

Lights On City Kit

Teacher Guide

1. Check out the lesson and activity packet below, which will be included in each student's City Kit.
2. The lessons have been adapted into Google Slides to be used in your virtual classroom as needed. Here is the link:
<https://docs.google.com/presentation/d/1i8wVkWiq0ANQtcdILk2cCXS2eSssQtJWz57O4R8vL5Q/copy?usp=sharing>
3. Ask students to watch the introduction video before tackling the kit and the lesson packet. Video can be found on YouTube: <http://bit.ly/lightsonvideo> or through Google Drive:
<https://drive.google.com/file/d/1U5ipZw6W-kiFAdT1LY5PxMogp0yr7gU4/view?usp=sharing>
4. Here is the link to a short video about Morse Code found on Youtube:
https://youtu.be/ORIDAmGf_yQ, this is also in the student version for them to access.
5. Please fill out this teacher survey about you and your student's experience with the Lights On City Kit: <http://bit.ly/TeacherLightsOnSurvey>
6. Reach out to Jessica at jcelmer@thebmi.org if you have any questions or need anything.

LIGHTS ON CITY KIT

Grade Band:	1st Grade. <i>The activities in this kit build upon each other. We recommend that students start at Lesson 1, followed by Lesson 2 and then finish with the Activity.</i>	Topic:	How does light help us to see and communicate? Students will explore several methods for communicating with light and sound, then create their own light communication box.
Background Information	<p>People communicate with each other through three main methods: light, sound, and writing. Often all three methods are used together to communicate our ideas and thoughts.</p> <p>Light can be used on its own to convey ideas either by its color, by flashing, or by being on - think of a traffic light, a turn signal in a car, or an on/off switch on a device. Light can also be combined with sound - think of television, computers, and telephones.</p>		
Materials Included in Kit:	<ul style="list-style-type: none"> • Activity packets • Flash Light • Large Push Pin • Crayons • Black construction paper • Kit box for activity 	Other Materials Needed:	<ul style="list-style-type: none"> • Pen or pencil • Tape • Piece of cardboard
Standard:	1st Grade: 1-PS4-2-4 Can you see the light?		



PROCEDURE:

1. This lesson has one packet to explore using light and sound to communicate. Review background information before you get started.
2. To learn how to get started, check out our introduction video found at this link: <http://bit.ly/lightsonvideo>
3. Start with Lesson 1 to learn about what communication is and the three main ways to communicate. Read and answer the questions in the Lesson 1 worksheet.
4. Next, explore using light to communicate with Morse Code in the Lesson 2 worksheet.
5. Then, follow the steps in Lesson 3 to create and test your own light communication device using the box from this activity kit!

MODIFICATIONS:

- Lessons 1 and 2 include photograph examples and guiding questions to help get kids looking closely and thinking. For the photographs throughout the lessons, help get kids looking closely by asking 'What do I see, think, and wonder?'. Please feel free to modify questions or build on ideas that work best for your student.
- In each of the lessons, there are discussion questions and opportunities for turn and talks/pair share for students to engage with each other on the topic.
- Lesson 3 gets seriously hands-on and tasks kids with making their own communication device using the tools in this kit. Once the device is created, test it in a dark room. If your student is inspired, create multiple communication devices from boxes in your home or classroom.

EXTENSIONS:

Email us a picture of your communication device! We'd love to see it and check out your work. You can email a snapshot to us at info@thebmi.org or share it with us on social media with the hashtag #BMICityKits.

These activities are some of the materials we are making at the museum. We would love your feedback and help! Please complete this short survey at <http://bit.ly/lightsonsurvey> or get in touch with BMI Education Manager Jessica Celmer with any thoughts at jcelmer@thebmi.org.

LESSON 1: What is communication? How do we communicate?

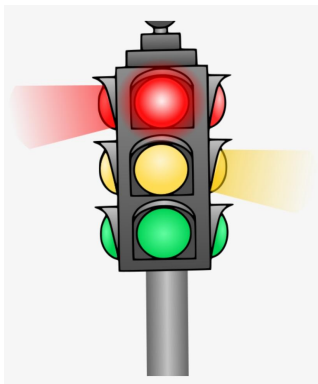
Communication means sharing information with other people. People and things communicate with each other every day. Communication includes talking, writing, reading, listening, and seeing.

Let's talk about the three main ways that people communicate. Three main ways we communicate are by sound, by the written word, and by light.

