

Unit 5/Week 1

Title: Messages By The Mile

Suggested Time: 5 days (45 minutes per day)

Common Core ELA Standards: RI.4.1, RI.4.2, RI.4.3; W.4.2, W.4.4, W.4.7, W.4.8, W.4.9; SL.4.1, SL.4.2, SL.4.4; SL.4.5; L.4.1, L.4.2

Teacher Instructions

Refer to the Introduction for further details.

Before Teaching

1. Read the Big Ideas and Key Understandings and the Synopsis. Please do **not** read this to the students. This is a description for teachers, about the big ideas and key understanding that students should take away **after** completing this task.

Big Ideas and Key Understandings

By observing the mysteries of animals, scientists can discover interesting adaptations such as infrasonic communication.

Synopsis

Scientists, Dr. Roger Payne and Dr. Katherine Payne, have discovered that the use of infrasonic sounds is a method of communication used by whales. Using this prior knowledge, Dr. Katherine Payne observes elephants and determines that elephants also use infrasound to communicate.

2. Read entire main selection text, keeping in mind the Big Ideas and Key Understandings.
3. Re-read the main selection text while noting the stopping points for the Text Dependent Questions and teaching Vocabulary.

During Teaching

1. Students read the entire main selection text independently.

2. Teacher reads the main selection text aloud with students following along. (Depending on how complex the text is and the amount of support needed by students, the teacher may choose to reverse the order of steps 1 and 2.)
3. Students and teacher re-read the text while stopping to respond to and discuss the questions and returning to the text. A variety of methods can be used to structure the reading and discussion (i.e.: whole class discussion, think-pair-share, independent written response, group work, etc.)

Text Dependent Questions

Text Dependent Questions

Answers

On page 416, the sentences, “you might think the world’s second-largest animal would have the loudest voice, but we can’t hear even a trace of the fin whale’s long distance sound.” Why can’t we hear even a trace of the fin whale’s long distance song?

The reason we aren’t able to hear the fin whale song is because it is below the level humans can hear.

Reread page 416. How is the mystery of not hearing the fin whale explained?

Infrasonic sounds are sounds so low that humans can’t hear but can sometimes feel. An example could be earthquakes, volcanoes, and severe thunderstorms. Another example could be how ocean waves create a tingling sound when they’re near big whales.

After students share infrasonic sound, follow-up with the question below.

Explain what infrasonic sound is and give an example from the text.

Reread page 417. A mystery is something that is difficult or impossible to understand. If a mystery is something that is difficult or impossible to understand, why is the process by which whales make sounds still a mystery? How were the scientists trying to solve the mystery?

The process by which a whale makes a sound is still a mystery because they have no vocal cords and whales have a complicated “plumbing” in their heads and we don’t know how it all works. The scientists recorded and listened to the sounds whales made while feeding in the cold water of the Antarctic oceans in the spring.

The process by which whales make sounds continues to be a mystery to scientists. On page 417, what are two things scientists still don’t know about whales’ infrasonic sounds?

Scientists still don’t know how whales make these sounds since they don’t have vocal cords. Scientists still don’t know what these sounds mean.

Reread pages 418 and the first paragraph on page 419. Are all whale songs the same?

All whale songs are not the same. They are made up of low rumbles, shrill whistles, grunts, eerie groans, and squeaks. Some conversations are short while others are very complicated.

On page 419, Dr. Payne suspects elephants are sending infrasonic messages. What caused her to suspect they were sending infrasonic messages?

Dr. Payne suspected that the elephants were sending messages because she could feel a repeating vibration in the air while observing the elephants. That “throbbing” was felt when she was in the church choir and felt vibrations from the low notes on the pipe organ. In addition, she felt vibrations from the whale songs she had heard about the vibrations from the whale songs she had heard.

Reread page 420. What mysteries about elephants could be explained by infrasonic sound?

An example of how infrasonic sound would explain elephant behavior is when a group of female elephants pause, and change direction. Another example is how elephant groups can arrive at a watering hole. In addition, how a male elephant finds a female.

