

Sound Reasoning

Use your math skills to understand dolphin echolocation.

Dolphins use echolocation to find their way through murky waters. They do this by emitting a clicking sound and listening for an echo. The direction and delay of the echo give the dolphins information about what objects are nearby and where the objects are located.

1. Sound travels about 1530 m/s in sea water. How many times faster does sound travel in sea water than in air? (The speed of sound in air at 25°C is about 345 m/s.)

2. A dolphin emits a click that is reflected off an object. If it takes 0.2 seconds for the sound to be sent and to come back, how far away is the object?

3. How long would it take the sound to be sent and returned from the same object in air?

4. Assume that the speed of sound decreases by 6 m/s for every 10°C decrease in water temperature. If a dolphin swam to the Arctic Ocean, where the water is about 5°C, how would the dolphin's ability to estimate the distance to an object be affected?
