

Light and Sound Waves

Part B

Communicating with Light and Sound

Teacher Tip

Three class sessions are allotted for this activity. Break at points that work best for your class, but consider breaking after Step 6 and again after Step 9.

1

Begin a class discussion on forms of communication by asking,

- What is communication?

Guide students to come to the understanding that communication is a way to transfer information.

2

Ask students to list different ways people communicate. Students may suggest ways such as talking, writing, by phone, by email, by motions, such as sign language, etc.

3

On the board or on chart paper, write the following words: *transmitter*, *receiver*, *code*. Explain that when any type of communication happens, there must be these three things. Ask students what they think these three words mean. Guide them to the understanding that a transmitter sends the communication, a receiver gets or receives the communication, and code is what is being communicated.

4

Walk students through an example. Ask them to identify the transmitter, receiver, and code in the following scenario:

- A teacher is talking and students are listening. (*The transmitter is the teacher; the receiver is the students; the code is the words the teacher is saying.*)

5

Ask students to think of other types of communication, and to identify the transmitter, receiver, and code for each. Below are some examples:

- Phone: transmitter = part you talk into; receiver = part you listen through; code = sound of voices
- Email: transmitter = person sending the email; receiver = person getting the email; code = words that have been typed
- Sign language: transmitter = person signing; receiver = person watching; code = motions of the signer

6

Ask students to think of ways other than talking in which light and sound could be used to communicate, or send messages. Students may suggest things such as patterns of knocking on a door, turning on and off a light to send a signal, Morse code, etc. For each example that students think of, allow them to identify the transmitter, receiver, and code.

Teacher Tip

If you need to split this activity into multiple class sessions, this is a good stopping point.

7

Tell students that they will work with a partner to design a communication device that uses light or sound. After they build it, they will use it to communicate with their partner from across the room. Pair students up, and distribute a copy of Student Activity Sheet 6: *Designing Our Communication Device* to each pair.

8

Review the steps on the activity sheet, which will guide pairs in planning out their communication devices. Let students know that all the things they have learned about sound and light during this unit will help them with their designs. To complete the design challenge, each pair will need to:

- Decide whether their device will use light or sound.
- Determine which materials they will use from the materials list.
- Draw a picture of their device.
- Develop a code for their device. For example, this could be as simple as one flash of light meaning “go” and two flashes of light meaning “stop”, or more complex depending on students’ ability and creativity.
- Get their plan approved by the teacher.
- Build their device.

9

Allow ample time for pairs to plan, build, and test their devices. As they work, circulate around the room and assist and guide pairs as needed.

10

Once all pairs have built and tested their device, allow them to present their devices to the class. This could be done either by having each pair of students demonstrate and explain their device to the class as a whole, or by having groups rotate around the room to view the communication devices of other groups in a “showcase” type fashion.

Teacher Tip

If you need to split this activity into multiple sessions, this is a good stopping point.

Science Notebook Opportunity

Once students have had a chance to build, test, and demonstrate their device for the class, ask them how they would change the design of their device so that it could communicate better. Have students write or draw a picture of what they would do to improve their design.

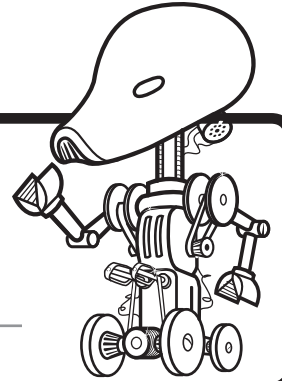
Notebook Prompt:

I could improve my communication device by _____.

Light and Sound Waves

Student Activity Sheet 6: Name _____

Designing Our Communication Device



Date: _____

Team of Scientists: _____

A) _____ **B)** _____

A. Predict

Circle One:

We will use **light** / **sound** for our communication device.