What differences did scientists observe when the elephants made the deep rumbling sounds or purring sounds as compared to the low level “silent” sounds? Use the text to support your answer.

The rumblings and purring sounds can be heard by the ear but the low level silent sounds are only a low level “silent” sounds? Use the text to support your answer. tapping equipment.

Inferred means to come to a conclusion based on evidence. What was inferred about elephants’ behaviour of standing as still as statues and fanning out their ears?

The elephants stand as still as statues with ears fanned out a few minutes then change directions suddenly. Scientists inferred that they are listening to infrasonic sounds in different directions or instructions.

How did Dr. Payne discover that elephants communicate using infrasonic sounds?

She used special recording equipment and discovered a vibrating spot on forehead.

Vocabulary

	KEY WORDS ESSENTIAL TO UNDERSTANDING	WORDS WORTH KNOWING General teaching suggestions are provided.
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<p>TEACHER PROVIDES DEFINITION not enough contextual clues provided in the text</p>	<p>Page 417 - amplified, mystery, explanation Page 421 - registered Page 419 - throbbing Page 419 - vibrations Page 417 - vocal cords Page 418 - migrated</p>	<p>Page 417 - plumbing Page 417 - shrill Page 417 - grunts Page 417 - eerie Page 417 - hollows Page 418 - equipment Page 418 - tune Page 418 - pitch Page 419 - trumpeting</p>
<p>STUDENTS FIGURE OUT THE MEANING sufficient context clues are provided in the text</p>	<p>Page 416 - rumbling Page 417 - recording</p>	

Culminating Task

- Re-Read, Think, Discuss, Write
- *Using specific details and evidence from the text, explain how Dr. Payne contributed to the discoveries of infrasonic sounds.*

Answer:

Dr. Payne greatly contributed to the discoveries of infrasonic sounds. For example, she observed the strange throbbing in the air when she was watching the elephants. This throbbing reminded her of the same throbbing she felt from the pipe organ in the church choir and also the vibrations from the whales’ infrasonic sounds. These observations led her to study whether or not elephants were using infrasonic messages.

She learned that when elephants made rumblings that humans could hear, there was a trembling in their forehead. Also, when they made silent sounds, there was a fluttering in their foreheads. This, coupled with the recording, led her to know that elephants use infrasonic sounds.

Additional Tasks

With a partner, use the Internet to research what others animals are known to use infrasonic sounds. Take notes on your finds and keep track of your sources. Be sure to use at least two sources. After you've collected all of your information, write a summary of your findings. Provide a list of your sources, and create a 3-minute presentation that explains your findings. Include at least one visual aid in your presentation.

Possible websites/information:

- <http://www.nytimes.com/1986/02/11/science/secret-language-found-in-elephants.html>

“It is the first evidence that land mammals can produce such infrasonic sounds, and it adds the elephants' basso calls to the wildlife choir that includes the high-frequency shrieks of bats, the soprano voices of porpoises, the alto wails of wolves and coyotes and the tenor-to-bass-range songs of humpback whales. The significance and role of such sounds, audible to people or not, has long puzzled wildlife biologists.”
- <http://www.academickids.com/encyclopedia/index.php/Infrasound>

“Whales, elephants rhinoceros, giraffes, okapi, and alligators are known to use infrasound to communicate over varying distances of up to many miles as in the case of the whale, for instance. It has also been suggested that migrating birds use naturally generated infrasound, from sources such as turbulent airflow over mountain ranges, as a navigational aid.”

Name _____ Date _____

“Messages by the Mile”

1. On page 416, the sentences, “you might think the world’s second-largest animal would have the loudest voice, but we can’t hear even a trace of the fin whale’s long distance sound.” Why can’t we hear even a trace of the fin whale’s long distance song?
2. Reread page 416. How is the mystery of not hearing the fin whale explained?
3. Explain what infrasonic sound is and give an example from the text.
4. Reread page 417. A mystery is something that is difficult or impossible to understand. If a mystery is something that is difficult or impossible to understand, why is the process by which whales make sounds still a mystery? How were the scientists trying to solve the mystery?

11. How did Dr. Payne discover that elephants communicate using infrasonic sounds?