



Science Knowledge Organiser:

Science unit: Sound

Year group: Y4



Overview: What will we learn in this unit?



In this unit, pupils should be taught to

Identify how sounds are made, associating some of them with something vibrating

Recognise that vibrations from sounds travel through a medium to the ear

Find patterns between the pitch of a sound and features of the object that produced it

Find patterns between the volume of a sound and the strength of the vibrations that produced it

Recognise that sounds get fainter as the distance from the sound source increases.



Key vocabulary

Scientific language



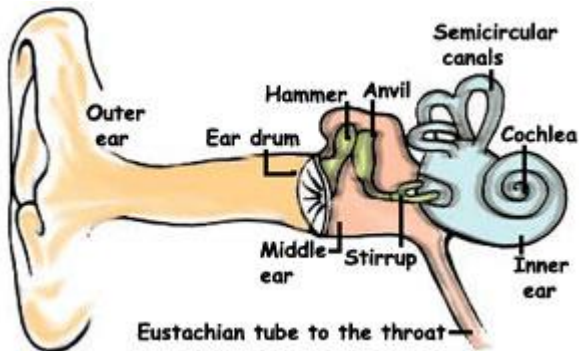
Vibrates	Move continuously very quickly
Pitch	How high or low a sound is
Volume	How loud or quiet a sound is
Obvious	Clear and easily seen or understood
Material	What something is made from
Medium	The material something (sound) goes through

Key knowledge

Sound

What is a sound?	A noise that can be heard by someone.
How is a sound made?	A sound happens when something vibrates. This can be obvious: For example: when a drill is hitting the ground repeatedly which causes a loud noise This can be less obvious: when air in a bottle vibrates to produce a noise

So how do we hear sounds?

How do sounds travel?	Sounds can travel in two ways: - Through the air - like from a TV speaker across the room to your ears - Through an object/material - like stone, brick, water and glass. If someone moves furniture upstairs, the sound can travel through the floor to you.
How do we hear these vibrations?	- The vibrating air hits our ear drums and makes them vibrate.  - The vibration is picked up by our brains and converted to sounds we recognise.

Changing sounds

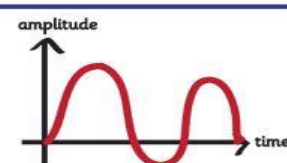
Volume	- The closer we are to the sound source, the louder the sound will appear to us. - The further away we are from the sound source, the quieter the sound will appear. - The more energy in the initial vibration the louder the sound will be. For example, if you tap a hammer on a desk the sound will be quiet, but if you smash a hammer on a desk it would be much louder.
Pitch	The pitch is how high or low a sound is. - The shorter the vibrating object, the higher the pitch of the sound. - The longer the vibrating object, the lower the pitch of the sound. With string instruments, the tighter the string, the higher the pitch of the sound.

Diagrams and symbols

Volume or loudness of sounds / Pitch of sounds



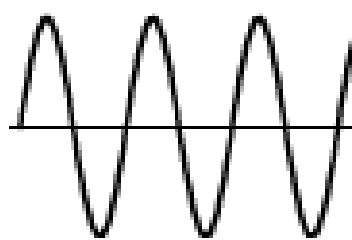
The loudness of a sound depends on how big the vibrations are. Beating the drum harder causes larger vibrations and a louder sound.



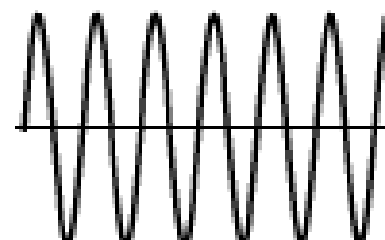
The sound is louder closer to the sound source.

The sound is fainter further away from the sound source.

The amplitude of a sound wave tells us how big the vibration is.



Lower Pitch



Higher Pitch

Possible experiences / research opportunities

- Investigating how sounds are made – dried peas on a drum, tuning fork in water, strings on a guitar – seeing vibrations
- Investigating patterns between pitch and features that produced it / volume and strength of vibration that produced it.
- Making musical instruments using knowledge of how sounds are made and how they change in pitch and volume
- Investigating what happens to the volume of sound when distance from the sound source increases
- Investigating materials that absorb sound – write to a band to give advice about soundproofing a studio; design the best ear defenders



Key skills including Working Scientifically



To set up practical enquiries and comparative tests

Make systematic observations and record findings

Identify differences and changes related to scientific processes (looking for patterns in changes to pitch and volume)

Record findings and use results to draw conclusions eg what happens to sounds when the distance from the source of sound increases)

Use scientific evidence to answer questions (understanding how we hear / how sounds reach our ears)

Curriculum links



Links to

- Music – understanding how different instruments make sounds and changes in pitch and volume
- DT – designing and making instruments.
- English – answering questions from information texts
- Maths – drawing graphs to show patterns investigated.

Useful websites:

<https://www.bbc.com> <https://stem.org.uk> sigmascience.com

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Loudness

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The loudness of a sound depends on how big the vibrations are.

Beating the drum harder causes larger vibrations and a louder sound.



The diagram shows a human ear on the left and a drum on the right. Between them are three vertical lines of increasing height, representing the amplitude of sound vibrations. The drum is a red drum with a yellow head and a stick resting on it.

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Pitch

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We can measure sound waves by counting the number of vibrations that occur per second.

This value is called the *frequency* of the sound wave. It tells us how fast something is vibrating.



Click to hear

A high frequency produces a high-pitched sound.

A small mouse cursor is positioned over the text "A high frequency produces a high-pitched sound."