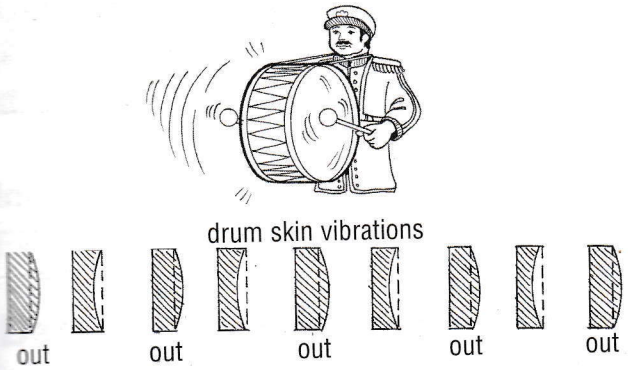
Sound

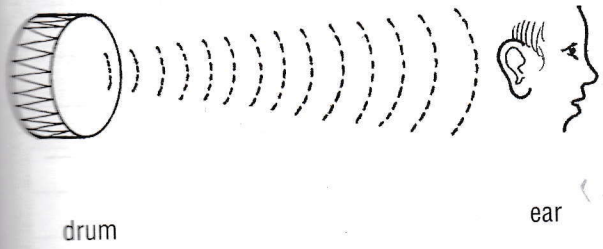
1. How Sound Travels

All sounds come from something which is vibrating. When someone hits a drum, the skin of the drum vibrates. This vibration consists of the skin of the drum spinning outwards and inwards until the movement finally goes away.



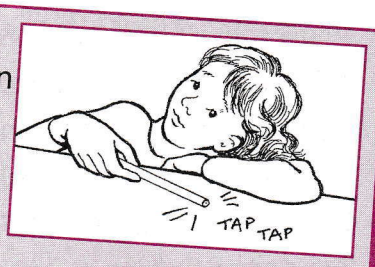
The drum is surrounded by air and each movement of the drum has an effect on the air around it. When the drum vibrates it causes the air beside it to vibrate. When the vibrating air reaches your ear you hear the drum sound.

This sounds like a very long process but we must remember that sound travels at 331 m per second. In water, sound travels at 1,430 m per second.



The movement or vibration from the drum to our eardrum follows a wave pattern. However, unlike waves in the sea, it is not an up and down wave and it is not visible. Our only proof of the existence of such sound waves is the sound we actually hear.

Try this!



Tap your pencil on the table.
Can you hear anything?
In this case the table and the pencil vibrate. You can't see them vibrating because the amount of movement is so slight but it is enough to set up a sound wave of vibrating air, which causes your eardrum to vibrate and enables you to hear the sound of the tapping pencil.

Soundwaves can be illustrated as follows:

regular wave

This is a regular wave and could be a musical note. However, if you bang a book on the desk you could get an irregular wave.

irregular wave

A piece of laboratory equipment used for examining wave patterns is called an **oscilloscope**.

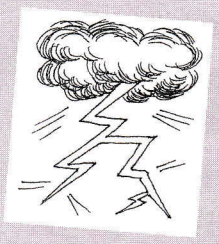
Sound travels better through some types of material than others because they carry vibrations better. These include water and other liquids and hard materials such as metals or wood. Soft materials, like cotton wool, soak up the sound. Sound does not travel though a **vacuum**.

Echoes

If you stand in an empty room and shout, you will hear the sound of your voice being repeated. This is called an **echo** and it is caused by the sound of your voice bouncing off, or being reflected by, the walls.

Fishermen in small boats have often used this to find out how far they are from cliffs in poor weather conditions. By giving a shout and counting the seconds until the echo returned they could estimate their distance. (A sound takes approximately five seconds to cover one mile.)

Echo sounding is a process used for measuring the depth of the sea or the location of a shoal of fish. A sound wave is sent into the sea and the required information is calculated by measuring the time taken for the echo to return.



Did you know that lightning causes thunder? Lightning is very hot and heats the air around it, which then expands. As it expands, it pushes away the air from near the flash of lightning, very quickly. This makes the loud noise we know as thunder.

Activities

1. **A.** What causes sound? _____

   B. At what speed does sound travel? _____

   C. In what ways do sound waves differ from sea waves? _____

   _____

   D. Draw an illustration of the following:

   (a) the sound wave created by a musical note

   (b) the sound wave created when you bang a wooden door.

   musical note | wooden door

   E. What is an oscilloscope? _____

   F. List three materials through which sound travels well. _____

   G. What causes an echo? _____

   H. How have fishermen used this? _____

   _____

   I. What is echo sounding? _____

   J. What causes thunder? _____

2. **A.** Complete the following:

   (a) An echo is _____

   (b) An oscilloscope is _____

   (c) _____ is a good transmitter of sound.

   B. Unscramble these sound words:

   TIBAVIRNO_____ OCEH _____ AEVW _____