from the article, "Life in the Deep," to decide which animal the sentence is describing. Choose an animal from the word bank that matches the sentence. Write the correct animal name on the line.

anemones	**chimaera**	**gulper eel**	**hatchet fish**
vampire squid	**jeweled squid**	**dragon fish**	**lizardfish**

_____ 1. These fish light up their bellies when they rise to the surface each night to feed.

_____ 2. A dark cloak hides its dinner from other hungry creatures.

_____ 3. Sticky tentacles are used to snare the food of this flowery animal.

_____ 4. These fish have backward-pointing teeth so prey can't escape.

_____ 5. Its stretchy body expands to gulp large prey.

_____ 6. These fish use lighted lures to attract prey.

_____ 7. The spots on this squid light up in the dark.

_____ 8. Ancient cousins of sharks, these fish find their prey by smell, and with motion detectors in their skin.

***On the back of this paper, draw one of the creatures studied above. Details from the article can help with your illustration.**

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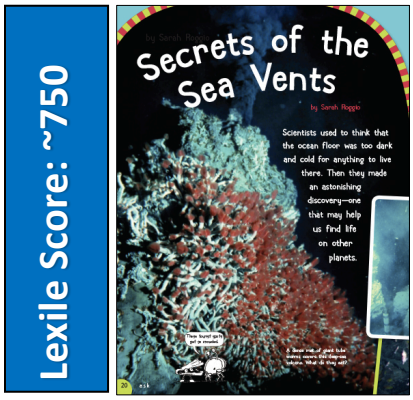
Secrets of the Sea Vents

pp. 20–23, Expository Nonfiction

This article is erupting with information about the strange, tall chimneys that were discovered on the sea floor near deep cracks in the Earth's crust. Readers will learn about the life that surrounds these hot, poisonous hydrothermal vents, as well as how they were formed.



RESOURCES

- Some Like It Hot

OBJECTIVES

- Students will learn about hydrothermal vents on the sea floor.
- Students will study the structure and function of hydrothermal vents.
- Students will write a personal essay.

KEY VOCABULARY

- ***astrobiologists* (p. 23)** scientists who study the possibility of life beyond Earth
- ***chemosynthesis* (p. 22)** using energy derived from the oxidation of inorganic chemicals to produce food
- ***hydrothermal* (p. 21)** of or relating to hot water

ENGAGE

Conversation Question: What can be learned from studying the deep sea?

Post the title of the article and ask students what they think a "sea vent" might be. List reasonable responses on the board. Play a video clip for the class that shows the actual structure of a hydrothermal vent, as well as the life that surrounds it. Distribute the article for reading.

INTRODUCE VOCABULARY

Review the key words and definitions with the class. Guide students to notice that all of the terms contain prefixes. Instruct them to create three columns on their paper with the following headings: -astro, -chemo, and -hydro. Have them work in pairs to brainstorm at least three other words that contain each prefix. They may use resources.

READ & DISCUSS

Read aloud the following questions prior to reading the text. Advise students to note where in the article the answers are found. Discuss responses to the questions as a post-reading activity.

- Explain in words and provide a simple sketch illustrating hydrothermal vents. (sea vents)
- Why does the magnitude of life surrounding these sea vents create hope for viable life on other planets?
- How can living things survive down in the deep, with no sunlight?
- What methods are scientists using to study hydrothermal vents in Loihi, Hawaii?

CONCEPT/SKILL FOCUS: Structure and Function

INSTRUCT: Elicit from students that the main idea of the article is to provide information that details the existence of hydrothermal vents. Present the graphic organizer, *Some Like It Hot,* and tell students that they will be using information from the article to record the special function of these sea vents.

