



## Echolocation and SONAR: Sound Rather Than Sight

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In this activity students explore the idea of how it feels to use sound to locate objects and experiment with having to search for objects above and below them, not just side to side.

This activity can stand-alone or be done in correlation with the other echolocation activities.

Science Topics	Process Skills	Grade Level
Sound	Scientific Inquiry	1-2
Echolocation	Observing	
SONAR	Measuring	
Vision impairment	Comparing	
	Inferring	
	Communicating	

Time Required			
Advanced Preparation	Set-Up	Activity	Clean-Up
Gather materials	15-20 minutes	50 minutes	10-15 minutes

### Learning Goals

Students will be able to

- Explain the different experiences between locating something using only their ears vs. their eyes and ears.

### Materials

- Worksheet – 1 per student (page 4)
- Blindfolds – 1 per group
- Cotton balls
- Pencil, dry erase markers, etc
- Rulers – 1 per group

### Advanced Preparations

Please forward any questions or comments to:

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- Gather materials

## Set Up

- Prepare materials for students to collect

## Introducing the Activity

Explain that in the following lesson students will be using sound rather than sight to complete several tasks.

## Doing the Activity



### Using Sound Rather than Sight

Students will divide into groups of 3 -5. One student will wear blindfolds so that they are entirely blind (we put cotton balls under the blindfold on the eyes so students can't peek under the blindfold) and another will drop an object on the floor. The blindfolded student has to guess

- What object fell and
- Where they think the object fell (by placing their hand down directly- not by fishing!).

The students should try dropping the objects at different locations around the room, including behind the blind folded person and between their feet.

They will measure the distance between where the blindfolded person guessed and where the object actually fell.

Students do this five times and then switch positions.

As they do the experiments, they should fill out charts similar to this:

Drop	Item dropped	Guessed item	How far off	Where dropped	Where guessed
1	Pencil	Marker	36 cm	Half a meter on the right side on the floor	15 cm to the right of their feet



Have a class discussion about the following questions about the activity they just completed.

1. What location was the easiest to identify?
2. What location was the hardest?
3. Describe the mistakes for each location:
  - a. Close
  - b. Far away

- c. Medium distance
  - d. Behind the person
  - e. Table
  - f. Floor
  - g. Between the feet
4. Did you get better?
  5. How much practice do you think you'd need to be able to actually find objects?
  6. How much practice do you think you'd need to identify objects 30 meters away? (Remember By this complex system of echolocation, dolphins and whales can determine size, shape, speed, distance, direction, *and even some of the internal structure* of objects in the water.)

## Explanation

In-depth background information for teachers and interested students

People have a harder time locating objects right between their feet or directly in front or behind them. Our brains are able to detect the time delay for sound arriving at each ear. Using this delay our brain determines to which side the object fell and how far away it is. When an object is right between our feet or directly in front or behind, the sound arrives to each ear at the same time.

### **Key Terms:**

- Echolocation – A method used to detect objects by producing a specific sound and listening for its echo.
- SONAR – Sound Navigation And Ranging, is the process of listening to specific sounds to determine where objects are located.

## Optional Extensions /Modifications

### **Modifications:**

- Hard of hearing students can be the recorders/measurers

### **Optional Extensions:**

- Conduct the [Speed of Sound](#) activity (if you haven't already!)
- Complete the other activities in the Echolocation Unit

## Echolocation and SONAR

Name: \_\_\_\_\_

### Using Sound Rather than Sight.

One person wears the blindfold (do not cheat!). Stuff cotton balls under the blindfold below the eyes. The other person drops a pencil somewhere on the table or floor. The blindfolded person gets one chance to grab the object. They cannot *search* with their hands! Leave your hand where you grabbed. The other person measures how far off the grab is from the object with a ruler.

Now drop either the pencil or a pen/dry erase marker in a new spot. The blindfolded person must identify what was dropped and puts their hand where they think it is. Do this four more times.

Note: Make sure that sometimes it's behind them or between their feet!

### Person1: \_\_\_\_\_

Drop	Item dropped	Guessed item	How far off	Where dropped	Where guessed
<i>Example</i>	<i>Pencil</i>	<i>Marker</i>	<i>36 cm</i>	<i>Half a meter on the right side on the floor</i>	<i>15 cm to the right of their feet</i>
1					
2					
3					
4					
5					

### Person 2: \_\_\_\_\_

Drop	Item dropped	Guessed item	How far off	Where dropped	Where guessed
1					
2					
3					
4					
5					