

## **Waves, Energy, and Information:**

Investigating How Dolphins Communicate

**Grade 4 - Lessons 3.4, 3.5 and 3.6**

Accompanying Videos and Books can be found at:  
[tinyurl.com/SciLessons](https://tinyurl.com/SciLessons)

Other Amplify resources can be found at:  
[amplify.com/remoteteaching/Science/resources](https://amplify.com/remoteteaching/Science/resources)

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Daily Written Reflection

Some scientists use visual representations of sound in their work. Why do you think using visual representations helps them?

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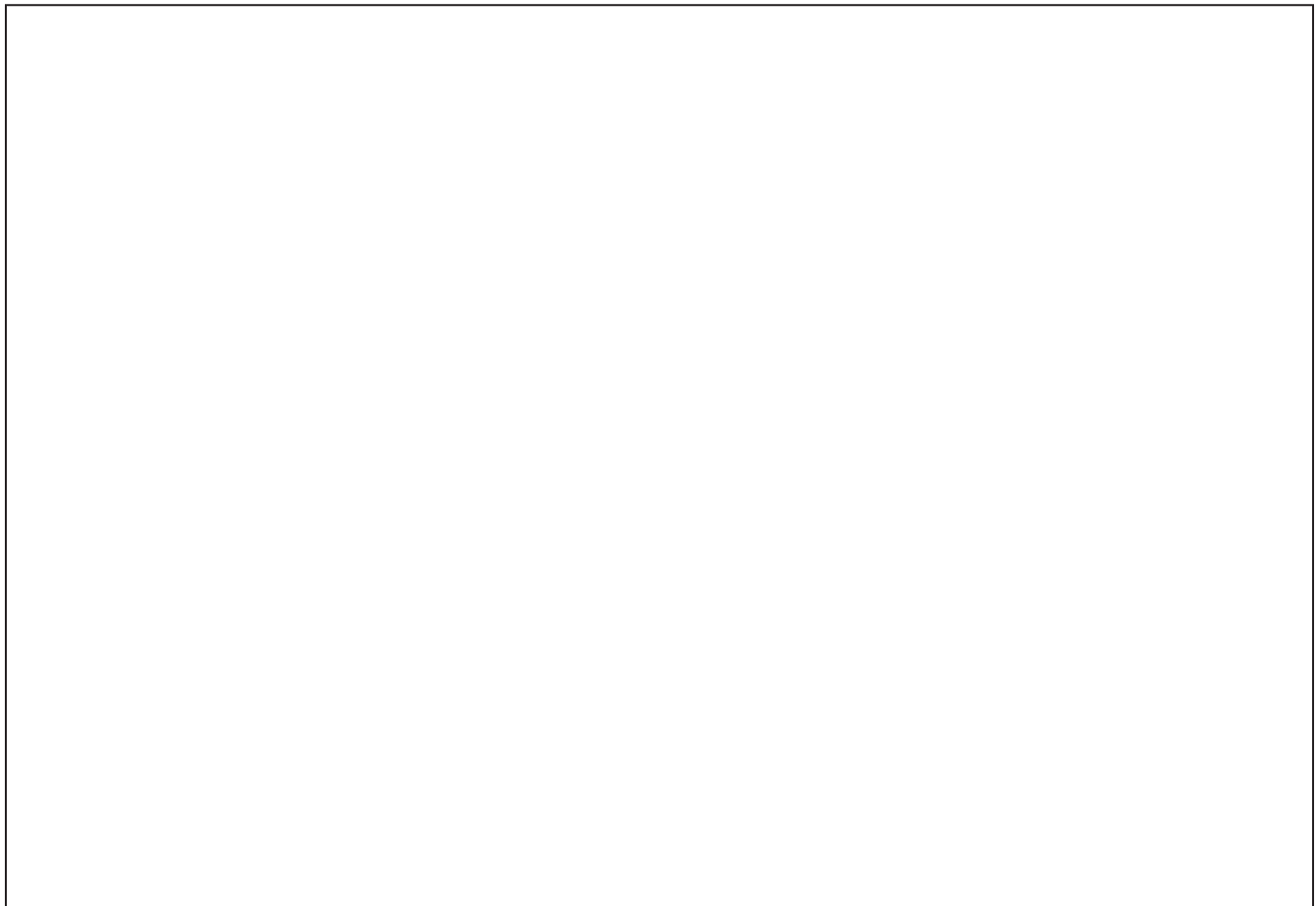
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Make a drawing if it helps you explain your thinking. Label your drawing, then take a photo of it and attach the photo in the box below:



## Getting Ready to Read: *Seeing Sound*

1. Before reading the book *Seeing Sound*, read the sentences below.
2. If you agree with the sentence, type an “A” on the line before the sentence.
3. If you disagree with the sentence, type a “D” on the line before the sentence.
4. After you read the book, see if your ideas have changed. Be ready to explain your thinking.

