Did You Get My Message?
Overview

This classroom manual is designed to provide ideas for how to use pages of the *Did You Get My Message?* e-book with students. It explains the concepts and suggests what to look for in students’ learning, while also supplying information about how they are practicing science and using crosscutting concepts.

The goals of this classroom manual are as follows:

- engage students in grade-level appropriate, three-dimensional learning;
- use the e-book as a tool in class-wide, small group, or independent explorations of its content;
- provide additional ideas and activities that utilize the e-book content but are not included in the e-book;
- explore how STEM content can be effectively integrated into literacy (English language arts);
- facilitate investigations that utilize the e-book content and connect it with students’ own classroom and community; and
- assess students on the second-grade content standards to which this e-book is aligned and additional *Common Core State Standards*, in English language arts and mathematics suggested throughout the e-book.

Book Description

In this book students will explore some of the many ways we communicate. The possibilities for communication methods are endless. The book focuses on how sights and sounds help us send and receive messages. The anchor phenomenon for this e-book is that sound and light can be used to communicate messages. As students explore communication systems, they will discover that each has benefits and drawbacks. Students will also discover that usage is determined by the method that works best for the situation. Some methods work better over long distances. Some methods are easy to understand. Other methods require learning or decoding. After reading the book, students will be able to design their own communication devices.

The Driving Question

A driving question is one that drives the
teaching and learning for a given unit, or even an entire school year. It provides context for the purpose of student exploration and understanding of a phenomenon. This e-book is written around the driving question:

*How can I communicate with someone who is far away?*

### Three-Dimensional Learning and the *Did You Get My Message?* E-book

You will notice throughout the document that certain words and phrases are highlighted in different colors: blue, green, and orange. These colors correspond to the science and engineering practices (blue), crosscutting concepts (green), and disciplinary core ideas (orange). The book also incorporates engineering design (purple). This will help you quickly notice how each of the three dimensions and engineering design are used on a page. Refer back to this section for the full descriptions.

This e-book does not use all of the grade-level elements for the practices and crosscutting concepts, but that does not mean that you should not be aware of the other practices and concepts your students need to know. For a full list of all grade-level elements for the science and engineering practices and crosscutting concepts, refer to Appendix A.

For engaging in literacy ideas, refer to Appendix B.

### Disciplinary Core Ideas (DCIs)

This e-book examines an anchor phenomenon related to the following disciplinary core ideas:

**PS4.C: Information Technologies and Instrumentation**

People also use a variety of devices to communicate (send and receive information) over long distances. (1-PS4-4)

**ETS1.A: Defining and Delimiting Engineering Problems**

A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2-ETS1-1)

Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1)

Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-3)

**ETS1.B: Developing Possible Solutions**

Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem’s solutions to other people. (K-2-ETS1-2)

**ETS1.C: Optimizing the Design Solution**

Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (K-2-ETS1-3)
Chapter 1

Sending Messages

This chapter is meant to engage students and expand their thinking about how to send and receive messages. The term communicate is introduced at the end of the chapter to give students multiple experiences with the concept before naming it.

By the end of the topic, students will be able to:

- analyze patterns of communication using various devices;
- define a problem that can be solved through communication; and
- compare multiple solutions to the problem of how to communicate.
The topic of fire trucks engages students with the idea that communication comes in many forms. Play the audio of the fire truck. Ask students how people know they should stop and get out of the way of the fire truck. The lights and sirens of the fire truck are a system that sends messages to the drivers nearby. This is a good time to introduce the idea of the lights and sirens as a system. A system is something that has parts that work together.

Discuss with your students:

- What are the parts of the system (fire truck siren) that make it work? (A battery, lights, sirens, switches, wires.)
- What would happen if you removed one of the parts? (The system wouldn’t work in the same way.)

**Thinking Beyond**

Talk or write to emergency responders to find out other ways they send and receive messages.

**Preconceptions**

Some students may believe that the vehicle operator makes the siren change pitch (get high and low) as it passes the student. This is not the case. The change in pitch is due to the frequency of sound waves moving towards or away from the person hearing the sound.
Page 7

The term communicate is introduced here. At this point in the book students have had experiences with a variety of communication methods so they are ready to learn the terminology. Discuss the terms that have been used and how they relate.

- What is communication? (Sharing a message that someone understands)
- What is information? (A message or knowledge that is shared)
- What is a message? (Information that is shared with someone else)

Use the following questions to initiate classroom discussions.

- How do we send messages?
- How do people choose or develop ways to communicate?
- What are the benefits of choosing one way to communicate over another?

This page checks students’ understanding of the term communicate. You may want to discuss other types of books, such as traditional paper books or audiobooks.

Investigation

Give students a challenge and see if they can figure it out.

Lay out several colors of paper on a table. Have students work in teams or small groups to figure out a way to ask for a certain color of paper without talking. What are different ways to communicate what you want? Students may come up with a variety of solutions. They could hold
Hearing And Seeing Words

Perhaps the most obvious way of communicating is with words. This chapter encourages students to think about the many ways we use words to communicate. Students can then analyze how various systems work.

