

Lesson 8.2

Echolocation: Where's That Sound?

NEW BEDFORD WHALING MUSEUM

WHALES

GIANTS OF THE OCEAN



Echolocation

- Sound waves can reflect or bounce off objects in the medium (air, liquid, solid) in which they are traveling.
- Depending on how long it takes the sound to reach their ears and the direction it comes from, these animals can determine the location of the object.
- For example, when a sperm whale is hunting for prey, such as squid, they send clicks from their heads. Those clicks will travel through the water and may bounce off a squid.
- Bats use the same process when they fly and hunt for prey items, such as moths.
- The predators will take the information from these reflected sounds and figure out where the prey or the obstacle is.
- The process of using sound to locate prey and to navigate is called echolocation.
- This process is especially important for animals that hunt and navigate in the dark.
- Toothed whales find their food in water that is deeper than where baleen whales hunt. This is why they have evolved to use echolocation.

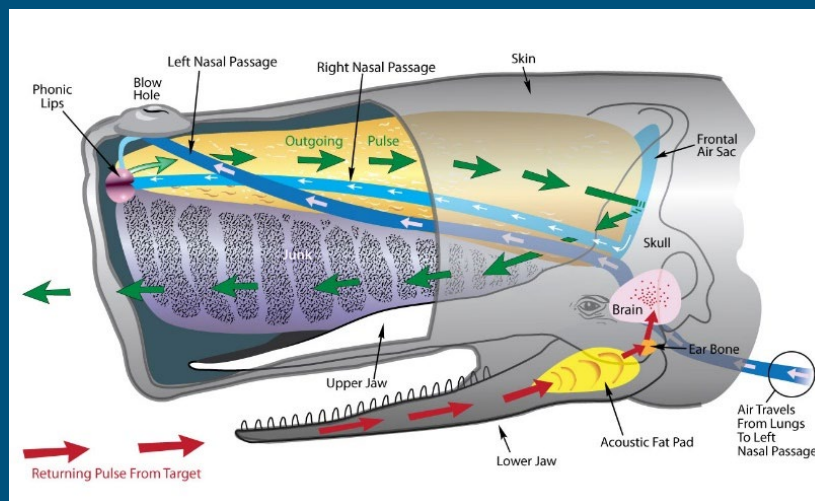
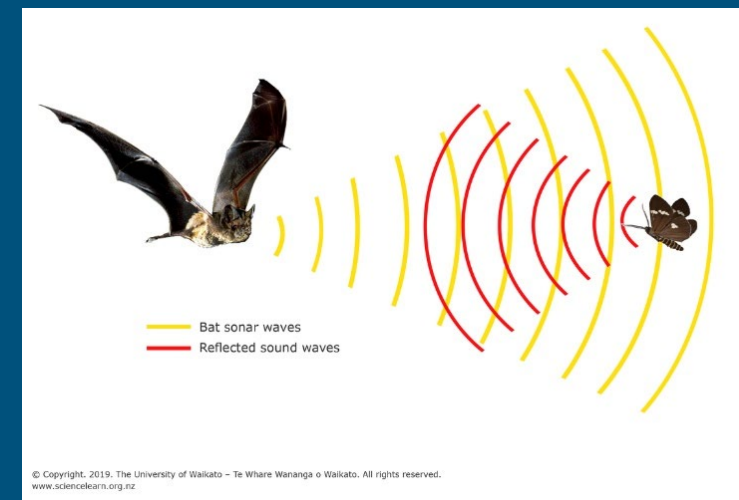
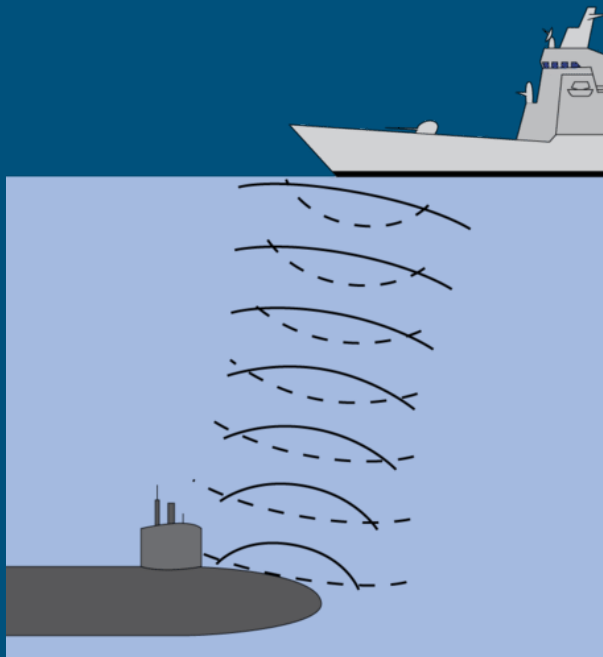


Illustration by David Blanchette,
property of NBWM.



Echolocation

- Humans have taken these concepts and created mechanical methods of using them.
- We call this SONAR (Sound Navigation Ranging)
- Some SONAR has important military uses.
- SONAR is also used in oceanographic and fisheries research.
- Recreational and commercial fishing is aided by use of fish finders.



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TOOLS OF THE TRADE
How NOAA Scientists Map What Lies Beneath the Waves

WHILE SCIENTISTS USE DIFFERENT METHODS TO MAP WHAT LIES BENEATH THE WAVES, TWO OF THE MOST IMPORTANT TOOLS ARE SONAR AND VIDEO.

- 1 SHIP Multibeam & Fish Sonar**
Some NOAA ships are equipped with high-tech sonar systems that use sound to efficiently map large swaths of the ocean. Multibeam sonar is used to 'paint the seafloor with sound' to create highly detailed maps. Scientific grade fish sonar is used to map where fish and other objects are located in the water column.
- 2 GLIDER Autonomous Ocean 'Robots' Collect Data**
Gliders are used for many things, from collecting ocean characteristics such as temperature, to finding where fish are spawning by recording underwater sounds. Once these torpedo-shaped vehicles are launched, they operate independently and report their findings back to the ship.
- 3 ROV Hi-Def Video**
While sound (sonar) is a great way to create detailed underwater maps of large areas of the ocean, remotely operated vehicles (ROVs) are used to take a closer look at what lies below. ROVs equipped with mounted cameras help scientists confirm fish species, find out if corals are healthy, and identify specific objects.

HOW IS THIS INFORMATION USED?
The maps created with these tools allow people to visualize the seafloor, coral reef ecosystems, and fish populations in amazing detail. These data are used to update nautical charts, to help preserve and protect underwater ecosystems, and to simply better understand what lies beneath the waves.

oceanservice.noaa.gov