B. Choose Materials

1. Circle the materials you will use

Cardboard tube

Plastic wrap

Ruler

Flashlight

String

Tape

Flexible mirror

Small rubber bands

Cardboard box

Paper cups

Medium rubber bands

Paper plates

Drum head

Large rubber bands

Rulers

Plastic cups

Construction paper

Scissors

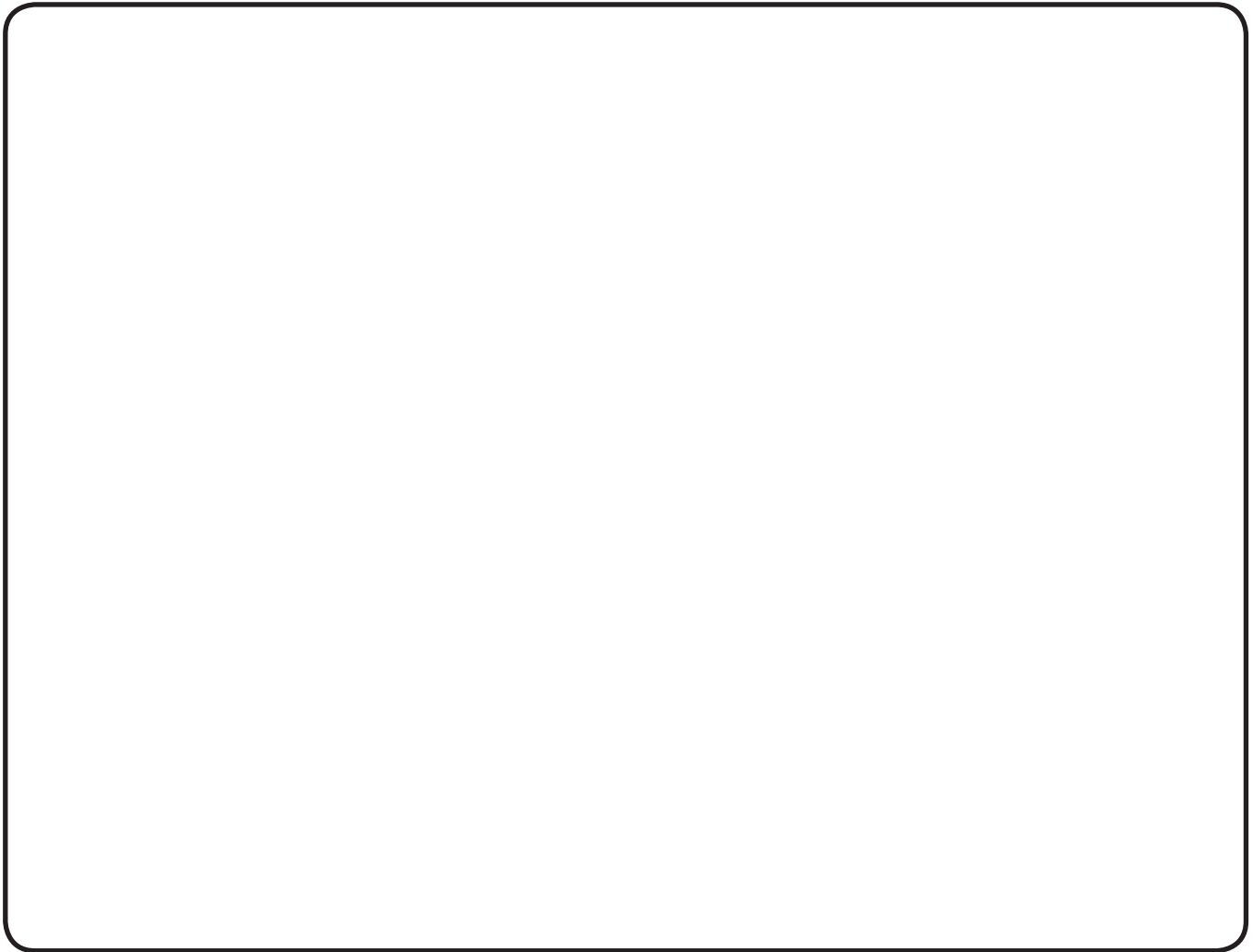
Waxed paper

Metal spoons

2. Do you need any other materials? List them here: _____

C. Plan

Draw a picture of your device and label the material you plan to use for each part.



D. Develop a Code

Write down the code that your device will use to send messages.

E. Build

1. Have your teacher review and sign to approve your design plan. _____
2. Follow your plan to build your device. Then test it to be sure it works.