Sound

People used sound to communicate for a long, long time. We communicate with sound whenever we talk.

Circle the image that uses sound to communicate:



Can you find any items in your home that use sound to communicate?

Below are examples of items from the museum that use sound to communicate--two radios and a telephone:



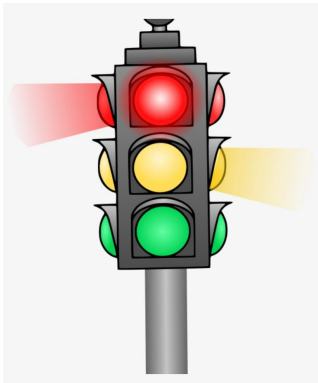
Do radios and telephones that we use today look different? Draw a radio or telephone that is found in your home in the space below.

Writing

The written word has also been used to communicate for a long time. Writing can be used to communicate in many different ways.

Think about all of the items people read every day. Do you have a favorite book that you like to read?

Circle the image that uses the written word to communicate:



Below are traffic signs and a neon sign from the museum, using words to communicate:



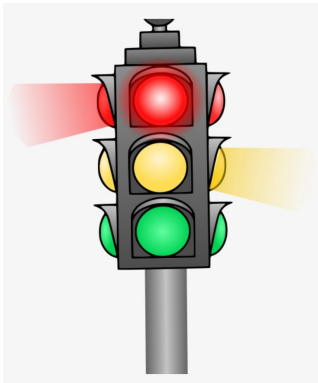
When we drive, it is important that the driver can read the sign quickly. What do you notice about the road signs above?

Light

The third way we communicate is by light. There are many ways light is used to communicate. Light can be used as a way to communicate on its own, with sound, or with words.

Machines glow to let us know they are on. Traffic lights change colors to tell us when to drive. Fire alarms flash and make loud noises when there is danger. And televisions use light and sound for people to watch.

Circle the image that uses light to communicate:



Here are two televisions from the museum--how do they look different from a TV in your home?



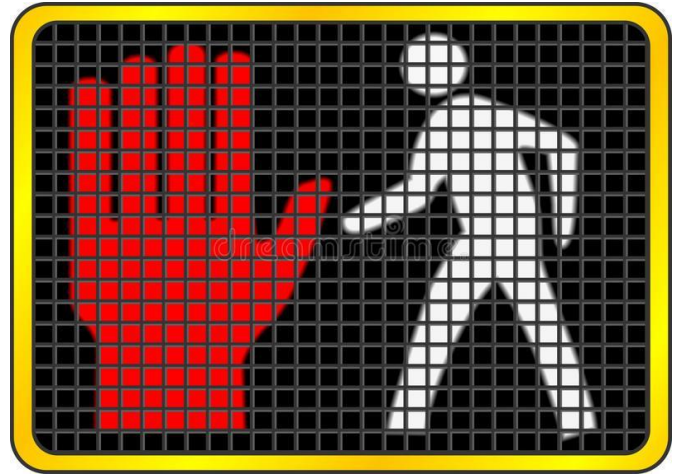
BMI Baltimore Museum OF Industry

This is a car from the museum. Cars use brake lights and turn signals to communicate to other drivers on the road. Check out a turn signal and brake lights in action at the bottom of the page.



BMI Baltimore Museum OF Industry

Take a look at the photos below for some more examples of light communication. **Circle the ones you have seen before.**





Why do you think it is important to have so many different ways to communicate? **Circle the options you think are most important.**

- For people who cannot see or hear well
- In case technology breaks
- For people who speak a different language
- For people who cannot see all colors
- When it is important to communicate quickly
- For people who cannot read
- For people who like to read more than listen
- For communicating with a lot of people at once
- For people who like to listen more than read
- Write your own answer:

LESSON 2: Using Light to Communicate

One method that can use both light and sound to communicate is Morse Code.

Morse Code communicates using a code made up of dots and dashes representing the letters of the alphabet and the numbers 1-10.

