



# Year 4 – Sound

The softer the material, the more sound will be absorbed by it.

Sound energy can travel from particle to particle more easily in solids because the vibrating particles are closer together.

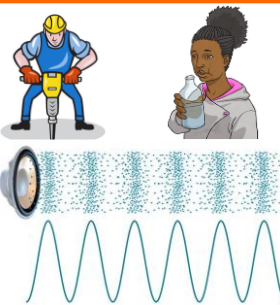
Echoes are caused when sound waves bounce off surfaces

## Making or hearing sound

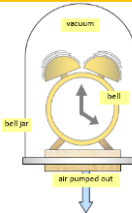
A sound happens when something **vibrates**. E.g. a drill hitting the ground or, less obviously, air **vibrating** in a bottle to produce noise.

Sounds can travel through **solids, liquids and gases**. Sounds travels as a wave, vibrating the particles of the medium it is in.

Sound cannot travel through a vacuum because there are no particles to transit the vibrations.



The fact that sound cannot travel through a vacuum was first demonstrated in the 1600s by a scientist named **Robert Boyle**. Boyle placed a ticking clock in a sealed glass jar. The clock could be heard ticking through the air and glass of the jar. Then Boyle pumped the air out of the jar. The clock was still ticking, but the ticking sound could no longer be heard because the sound couldn't travel away from the clock without air particles to pass the sound energy along.

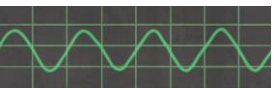
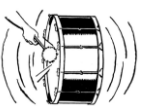


## Vital Vocabulary – learn these words and their definitions

Key Word	Definition
<b>vibrate</b>	to move continuously and quickly forwards and backwards
<b>volume</b>	how loud or quiet a sound is
<b>pitch</b>	how high or low a sound is
<b>sound waves</b>	invisible waves that travel through air, water and objects as vibrations
<b>transmit</b>	to cause (light, heat, sound etc) to pass
<b>decibel</b>	the unit for measuring the loudness of sounds
<b>sound insulation</b>	the ability of building elements or structures to reduce sound transmission

## Changing volume

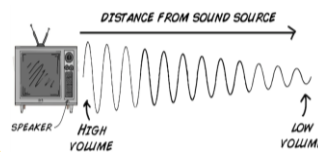
The **more energy** a vibration has, the **louder** the sound.



Large energy = loud sound

Little energy = quiet or soft sound

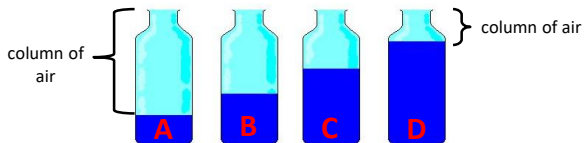
The **further away** from the source, the **quieter** the sound.



## Changing pitch

The **shorter** the vibrating object, the higher the pitch.

The **larger** the vibrating object, the lower the pitch.



Bottle D will give the **highest note** because the vibrating column of air is the **shortest**.

high pitch



low pitch



The double base has **longer strings** than the violin so it produces **lower notes** than the violin.

## How we hear

Vibrating air hits our ear drums and makes them vibrate. This is how we hear sound. The vibrations are picked up by our brains which decides what the sound is.

Ear defenders can be worn to protect the ears from loud sounds that could damage the eardrum.

They contain foam to absorb sound waves

