



Echolocation and SONAR: Sound Rather Than Sight¹

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Students explore the idea of how it feels to use sound to locate objects and experiment with having to search for objects.

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

Time Required			
Preparation	Set-Up	Activity	Clean-Up
See advanced preparation	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	
In the Kit	Not in the kit
Sound Rather than Sight Chart (page 4) – 1 per student	1 blindfold per group 1 ruler per group Cotton balls Objects for students to identify*: pencils, dry erase markers, etc.

* Objects will be intentionally dropped, so don't choose objects that might break if dropped.

Advanced Preparations
Gather materials (see list above).

Introduce the Activity
Explain that the class will be using sound rather than sight to complete several tasks. They will need some pencils, pens, and markers to drop.

Doing the Activity
Using Sound Rather than Sight
1. Divide the students into groups of 3-5. One student will wear the blindfold. NOTE: We put cotton balls under the blindfold on the eyes so students can't peek under the blindfold.

¹ This activity can stand-alone or be done in correlation with other echolocation activities.



2. Have another student in the group drop an object on the floor. The blindfolded student has to guess:
 - a. What object fell
 - b. Where they think the object fell.
 NOTE: They should place their hand down directly to guess where the object fell- no fishing!
3. Students should try dropping the objects at different locations around the room, including behind the blindfolded person and between their feet.
4. Students should do this five times each, so that everyone has a chance to be a dropper and as a blindfolded guesser.
5. As the blindfolded student makes guesses, the student in charge of dropping the objects should fill out the chart from the worksheet (page 4).

Object Number	Item dropped	Guessed item	Location dropped	Location guessed	How far off was guess?
1	Pencil	Marker	Half a meter on the right side of the floor	15 cm to the right of their feet	36 cm

6. Have a class discussion:
 - a. What location was the easiest to identify?
 - b. What location was the hardest?
 - c. Describe the mistakes made for each location:
 - Close by
 - Far away
 - Medium distance
 - Behind the person
 - On a Table
 - On the floor
 - Between their feet
 - d. Did you get better?
 - e. How much practice do you think you'd need to be able to actually find objects?
 - f. How much practice do you think you'd need to identify object 30 meters away? (Remember, using a 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 Lesson Terminology

- 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

- Conduct the Speed of Sound activity
- Complete other activities in the Echolocation Unit

Modifications

Hard of hearing students can be the recorders/measurers

Supplemental Materials

Identification from a Distance Chart below on page 4.

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. Another person in the group drops an object somewhere on the table or floor. The blindfolded person gets one chance to try to pick up the object. They can't *search* for it with their hands! Leave your hand where you grabbed. Another person in the group needs to measure how far off the grab is from the dropped object with a ruler.

Now drop an object in a new spot. The blindfolded person must identify what was dropped and put their hand where they think it is. Do this four more times.

NOTE: make sure that sometimes the object is dropped behind them or between their feet!

Object Number	What did you drop	What did your partner guess?	Where did you drop it?	Where did your partner guess?	How far off was the guess?
Example	Pencil	Marker	Half a meter on the right side of the floor	15 cm to the right of their feet	36 cm
1					
2					
3					
4					
5					