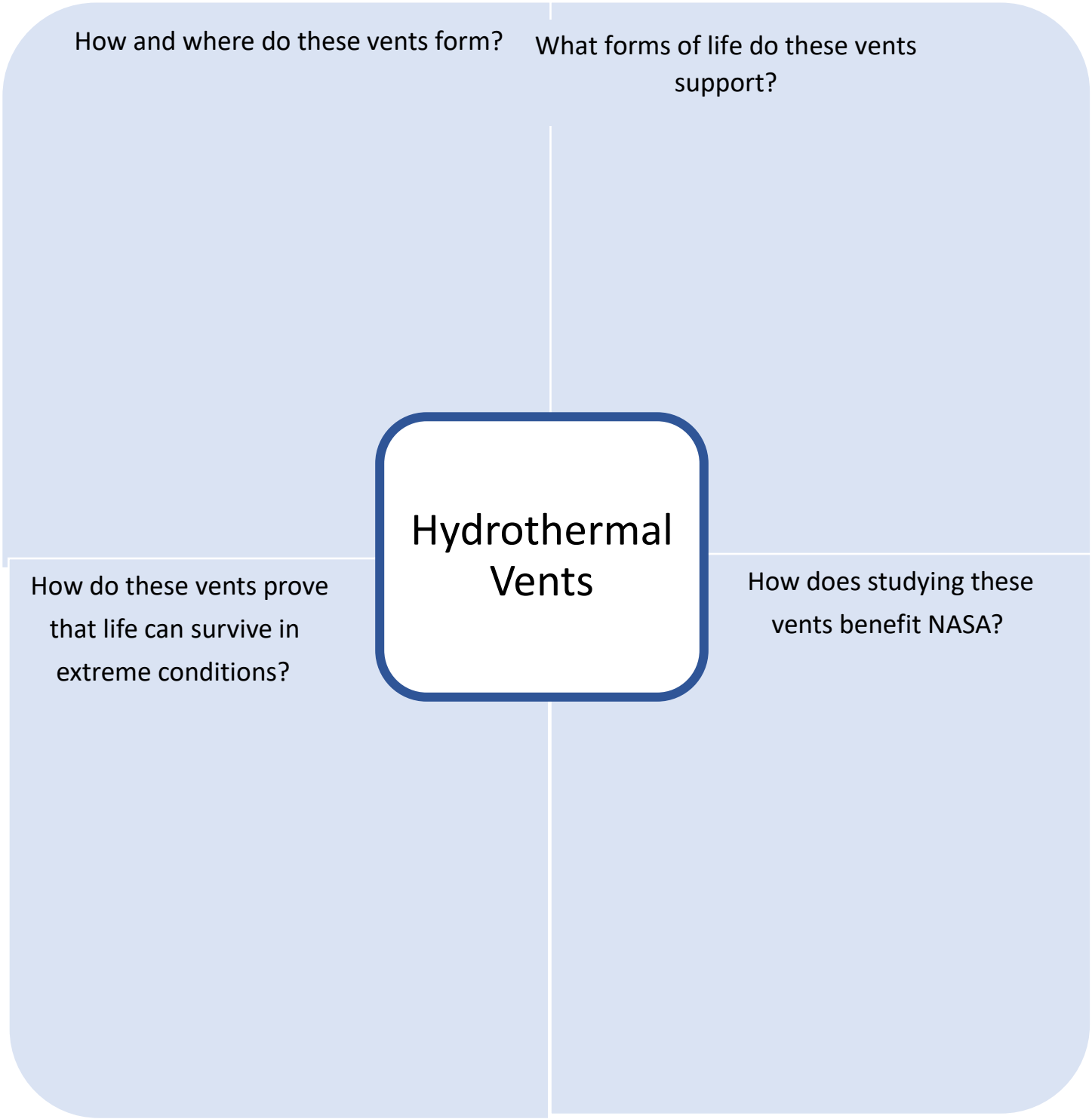
ASSESS: Collect and review the students' graphic organizers, as well as their answers to the questions from the "Read & Discuss" activity to determine understanding.