\_\_\_\_\_ Many people use visual representations of sound in their jobs.

\_\_\_\_\_ Engineers study how animals use sounds to communicate.

\_\_\_\_\_ Doctors can sometimes use sound waves to help people who are sick.

\_\_\_\_\_ All people can hear low-pitched sounds and high-pitched sounds.

\_\_\_\_\_ It is not possible to change a sound once it has been recorded.

## Why People Visualize Sound

1. As you read *Seeing Sound*, record some of the reasons why people visualize sound in their jobs.
2. Remember to look carefully at the visual representations in the book as well as reading the text.

Job	Why they visualize sound
Scientists	
Audiologists	
Doctors	
Sound engineers	

## Multiple Meaning Words

Some words can mean more than one thing. For each word in the table:

1. Read the sentence from the book *Seeing Sound* that uses the word.
2. Read the two meanings the word can have.
3. Decide which meaning the word has in the sentence from the book and check that meaning in the table.

Word	Sentence from the book	Meaning 1	Meaning 2
treat	Doctors can even use sound to <b>treat</b> their patients.	a special snack or sweet	to try to heal a disease
property	These scientists need to understand the <b>properties</b> of sound.	something someone owns	what you can see, hear, smell, taste, or feel about something
tone	One of these tests is called a pure <b>tone</b> test.	the pitch that a sound has	the way you say something
record	Sound engineers work with musicians to <b>record</b> music.	to use a computer or other machine to save a sound to listen to later	to draw or write information

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## Reading Reflection: *Seeing Sound*

Choose one job you read about and think about how people visualize sound in that job.

How is this **similar** to how you have visualized sound in your investigations?

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How is it **different**?

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What questions do you have about sound after reading the book *Seeing Sound*?

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## Daily Written Reflection

What do you think it means to “crack a code”?