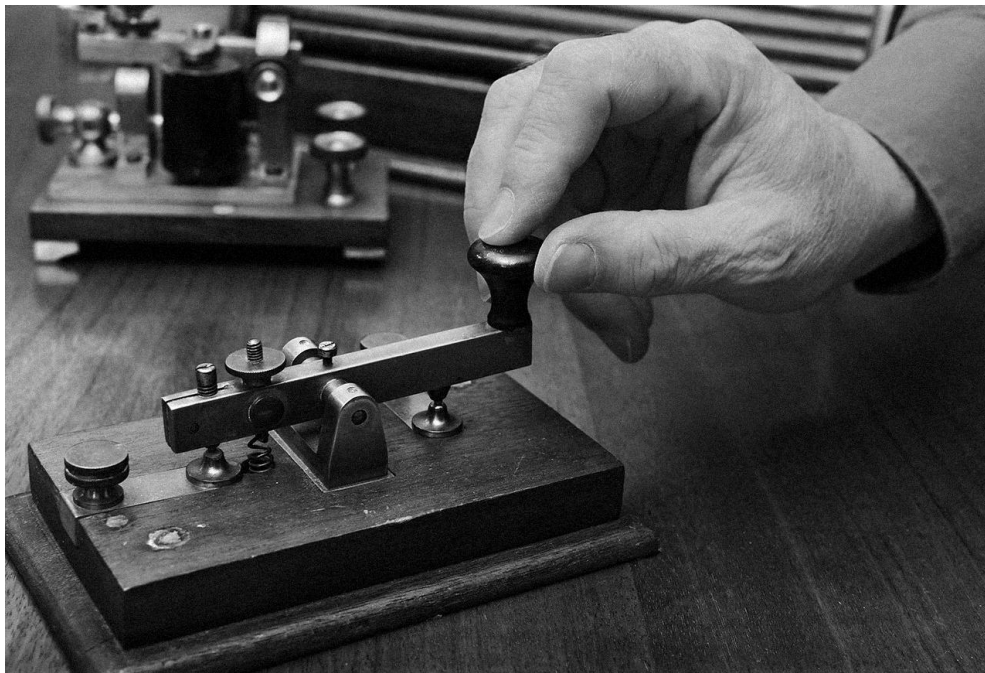
Morse Code was invented by a man called Samuel Morse over a 100 years ago. The code was used to send messages very long distances with a machine called a telegraph. The first message using Morse Code was sent by Samuel Morse from Washington DC to Baltimore! Check out this short video by The Dr. Binocs Show to learn more:

https://youtu.be/ORIDAmGf_yQ

Here is a painting of Samuel Morse with a telegraph:



A telegraph uses electricity to send messages over connected wires. This is a telegraph:



Text messages were sent using the special Morse Code alphabet. Back then, this was faster than writing a letter and mailing it.

Check out the Morse Code Alphabet:

MORSE CODE

A ● —	J ● — — —	S ● ● ●
B — ● ● ●	K — ● —	T —
C — ● — ●	L ● — — ●	U ● ● —
D — ● ●	M — —	V ● ● ● —
E ●	N — ●	W ● — —
F ● ● — ●	O — — —	X — ● ● —
G — — ●	P ● — — ●	Y — ● — —
H ● ● ● ●	Q — — ● —	Z — — ●
I ● ●	R ● — ●	

Here is an example of the word Baltimore written in Morse Code:

— ● ● ● * — * — ● ● — ● ● — — — — — — — * * *

Can you write your name in Morse Code using the dots and dashes for each letter of your first name?

Morse Code is not used very often today. We now have better technology to communicate. Only the military uses Morse Code when there is not another way to communicate.

Messages in Morse Code can be sent using sound like with the telegraph. Light can also be used to send messages in Morse Code. The light source can be flashed on and off in the pattern of the dots and dashes.

A soldier in the Navy or Coast Guard would use a light like the one below to send a message in Morse Code to another ship.



Activity:

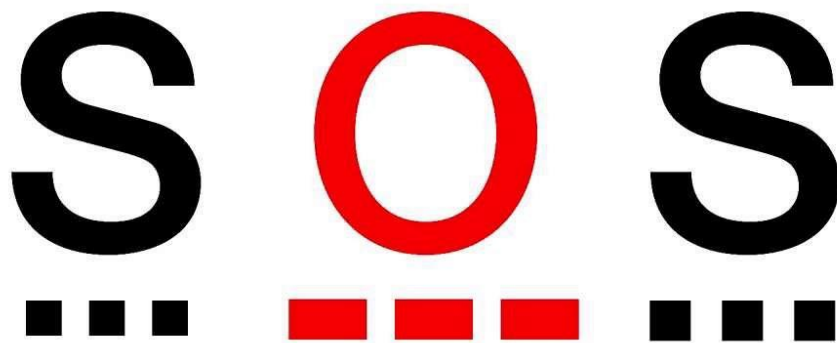
One of the most common phrases everyday people may still know in Morse Code is SOS. SOS is a signal that you need help, it means 'Save Our Souls'.