By the end of the topic, students will be able to:

- analyze communication systems that use words;
- determine which systems work well at a distance; and
- compare multiple solutions to the problem of how to communicate using words.
This page allows students to **obtain and communicate information** about how people have **solved the problem of communicating** with mail.

Our post office is a complicated **system** with many parts, from the tiny stamp to the massive sorting machines that route the mail. Have students brainstorm the parts of the postal system. Then watch one of these videos to **obtain and communicate more information** about how the postal system works.

- [https://www.youtube.com/watch?v=WX16-52bHvg](https://www.youtube.com/watch?v=WX16-52bHvg) (nine minutes)
- [https://www.youtube.com/watch?v=KYFtalTNzKk](https://www.youtube.com/watch?v=KYFtalTNzKk) (one and a half minutes)

More information about rocket mail can be found here:

- [https://www.youtube.com/watch?v=kjsHNAHW__A](https://www.youtube.com/watch?v=kjsHNAHW__A)

Discuss with students why some systems, such as airplane, truck, and mule delivery are still used but others are not. (Rockets were too expensive. Pigeons cannot carry much mail. It takes time to train and take care of dogs or reindeer. Animals need to rest and eat. While animals do need to rest and eat, they can deliver mail to hard-to-reach places.)
Pages 11 and 12 encourage students to **solve a communication problem** by writing a letter.

After reading this section of the book, your class could test different ways to communicate by writing letters, e-mails, texts, or using other tools. You could even video chat with another class and then write letters. Students could then **analyze** the benefits and drawbacks of each communication method.

**Math Connection**

If you measure the amount of time it takes to get a response, you could track your data in a table and then make a graph.

Example data table:

<table>
<thead>
<tr>
<th>Communication Tool</th>
<th>Time to Get a Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text</td>
<td>10 minutes</td>
</tr>
<tr>
<td>E-mail</td>
<td>1 hour</td>
</tr>
<tr>
<td>Letter</td>
<td>7 days</td>
</tr>
</tbody>
</table>

You can also use data to create a graph comparing length of time needed for different forms of communication. Discuss with students how they would represent time. Perhaps an image of a sun would represent one day. You could estimate and draw a small part of a sun to represent a small part of a day.
Chapter 3

Seeing Messages: Signs, Signals, and Codes

This chapter introduces the idea of using codes to communicate.

There is some overlap between the definitions of language, code, and signal. They are all ways of communicating. Signals tend to be shorter bits of information. A code may be a language that is understood by many (think cracking the code of reading) or it may be understood by only a few people (secret codes). All language is, in a sense, a code.

By the end of the topic, students will be able to:

• analyze communication systems that use words;
• analyze which systems work well at a distance;
• compare multiple solutions to the problem of how to communicate using signals and codes; and
• construct an evidence-based account of some of the ways codes are used to communicate.
This page emphasizes the idea that having someone receive and understand a message is essential to communication. Discuss how the structure of a communication tool affects its function. How does the design of a road sign help us communicate? Encourage students to observe road signs in their daily lives. Things to notice: What makes them easy to read and understand? (Large font, few words, pictures, symbols.) What makes them easy to see? (Large size, reflective surface.) Are there any signs they don’t understand?

This discussion may be extended to include other forms of signage and written communication.

**Math Connection**

Give students rulers and have them collect data about the size of lettering used to communicate. Have them record their data in a table. Discuss how people choose what size to make letters. (If the letters are too small, they can be hard to read. If they are too big, they may not fit in a space.)

Example data table:

<table>
<thead>
<tr>
<th>Where I Found Letters</th>
<th>Size of Letters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Book title</td>
<td>1 cm</td>
</tr>
<tr>
<td>Bulletin board</td>
<td>10 cm</td>
</tr>
</tbody>
</table>
This page introduces the idea of a picture as a signal.

A signal is something you see or hear that communicates information. Signals are generally short bits of communication. Discuss the use of signals with students. What other kinds of signals can you think of? (Quiet signals, turn signal in a car, hand signals on a bike, bells and buzzers that signal when a period of time is up, such as the ones on microwaves.)

You can explicitly address patterns and cause and effect by discussing with students what happens when a signal is used. For example, when a walk signal is present, people cross the street. When a quiet signal is used, students stop talking. (Sometimes.)

**Preconceptions**

Students in early grades may be familiar with simple patterns such as ABABAB or the stripes on a shirt. Students (and adults) may not consider patterns in the natural and designed world as patterns. To develop student understanding of the concept of patterns you may want to start with simple observations. When the bell rings at the end of the day, students leave the school. It happens in a way that is repeated and predictable. After bells ring and lights flash, a train comes through. That is a pattern. When we read the letter B, it makes a certain sound. This is a pattern, too.