



Science Learning Packet

Grade 4, Week 9:

Waves, Energy, and Information

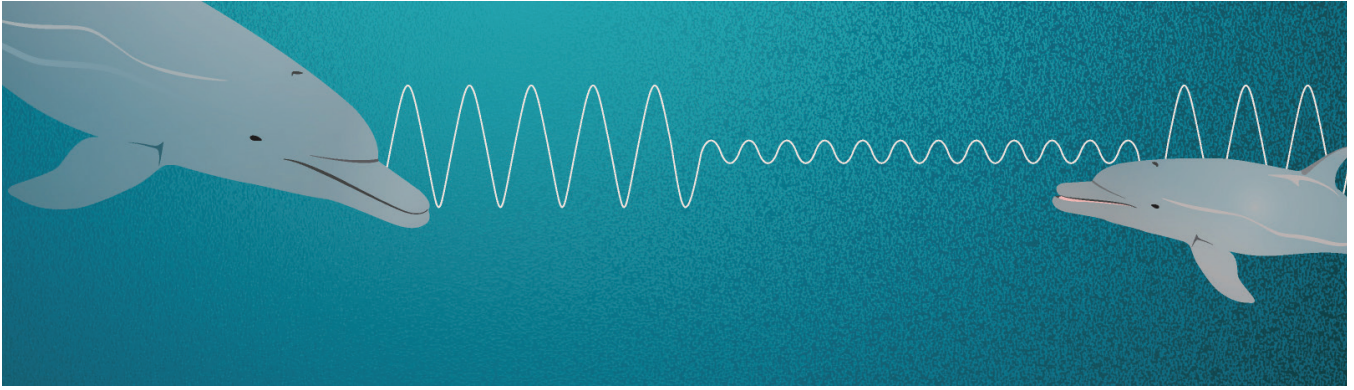
Suggested science learning activities for SPS students during the COVID-19 school closure.

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Due to the COVID-19 closure, teachers were asked to provide packets of home activities. This is not intended to take the place of regular classroom instruction but will help supplement student learning and provide opportunities for student learning while they are absent from school. Assignments are not required or graded. Because of the unprecedented nature of this health crisis and the District's swift closure, some home activities may not be accessible.

If you have difficulty accessing the material or have any questions, please contact your student's teacher.



Waves, Energy, and Information:

Investigating How Dolphins Communicate

Grade 4 - Lessons 4.2, 4.3 and 4.4

Accompanying Videos and Books can be found at:
tinyurl.com/SciLessons

Other Amplify resources can be found at:
amplify.com/remoteteaching/Science/resources

Decoding Your Teacher's Image

1. Your teacher will read you a binary code.
2. Use the code to re-create the image in the grid below. Start with the square in the top left of the grid.
3. The code is: 1 = Checkmark (X), 0 = White (No checkmark)

Your Teacher's Image

Name: _____ Date: _____

Decoding Your Teacher's Image (continued)

How similar was your image to your teacher's image?

Was using binary code easier or harder than describing your image to your partner in the previous lesson? Why do you think so?

Encoding an Image

On this page, you will make an image that you will send to a partner in binary code.

1. In the grid below, check some of the squares to make an image. Don't show the image to your partner.
2. Use the Code Communicator Tool to encode your image into binary code. Record the code on the lines below the grid.
3. Read the code to your partner to see if they can decode your image.
4. You may only say the words *one* and *zero* to your partner.

Your Image

Binary Code for Your Image

Decoding an Image

On this page, you will re-create your partner's image.

1. In the grid below, use the code your partner reads to check in the squares to re-create the image. Remember that the code is: 1 = Checkmark (X), 0 = White (No checkmark).
2. Do not look at your partner's image.
3. Do not talk while your partner reads the code.

Your Partner's Image

Code Challenge

Part 1: Encoding an Image

1. Make an image in the Code Communicator Tool with your partner.
2. In the grid below, check in squares to make a record of your image. Be sure to keep your image secret from the rest of your classmates!
3. In the Code Communicator Tool, turn on the Show Binary toggle to encode your image.
4. Record the code on the lines below the grid.
5. When you have finished making your image and recording the binary code, answer the question on the next page.