One situation where knowing SOS in Morse Code could be helpful is if you are stuck out on the water. Here is an example of a situation:

Imagine you are sailing a ship through dangerous waters. You want to communicate with someone on land far away. It is dark outside, and your radio is broken. Luckily, you have a flashlight. You can turn the light on and off to send a message in Morse Code!

Using the flashlight that came in your kit, practice Morse Code by leaving the light on for a couple of seconds for a dash and flickering it or covering the light quickly for a dot.

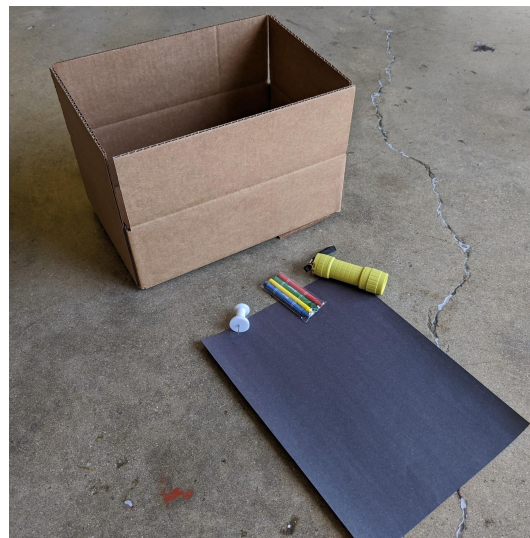
Take a look at the image below. **Can you practice signalling SOS using three quick flickers of the flashlight for S and three longer flickers for O?**



LESSON 3: Make your own Light Communication Device

In this next activity, we will be using our light communication skills in another way. You will create your own light communication device by using the following items from your kit:

- Your activity kit box
- Black construction paper
- Large push pin
- Flashlight



For our activity, imagine we are in a similar situation sailing on a ship through dangerous water, but you do not know Morse Code.

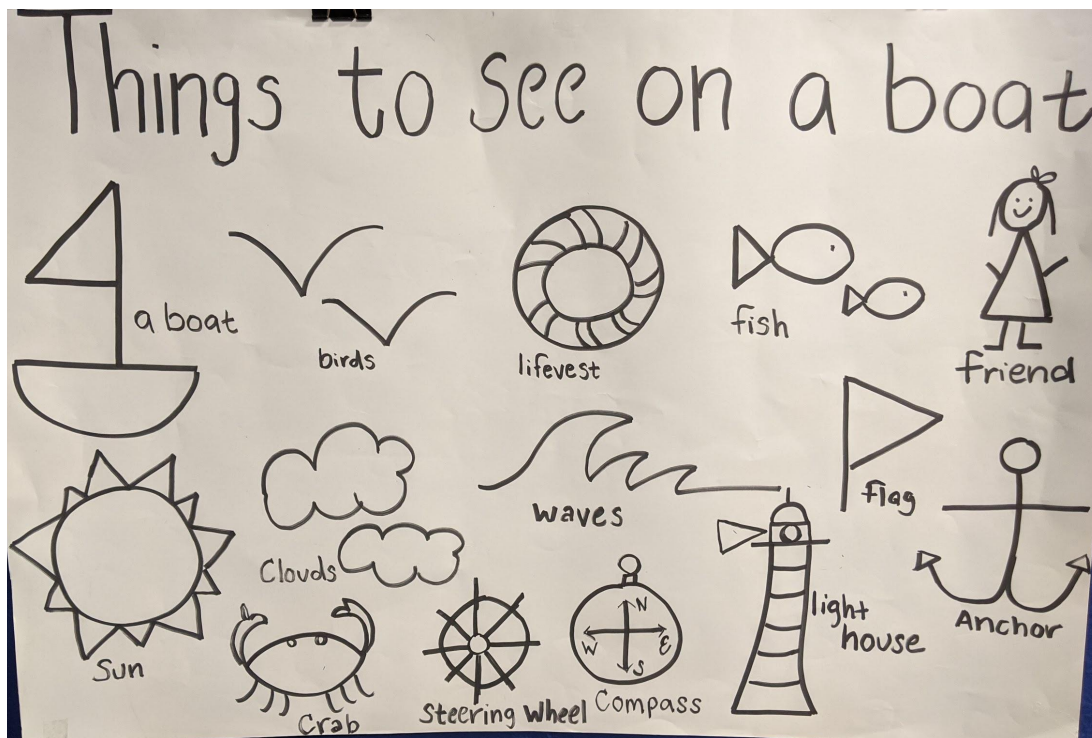
Could we build a device using light to communicate with each other?