EXTEND

Language Arts Students will consider the following question (Would you rather study the deep sea or deep space?) and then write a personal essay stating their opinion. This piece of writing must clearly state their preference, provide reasons, offer supporting details, and furthermore include examples of the specific work they would like to do. Encourage illustrations.

Some Like It Hot

Use information from the article, "Secrets of the Sea Vents," to record relevant information regarding the structure and function of hydrothermal vents.



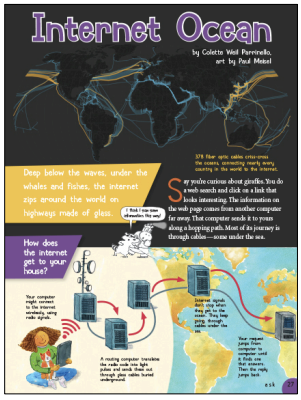
Ask® Teacher Guide: October 2010

Internet Ocean

pp. 27–29, Expository Nonfiction

Deep below the beautiful sea life, internet cables crisscross the ocean floor, connecting nearly every country of the world to the internet. This article will help young readers navigate the underwater pathways that bring us instantaneous information.

Lexile Score: ~950



RESOURCES

- Sea of Knowledge

OBJECTIVES

- Students will learn how cables under the sea allow us to access the internet.
- Students will demonstrate the ability to properly sequence and explain a studied process.
- Students will approximate the length of the first ocean (telegraph) cable and create Morse code messages.

KEY VOCABULARY

- ***drums* (p. 29)** cylindrical containers
- ***optical* (p. 28)** in relation to the physical action of light
- ***pulses* (p. 27)** short bursts of sound, electro current, light, or other waves
- ***wirelessly* (p. 27)** using a system of radio waves, rather than wires or cables

ENGAGE

Conversation Question: What can be learned from studying the deep sea?

Ask students to guess how far internet signals travel per second. Explain that the article they are about to read states that they travel 2/3 the speed of light. Given that the speed of light is 186,000 miles per second, how fast do the internet signals travel? Have students work together to calculate the answer. (2/3 × 186,000 = 124,000 miles p/s)

INTRODUCE VOCABULARY

After posting and discussing the key vocabulary terms and definitions, guide students to recognize that they are all different parts of speech. (*drums*: n, *optical*: adj, *pulses*: v, *wirelessly*: adv) Have the class fold a piece of paper into quarters and label them with the parts of speech and place words in the correct section. After reading the article they should add other words from the text into the appropriate boxes.

READ & DISCUSS

Divide the class into four groups and assign them each a different question to discuss. Reconvene and have each group share the main points of their conversation. The class should be taking notes so that after each group has shared, the students will have answers to each question.

- What material are internet cables made of?
- What do surveyors need to avoid when planning a route to lay cable under the water?
- What is the function of the underwater robot, “the plow”?
- How are breaks in the cable repaired?

CONCEPT/SKILL FOCUS: Sequence & Explanation

INSTRUCT: Review the information on pages 28–29, in addition to the text boxes. Elicit from the students that there is a specific sequence of events that contribute to the successful installation of internet cables under the ocean. Distribute the *Sea of Knowledge* graphic organizer and instruct the class to refer back to the article and to properly sequence and explain each step.

ASSESS: Circulate as students are working on the graphic organizer and discuss the information in the article. Direct students having difficulty with the sequencing process to reread the text with a partner. Collect the completed work to further evaluate understanding of this skill.

EXTEND

Social Studies Locate the telegraph line pathway between New York and Ireland on a map and approximate the distance. Supply students with a Morse code alphabet chart and have them make messages for their classmates to decode.

Sequencing

Sea of Knowledge

Use information from the article, "Internet Ocean," to put the steps of the underwater cable-laying process listed below in the correct order. Then, write a few sentences that explain what occurs during each step.

Send down robot	Make repairs	Make a glass cable	Coil up cable	Map the sea floor

Steps	Explanation
STEP 1 _____	
STEP 2 _____	
STEP 3 _____	
STEP 4 _____	
STEP 5 _____	