

ECHOLOCATION AND COMMUNICATION

9. Sound waves

Objective: Students will understand how sound waves travel through different media.

Level: 4-7

Background: Whales produce sound for communicating among themselves. Sounds may communicate the location of the caller, the state of excitement or physical condition, who the caller is or what group it belongs to. These vocalizations are different from the sounds used in echolocation.

Scientists use microphones called hydrophones to record sounds underwater. Using hydrophones, whale researchers have recorded vocalizations of a number of species of whales. Killer Whale researchers have discovered that certain vocalizations occur most often during playful activities, while other calls dominate during foraging or birth.

Of all baleen whale vocalizations, those of the Humpback have been studied the most. The Humpback Whale produces many different types of sounds including, moans, groans, squeals, chirps and clicks. During breeding season some of these sounds are arranged into complex sequences called songs. It was found that a solitary male Humpback song can travel several hundred kilometres under ideal conditions. Humpback songs have a number of themes, usually six, that are sung in order and repeated monotonously for long periods of time. Distinct dialects with subtle differences occur in different ocean basins and songs change annually within each population. There are several theories about the function of these songs but the predominant thought is that they are sung by mature males on the breeding grounds.

Materials: tuning forks, wood, metal, cloth, water, etc.

Procedure:

- 1) Set a tuning fork in motion and place it on different surfaces such as wood, metal and cloth, or in water. If you have more than one tuning fork you can test several materials simultaneously.
- 2) Have the students explain why sounds are different on different surfaces. (They will not hear sounds in the water, but they will see waves).
- 3) Have students determine how far from its place of origin they can hear the sound.
- 4) Suggest that the next time students are in a swimming pool they hold their breath under water and listen to the noises they hear. If your class has swimming lessons, this could be done as a group activity with some people making sounds under water while others listen. Surface noises will be muted, but sounds in the water will be more distinct.