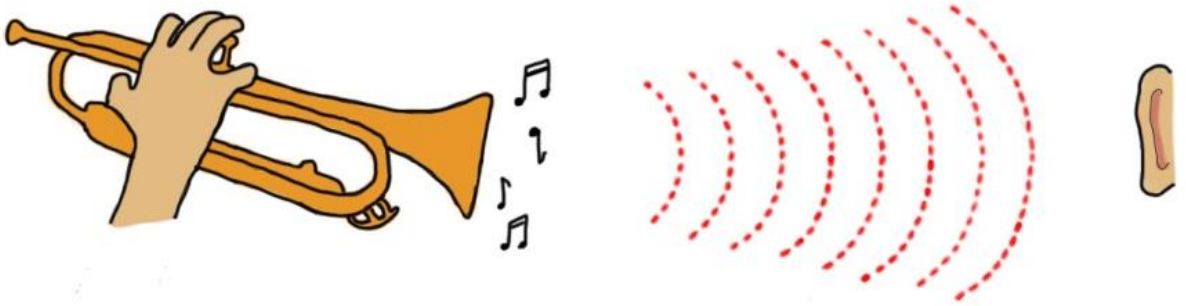
Sound and Hearing

What is Sound?

Sound is a form of energy. A sound is made when something vibrates, making the air around vibrate. These air vibrations (sound waves) then enter our ears and so we are able to hear sounds. This is why sound cannot be heard in a vacuum because there is no air to vibrate. Sound waves radiate from the source of the sound in all directions and can bend round corners and obstacles.

FUN FACT!
There is no sound in space because there is no air!

Sound waves travelling from a trumpet to the ear.



Sound can travel through solids, liquids and gases, although it travels through some materials better than others. For example, in air sound travels at 340 metres per second but in water it travels at 1500 metres per second. This is why divers can hear better under water! Sound travels even more quickly through metal, for instance, through a metal pipe.

FUN FACT!
A whisper would measure about 20 dB, whereas a jet plane would be about 135 dB.

How can Sounds be Different?

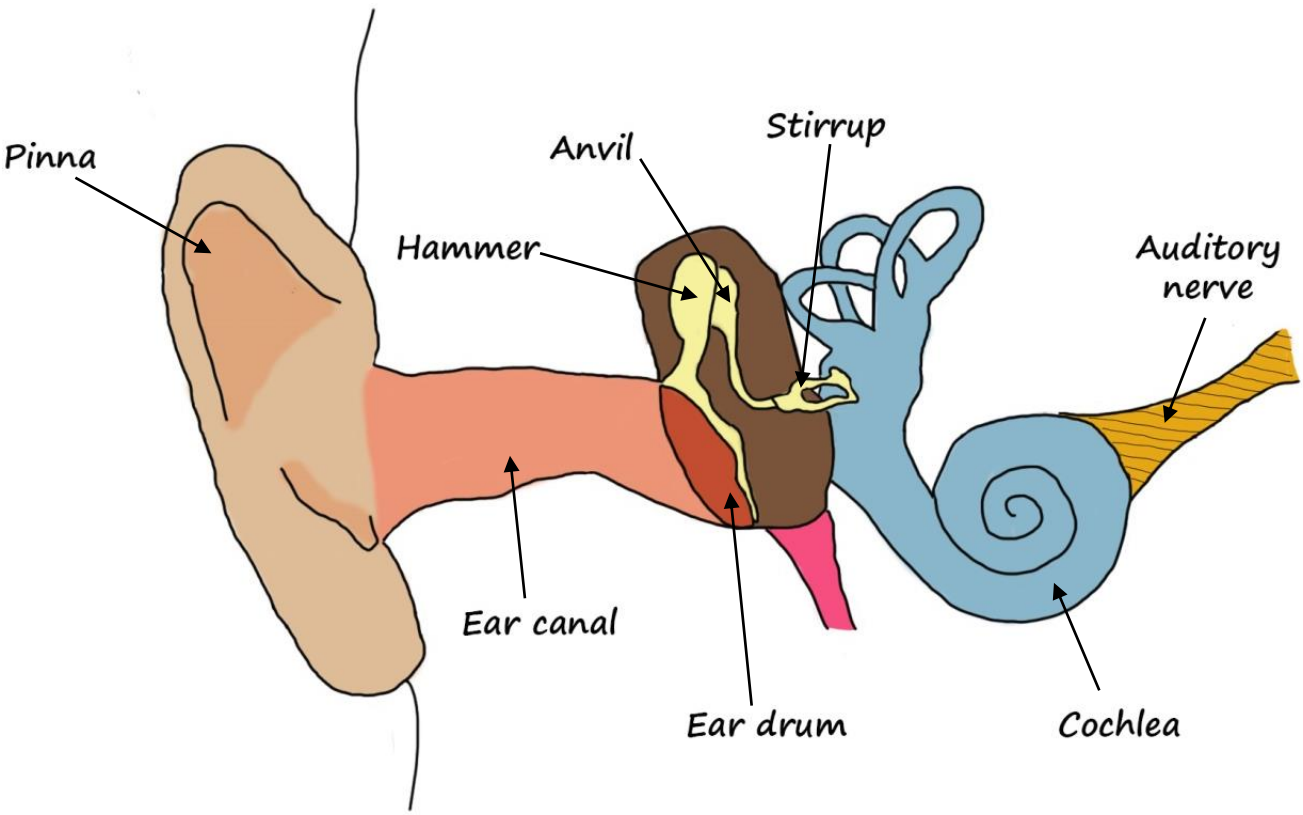
Sounds can be different as different sounds have different frequencies. The frequency is the number of vibrations produced in a second. This is more commonly known as pitch. The pitch of sounds can vary, for example, musical instruments can play high and low sounds. The faster the vibrations, the higher the sound. Sound can also be different volumes and this can be measured in decibels (dB).