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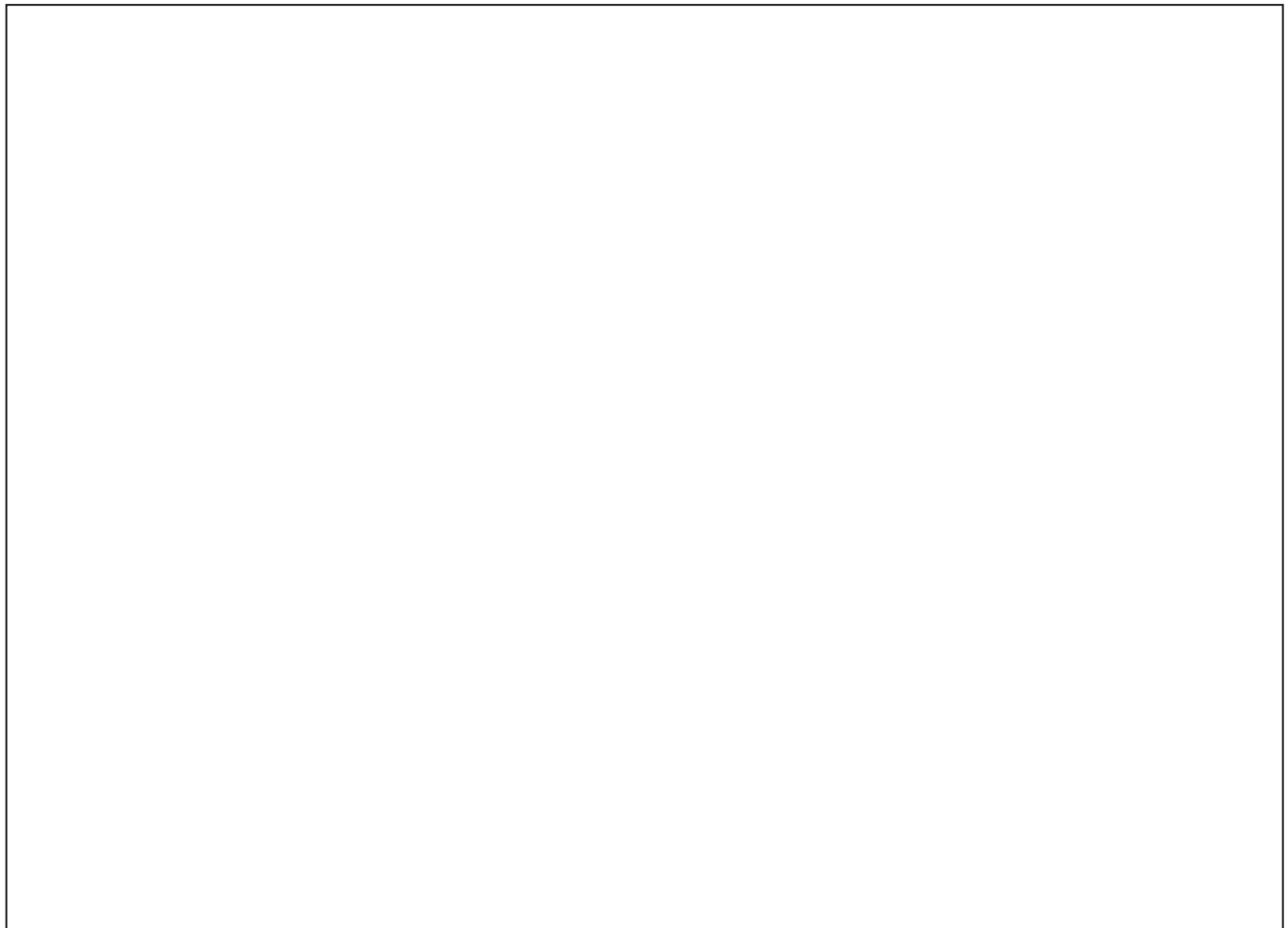
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## How Dolphins Use Different Sounds to Communicate

Write your answer to the question below based on what you read in *The Scientist Who Cracked the Dolphin Code*.

**How can dolphins use different sounds to communicate with one another?**

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Make a drawing if it helps you explain your thinking. Label your drawing, then take a photo of it and attach the photo in the box below:





Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Getting Ready to Read:**  
***The Scientist Who Cracked the Dolphin Code***

1. Before reading the book *The Scientist Who Cracked the Dolphin Code*, read the sentences below.
2. If you agree with the sentence, write an “A” on the line before the sentence.
3. If you disagree with the sentence, write a “D” on the line before the sentence.
4. After you read the book, see if your ideas have changed. Be ready to explain your thinking.

\_\_\_\_\_ Dolphins make clicking, buzzing, and squeaking sounds.

\_\_\_\_\_ Dolphins communicate using very low-pitched sounds.

\_\_\_\_\_ It is easier for people to tell the difference in sound waves by listening to them than by looking at visual representations of them.

\_\_\_\_\_ Dolphins respond to changes in the pitch of a sound.

## Multiple Meaning Words

Some words can mean more than one thing. For each word in the table:

1. Read the sentence from the book *The Scientist Who Cracked the Dolphin Code* that uses the word.
2. Read the two meanings the word can have.
3. Decide which meaning the word has in the sentence from the book and circle that meaning in the table.

Word	Sentence from the book	Meaning 1	Meaning 2
whistle	Each dolphin has a <b>whistle</b> that is different from every other dolphin's <b>whistle</b> .	a small device that makes a very loud, high-pitched sound as air is blown through it	a high-pitched sound made by blowing air through a hole
signature	Sayigh knew that bottlenose dolphins use <b>signature</b> whistles to stay in touch with each other.	a handwritten name	something that is special or unique
pattern	Humans are very good at grouping visual representations that show <b>patterns</b> of change in pitch.	something that we observe to be the same over and over again	a decorative design

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**Reading Reflection:**  
***The Scientist Who Cracked the Dolphin Code***

If you could meet Laela Sayigh, what questions would you ask her about her dolphin research?

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People all over the world are studying how dolphins use sound to communicate. What would you like to know about how dolphins communicate?

