Name(s)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_

|  |  | **Activity Guide - Binary Message Devices** | logo.png |
| --- | --- | --- | --- |

**Scenario:** You are going to build a device out of classroom supplies to send information to a classmate on the other side of the room. There are some basic rules and constraints:

* **Stay on your side.** You may not walk to the other side of the room.
* **No language.** That means no writing or talking to communicate.
* **No projectiles!**

##

## Challenge 1: Simple Binary Message (state A or B)

**Time Limit: 5 mins**

* Choose the **binary question** your device will be used to answer.
* **Create a device** using classroom items to send a simple binary message - state A or B.
* **Try to make it fail-proof.** Consider a few obstacles. Would it still work if…
	+ There was something in between you and your partner?
	+ You couldn’t see your partner?
	+ You were in a loud room?
	+ Your partner wasn’t paying attention?

**Record how to use your device to send a state A / B in the table below**

**Your Binary Question: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

| **Message** | **How to send with your device** |
| --- | --- |
|  **A:**  |  |
|  **B:**  |  |

**Check-in with the Teacher**

* Demonstrate the messaging systems
* Record this informationabout your device in your journal using a table similar to the example above.
* Your teacher may use the [rubric](https://docs.google.com/document/d/1sO2881fgXnLSnF29qhYbCygfKDLPz-kdL5owZofp31I/edit?usp=sharing) to assess your device.

##

##

## Challenge 2: Complex Messages (4 possible messages)

**Time Limit: 5 mins**

Not all questions have only two possible answers. Your new **challenge is to invent a way** to use your device to send an answer to a question that has **4 possible answers!** Think about these things:

* Should you modify your device?
* Should you use it in a different way?
* Should you make a new device entirely?

**You’ve got 5 minutes! GO!**

After you’ve done some testing, make a note below about how to use your device to send 4 possible messages. (enough that another person could pick up your device and use it).

| **Message** | **How to send with your device** |
| --- | --- |
|  |  |
|  |  |
|  |  |
|  |  |

## Challenge 3: Complex Messages (8 possible messages)

**Time Limit: 5 mins**

What if you wanted to ask an even more complex question with **8 possible answers?**

Just as before update your device and test it out. Record how to use your device in the table below.

| **Message** | **How to send with your device** |
| --- | --- |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

## Challenge 4: Complex Messages (16 - n possible messages)

**Time Limit: 5 mins**

Could we keep increasing the number of messages forever? Could our devices be used for questions with 16, 32, or 1,000,000 possible responses? Some things to think about...

* Our alphabet only has 26-letters, yet we can spell many words
* Our number system only has 10 digits yet we can represent many numbers
* Think back to your simple two-state device. Could you simply use it differently, rather than modifying it?

**Discuss with your partner**

* How could you use your device to respond to much more complex questions (for example one with 1,000 possible responses).
* Use the space below to **describe the system you develop** in such a way that another group could pick up your device and use it to send messages this way.

**Class Discussion**

Follow your teacher’s instructions for presenting your work to the class. You might need to:

* Describe how your system works
* Provide a simple example of your system
* Do a live demonstration of your system being used