

Ocean Bottoms

Teacher's Guide

The Initial View (Introducing the Activity)

The amount of paper mache paste and newspaper can be adjusted logically to fit the size of boxes you use. Caution should be advised while poking holes in the lid. It will be easy to bend the lid while doing the poking, so encourage them to be gentle! Someone else will be getting their box to use, and they will be using another's!!! The *Golden Rule* applies here!

Take a Deeper View! (More Science)

The huge surface of the **Ocean's** floor has not been completely **Mapped** by personal viewing like much of the **Crust** has been. One of the long range methods used for mapping from the ocean's surface is a device called **SONAR**. This is an acronym for **S**ound **N**avigation **A**nd **R**anging. This device uses high **Energy** Sound waves which are **Transmitted** through the water. When these **Waves** hit something they bounce back or are **Reflected**. They are used to find underwater objects, determine depths, and were especially designed to find submarines! The time it takes from leaving the device to when it returns as an **Echo** is measured. This along with a known **Speed of Sound** at that **Temperature** and **Salinity** (saltiness) of water is used to calculate the distance to the object or ocean bottom! Whales, bats and dolphins are just a few forms of life which use reflected sound waves to find food, direction, and maybe even mates! The police officer also uses the same concept with **RADAR**, **R**adio **D**irection **A**nd **R**anging, for checking car speed. Radar uses **Light** waves rather than **Sound** waves. A side note; Sonar has never been used to give a speeding ticket (unless you're in a submarine) but radar can!

More and Bigger Views! (Additional Classroom Ideas)

1. Check out WWII history and prior to learn more about SONAR and even earlier forms of sound location! How were these used to detect, locate, and help destroy submarines?
2. Research how many important ocean resources are located on the bottom. Which are being removed? What are some problems associated with removing these resources?
3. Most TV, stereo, or other remotes work by sending out a specific form of light called **Infrared**, normally called **Heat Waves**. (Nobody's been fried walking between the TV and the remote because the **Energy** level is so low!) How many remote controlled devices can the students identify? Find out more about remotes, how they work and their security codes.
4. Some remotes use a **Radio Wave** to send out their signal. All remote controlled devices require a **Receiver** which is sensitive to its particular signal! (garage openers!)
5. What forms of waves are our sense organs sensitive to? (**Light**, **Heat**, and **Sound**)
6. Bring a remote controlled airplane to class, use it to learn about flight and remotes.
7. Study the WWII *Battle of the Atlantic*. Find out how close the Allies were to losing due to German submarines. Look up Allied and Axis submarines and anti-submarine methods!
8. Looking at something from a long ways away with a remote controlled device is called **Remote Sensing**. Learn more about NASA's remote sensing space programs.
9. Surgical testing without cutting the body open is called **Non-Invasive**. Research these methods from a local hospital and what forms of **Energy** they use.
10. Make a bulletin board of all the different kinds of waves used to explore space, oceans, and even our bodies!