How Do We Hear Sound?

Firstly, sound waves are gathered by the outer ear called the pinna. Then the vibrations travel along the ear canal which connects the outer ear to the middle ear. This makes the ear drum (a thin layer of skin) vibrate. There are three tiny bones located next to the ear drum called the hammer, anvil and stirrup. These bones then amplify the vibrations causing ripples through the fluid in the cochlea. The cochlea is a snail shaped chamber filled with liquid and is lined with tiny hairs and nerve endings. Next, the nerve endings turn these vibrations into electrical signals and send them to the brain via the auditory nerve. Finally, the brain interprets these signals as sound.

FUN FACT!
The stirrup is the smallest bone in the human body.

Anatomy of the human ear



Why is Sound Important?

Sound is one of the five senses and is important to humans and animals as a way of communication, for example, humans speaking to each other or dogs barking. It is also very helpful in alerting us to potential dangers, such as, oncoming vehicles when crossing the road.

Sound and Hearing – Oral Teacher Questions

Which phrase used in the text means the same as 'air vibrations'? (AF2) Sound waves.

When is sound made? (AF2) When something vibrates causing sound waves which enter our ears.

Which material does sound travel fastest through? (AF2/AF3) Metal/solids

Can you estimate how many decibels a dog's bark would be? (AF3) Anything between 50 and 100 dB.

How many subheadings are there? (AF4) 4

Why can you not hear in space? (AF2) There is no air to vibrate.

Why do you think the writer has put some facts in blue boxes? (AF6) To make them stand out.

How many captions are there? (AF4) 2

What are the names of the three bones in the middle ear? (AF2) Hammer, anvil, stirrup.

Why do you think the writer described the cochlea as 'snail like'? (AF5) The cochlea is shaped like a snail's shell.

Find three time openers/connectives that the writer used to explain how we hear. (AF2/AF5) Firstly, then, next, finally.

The writer gives some examples of communication. Can you think of some other ways of communicating? (AF7) Any sensible answer e.g. Writing, hand gestures, cat meowing, etc.

What is the purpose of this text? (AF6) To give information, explain what sound is and how we hear.

Sound and Hearing – Follow-Up Work 1

Which phrase used in the text means the same as 'air vibrations'? (AF2)

_____

When is sound made? (AF2)

_____

Which material does sound travel fastest through? (AF2/AF3)

_____

Can you estimate how many decibels a dog's bark would be? (AF3)

_____

How many subheadings are there? (AF4)

_____

Why can you not hear in space? (AF2)

_____

Why do you think the writer has put some facts in blue boxes? (AF6)

_____

How many captions are there? (AF4)

_____

What are the names of the three bones in the middle ear? (AF2)

_____

How many captions are there? (AF4)

_____

What are the names of the three bones in the middle ear? (AF2)

_____

Why do you think the writer described the cochlea as 'snail like'? (AF5)

_____

Find three time openers/connectives that the writer used to explain how we hear. (AF2/AF5)

_____

The writer gives some examples of communication. Can you think of some other ways of communicating? (AF7)

_____

What is the purpose of this text? (AF6)

_____

Sound and Hearing – Vocab 1

Write down the meanings of these words. Use a dictionary or Thesaurus to help you.

vibrates _____

Vacuum _____

radiate _____

obstacles _____

vary _____

located _____

amplify _____

fluid _____

interprets _____

anatomy _____

communication _____

potential _____

Sound and Hearing – Vocab 2

vibrates radiate obstacles located fluid

amplify interprets communication potential

Put the words above into alphabetical order:

_____

_____

_____

_____

_____

_____

_____

_____

_____

Sound and Hearing – Vocab 1

vibrates – shakes very quickly

vacuum – a completely empty space in which there is no air

radiate – move or spread in rays from a centre point

obstacles – things that are in the way

pitch – how high or low a sound is

vary – change, differ

located – where something is

amplify – make louder

fluid – liquid, a material that flows/pours easily

interprets – understands, gives meaning to

anatomy – the structure of a body part, how a body part is made up

communication – the sharing of information/ideas/feelings

potential – something that could happen in the future

Sound and Hearing – Vocab 2

vibrates radiate obstacles located fluid

amplify interprets communication potential

Put the words above into alphabetical order:

amplify

communication

fluid

interprets

located

obstacles

potential

radiate

vibrates

Sound and Hearing – SPAG

There are lots of present tense verbs in the text:

"Sound waves radiate from the source of the sound."
"Next the nerve endings turn these vibrations into electrical signals and send them to the brain."

A verb is an action word or something that can be done. Underline the verbs in the sentences below.

I often hear loud music from next door.

Sound waves travel faster in water than in air.

The dog barked loudly at his owner.

I always listen to my teacher.

I heard a bang so I ran away.

My ears hurt so I went to the doctor.

I turned up the volume because the television was very quiet.

My grandad wears a hearing aid because he is deaf.

My sister dances when she hears music.

Sound and Hearing – SPAG

There are lots of present tense verbs in the text:

"Sound waves radiate from the source of the sound."
"Next the nerve endings turn these vibrations into electrical signals and send them to the brain."

A verb is an action word or something that can be done. Underline the verbs in the sentences below.

I often hear loud music from next door.

Sound waves travel faster in water than in air.

The dog barked loudly at his owner.

I always listen to my teacher.

I heard a bang so I ran away.

My ears hurt so I went to the doctor.

I turned up the volume because the television was very quiet.

My grandad wears a hearing aid because he is deaf.

My sister dances when she hears music.