Let's imagine that it is not an emergency, but you are trying to share something you saw while on the boat. You can share this information by creating a light communication device.

How will you know if the light communication device is working?

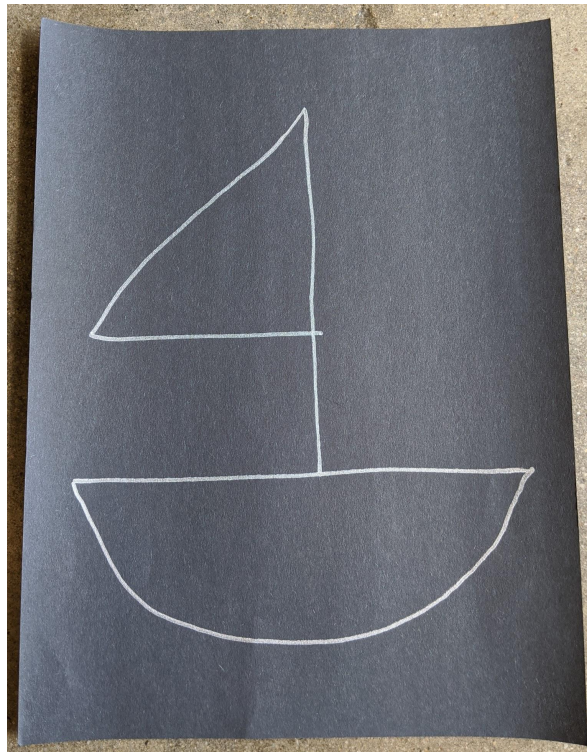
First, start by choosing what you would like to draw.

Here are some ideas of some things you may see while imagining we are at sea:

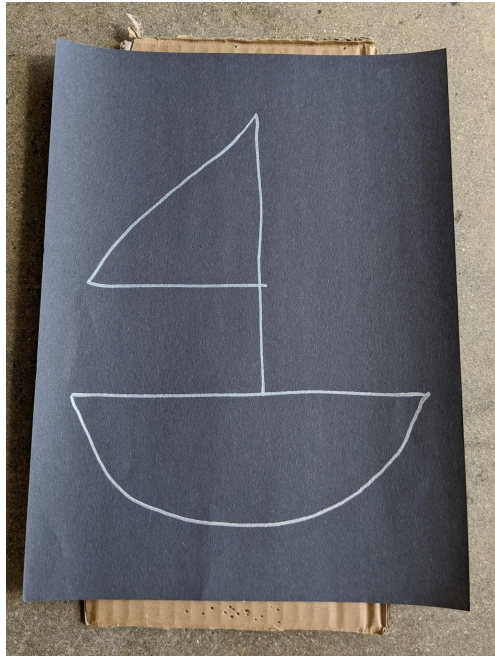


What will you choose to draw? In the space below draw a small version of what you will draw for your communication device:

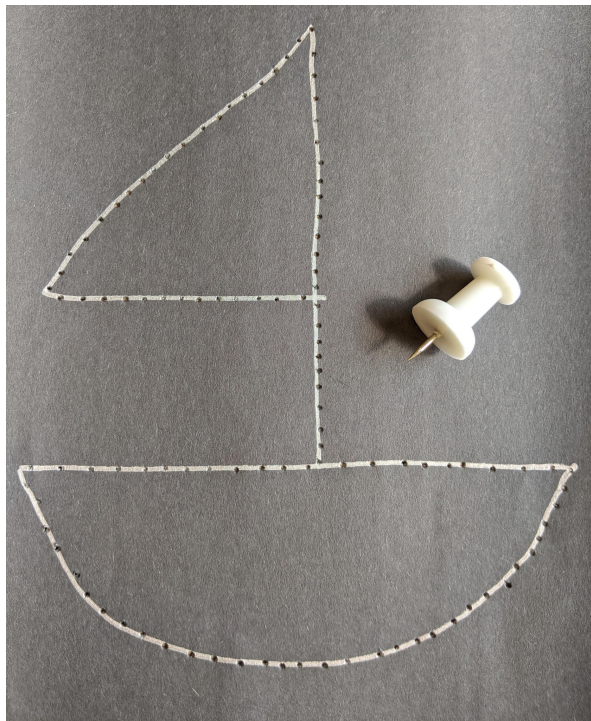
Next, draw your picture using a pencil on the sheet of black construction paper. Keep in mind, a simple drawing is best since you will be communicating it from a distance. See our example below.



