Echolocation and SONAR[1]

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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.

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

Time Required			
Preparation	**Set-Up**	**Activity**	**Clean-Up**
None	None	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

In the Kit	Not in the kit	Optional
	At least 8 people A large open space Your imagination!	

Introduce the Activity

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

Doing the Activity

Fish Finding Game

1. Groups of 8-10 students will work together for this activity. One student will be a dolphin, 3 will be fish, and the rest will be 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.

[1] 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.

2. The dolphin tries to locate 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 a dolphin, and the dolphin becomes a fish.

NOTE: If the dolphin is having trouble locating fish, or if the fish are misbehaving, have the fish move one step per beep or have them stand still.

3. Discuss the following questions with the students:
    A. What can the dolphin do to make their job of fish finding easier?
    B. Does it help if they beep more often?

Explanation

In-depth background information for teachers and interested students.

Key Lesson Terminology

- 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 scientist 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.