Acoustical Society of America

Echolocation and SONAR:
Fish Finding Game
Adams, W. K.

Students explore the speed of sound by experiencing the delay for sound to reach them when they know a noise has been made. They will explore what it feels like to find objects without sight.

This activity can stand-alone or be done with other echolocation activities. We do it on the same day as the Speed of Sound activity.

Science Topics	Process Skills	Grade Level
Echoes	Observing	1-2
Echolocation	Predicting	
Speed of sound	Scientific Inquiry	
	Comparing	
	Classifying	
	Communicating	

Time Required			
Advanced Preparation	Set-Up	Activity	Clean-Up
Gather materials	15 minutes	30 minutes	10 minutes

Learning Goals

Students will be able to
- describe the limits of the size and distance that dolphins and bats can echolocate.
- Describe the limits of the size and distance that humans can locate visually.

Materials

- At least eight people
- Your imagination

Advanced Preparations

- No advanced preparation

Set Up

- No additional set up

Introducing the Activity

Explain that the class will be going outside and identify any safety concerns that may exist.

Doing the Activity

Fish Finding

Groups of 8-10 students will work together for this section. One student will be a dolphin, 3 will be fish, and 4 will be objects. Additional students will be fish or objects.

- The dolphin *must* keep their eyes closed the whole time.
- Objects are to lay, sit or stand in one place.
- Fish move around *slowly,* winding in and out of objects.

The dolphin tries to locate a fish while avoiding objects.
- The dolphin makes a sound, "beep," and any object or fish in front of the dolphin is required to respond.
  - Objects will say, "object"
  - Fish will say, "fish"
- When a fish is tagged, that fish becomes the dolphin, and the dolphin becomes a fish.

(*Optional Idea*: If the dolphin is having trouble locating fish or if the fish are misbehaving, have the fish move one step per beep or simply have them stand still)

Discuss the following questions with the students:

1. What can the dolphin do to make their job of fish finding easier?
2. Does it help if they beep more often?

Explanation

In-depth background information for teachers and interested students
Key Terms:

- Echoes – Reflections or repetitions of sound waves. Echoes can be produced and heard by clapping hands or shouting in a large empty room with hard walls or in a cave for example.
- Echolocation – A method used to detect objects by producing a specific sound and listening for its echo.
- Speed of Sound – The speed at which sound travels. This is very important for scientists who study sound. In air sound travels 343 meters in 1 second (767 miles per hour), but in water sound travels 1500 meters in 1 second (3350 miles per hour). Compare these speeds to cars traveling on the highway at 65 miles per hour.
- SONAR – Sound Navigation And Ranging, is the process of listening to specific sounds to determine where objects are located.

Optional Extensions /Modifications

Modifications:

Finding Fish
- If the dolphin is having trouble locating fish or if the fish are misbehaving, have the fish move one step per beep or simply have them stand still
- This activity provides a role for every student.

Optional Extensions:
- If there is extra time, students can switch roles in the Fish finding game and play from a new perspective.
- Complete the Sound Not Sight activity (if you haven't already!)
- Complete the rest of the Echolocation Unit.