After your drawing is complete, find a piece of cardboard to put under your piece of black construction paper, like the example below.



Then, take the large push pin and poke holes along the lines of your drawing. This will allow for the light to show through the holes in the paper. See our example below:

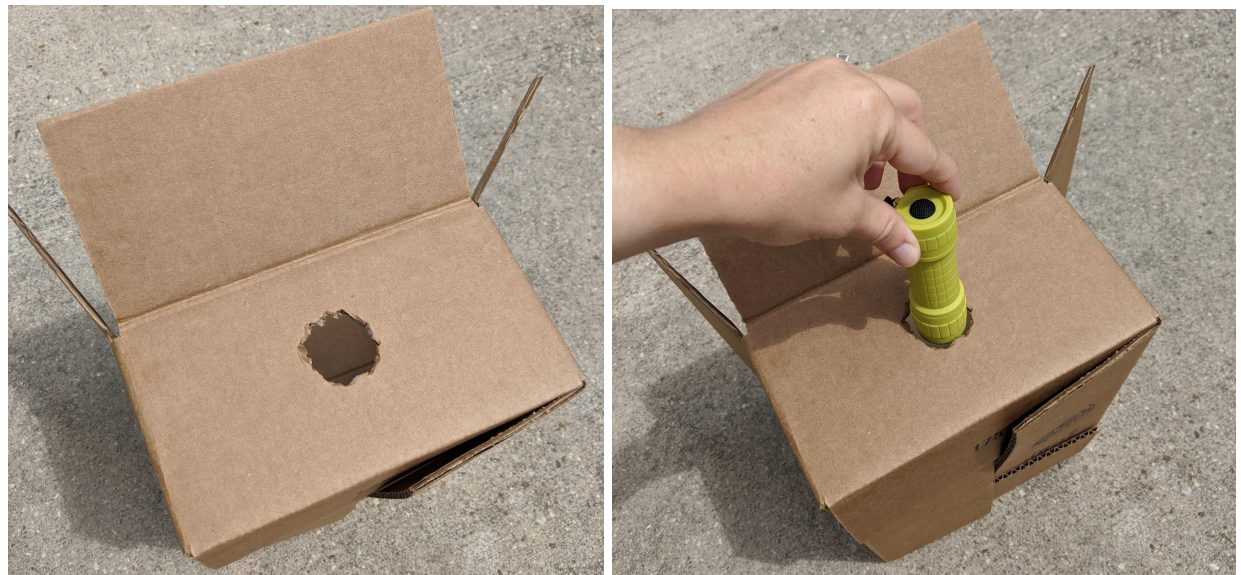


For our next step, you will need an adult to help you. A hole will need to be cut out on the short end of one side of the box.

First, take the flashlight from the kit, put the light end on one side of the box, and trace a circle outline of the light. See our example below.



Then, the adult will cut the outline of the hole out of the box safely, using a pair of scissors or a craft knife. See our example below.



Once the holes are poked along your drawing and the flashlight hole is cut in the side of your box, it is time to tape your drawing over the open area of the activity box kit.

You may need an adult to help you tape the paper. Make sure all of your materials are out of the box and the flaps of the box are open on only one side.

The paper should cover the entire open area of the box. See our example below.



Now your light communication device is ready to be tested!

Find another person to test it with, perhaps a family member or a classmate. Then, find a room that does not have many windows or that is dark when the lights are turned off.

The other person should be standing across the room from you. Turn on your flashlight and put it in the hole at the bottom of your box. Then, turn off the lights.

Did your device work? Was your friend able to understand what you were communicating without talking?

See our light communication device in action in the photo below!



If you enjoyed making this light communication device, find a box in your home and make another one to share with your friend or family member!

Send us your feedback!

Share a picture of your communication device!: #BMICityKits or
info@thebmi.org

Take a survey: <http://bit.ly/StudentLightsOnSurvey>

Check out our website to learn more: www.thebmi.org