**Echolocation and SONAR[[1]](#footnote-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.

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

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| **Time Required** |
| **Preparation** | **Set-Up** | **Activity** | **Clean-Up** |
| None | None | 30 minutes | 10 minutes |

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

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

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| **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.
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| 1. 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. |
| 1. Discuss the following questions with the students:
2. What can the dolphin do to make their job of fish finding easier?
3. Does it help if they beep more often?
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| **Explanation** |
| In-depth background information for teachers and interested students. |
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| 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.
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| * Echolocation – a method used to detect objects by producing a specific sound and listening for its echo.
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| * 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.
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| * SONAR – Sound Navigation And Ranging, is the process of listening to specific sounds to determine where objects are located.
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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. [↑](#footnote-ref-1)