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## Daily Written Reflection

Think of an animal that uses sounds to communicate. Describe the animal's sounds and what message the animal is sending.

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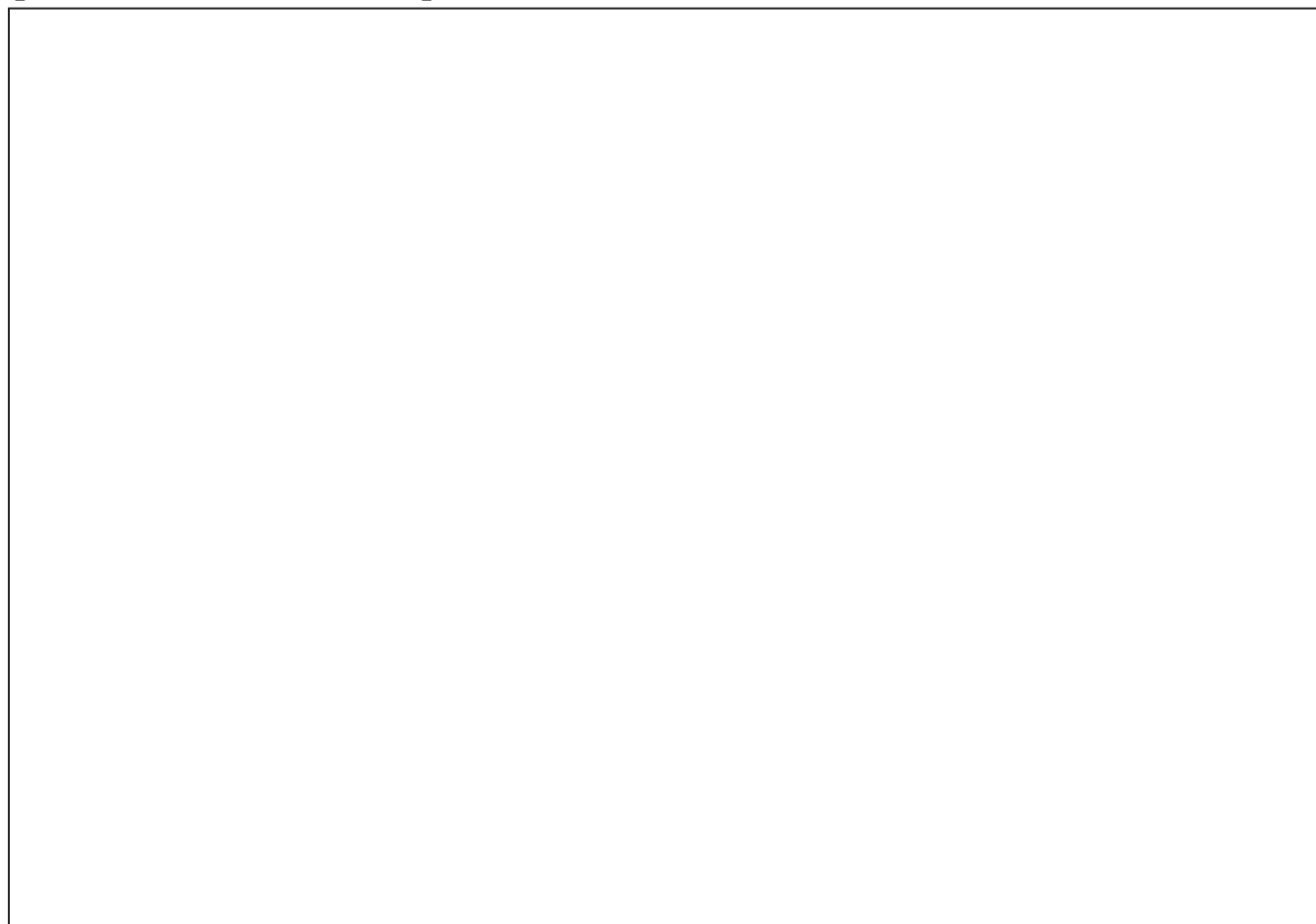
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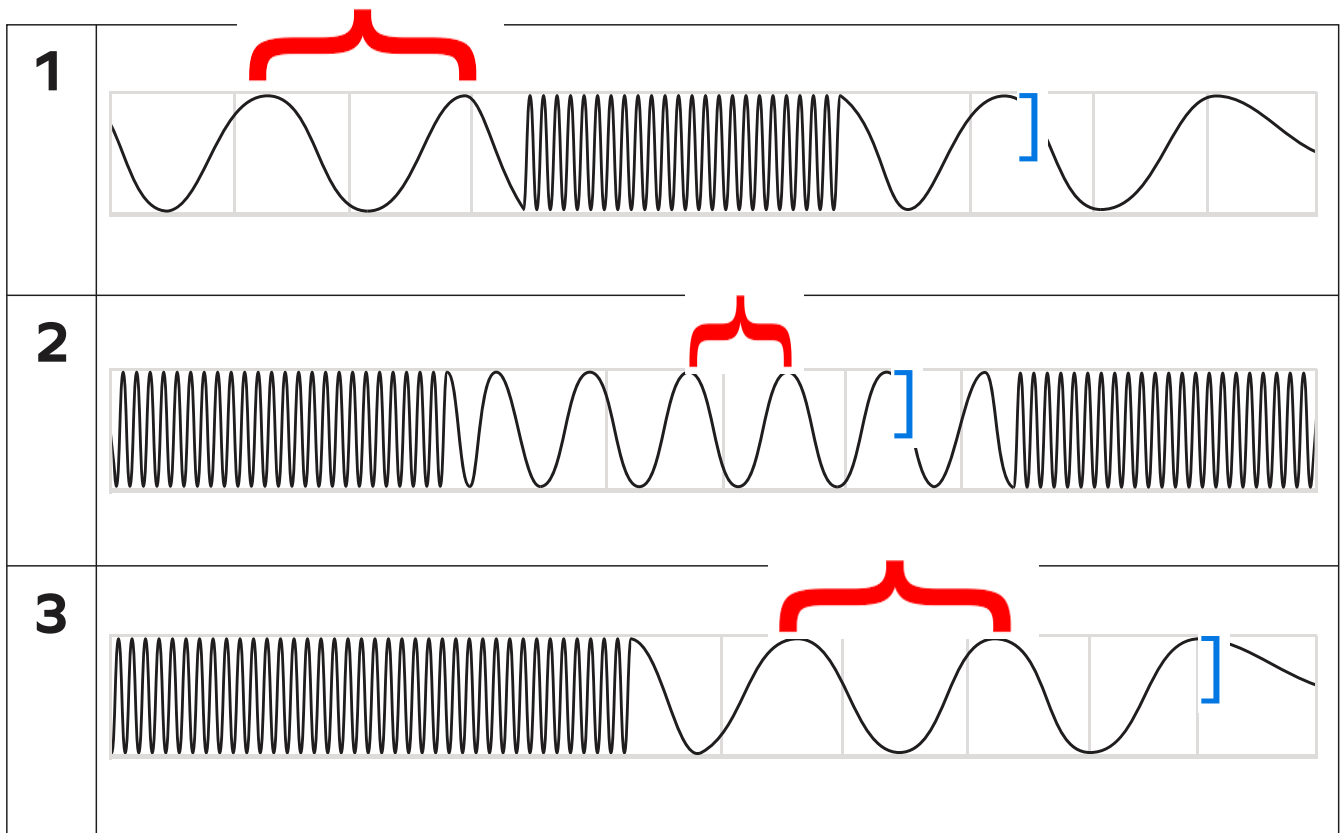
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## Dolphin Signature Whistles

Below are waveforms for three dolphin signature whistles (1, 2, and 3).

1. Discuss the following questions with a family member/partner.
  - What differences do you notice between the waveforms?
  - What do you think each whistle sounds like?
2. When your teacher assigns you a signature whistle, check the number to the left of the waveform.
3. Label the amplitude and wavelength on your signature whistle.



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## Simulating Dolphin Signature Whistles

1. Open the Custom Sound mode of the Sound Waves Sim.
2. Using the waveform for your whistle on page 70 as a guide, make your signature whistle in the Sim. (This might take a few tries!)
3. Make and listen to your signature whistle a few more times until you think you can recognize the sound.
4. Answer the questions below.

Describe what the waveform for your signature whistle looks like. Use words such as *long*, *short*, and *wavelength*.

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Describe what your signature whistle sounds like. Use words such as *high*, *low*, and *pitch*.

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