Your Image

Binary Code for Your Image

Name: _____ Date: _____

Code Challenge

Part 1: Encoding an Image *(continued)*

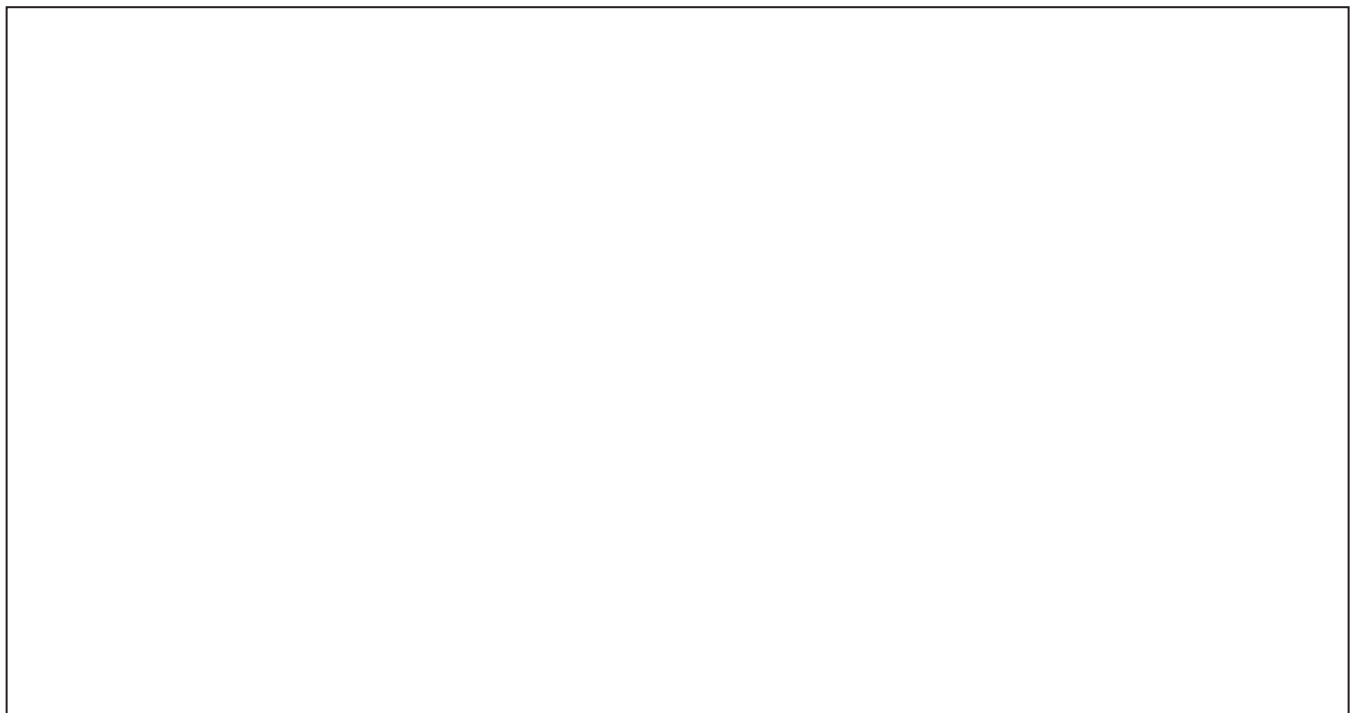
How do you think binary code will be helpful for sending a message across the room?

Name: _____ Date: _____

Communication Plan

With your group, discuss how you will send the code for your image across the room. When you have decided on a plan, write a description of what you are going to do.

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



Name: _____ Date: _____

Code Challenge

Part 2: Sending and Decoding Images

1. Senders and receivers stand on opposite sides of the room.
2. Senders: Partner A reads the binary code from page 92 to Partner B. Partner B sends the code across the room.
3. Receivers: Partner A watches for the code from the senders. Partner B enters the code into the Code Communicator Tool.
4. Take a screenshot of the image you received on your screen and attach it in the box below.
5. Senders and receivers switch roles.

Name: _____ Date: _____

Reflecting on the Code Challenge

1. Compare the image you decoded with the image that was sent to you.
2. Discuss the questions below with your group and record your ideas.

How accurate was the image you decoded compared with the original image? Why do you think so?

How is what you did for the Code Challenge similar to the way digital devices send and receive information?

In what ways do you think binary code is useful for communicating across distances?

Name: _____ Date: _____

Chapter 4: Check Your Understanding

This is a chance for you to reflect on your learning. This is not a test. Be open and truthful when you respond.

Scientists investigate in order to explain how or why something happens. Am I getting closer to figuring out how humans can use patterns to communicate?

I understand some ways that humans communicate. Yes Not yet

I understand how digital devices send and receive messages. Yes Not yet

I understand how binary code can be useful for communication. Yes Not yet

I understand that science explanations describe how or why something happens. Yes Not yet

What are you still wondering about human communication?
