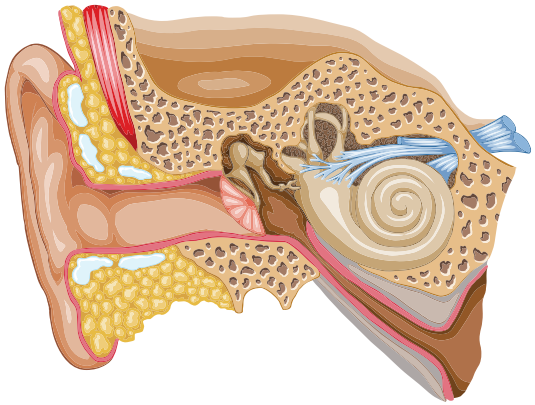
HOW YOU HEAR

Sounds are really **vibrations** in the air. Your ears collect the vibrations and funnel them into the ear **drum**.

The ear drum shakes and passes the vibrations onto three small bones: the **hammer**, **anvil** and **stirrup**.

The vibrations then reach the **cochlea**, which is lined with **nerve endings** that send messages to the brain.



The brain then **translates** the vibrations as sounds.

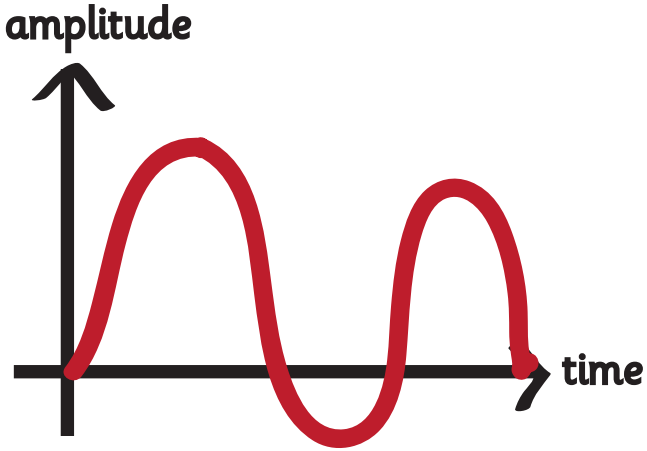
BALANCE

The cochlea helps your sense of **balance**.
The **cochlea** and the three loops above it are filled with liquid. The **liquid** moves when you do.

Tiny **nerve endings** feel where the liquid in the loops is and pass on messages to your **brain**.

Your brain then knows whether you are **balanced** or in danger of falling over.

LOUDNESS



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

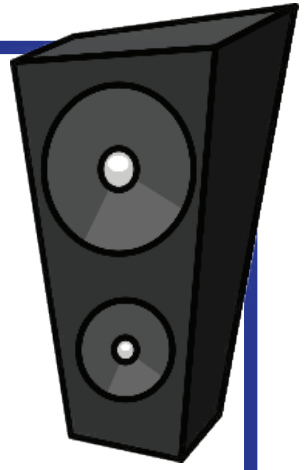
Beating the drum harder causes larger **vibrations** and a louder sound.

The sound is louder closer to the sound **source**.

The sound is **fainter** further away from the sound source.

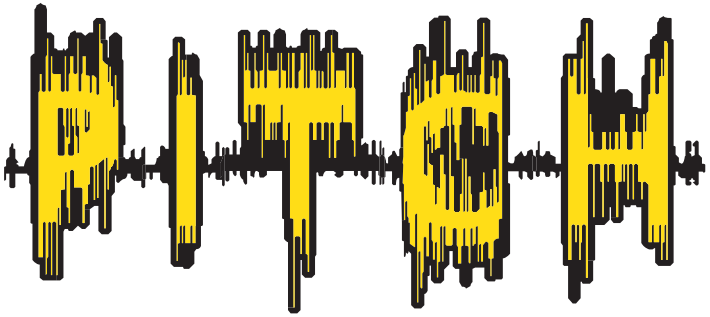
The **amplitude** of a **sound wave** tells us how big the vibration is.

LOUDNESS

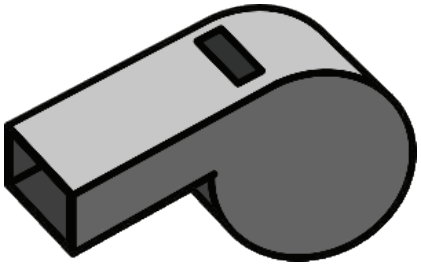


The earphones on your iPods and CD players bring the sound very close to your ears.
When the sound is louder it can be very **dangerous**.
Loud sounds can **damage** your ears and make you become hard of hearing.

The loudness of a sound is measured in the unit of **decibels** (dB).
The higher the number of decibels, the greater the risk to your hearing.



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.
Frequency is measured using the unit of Hertz (Hz).



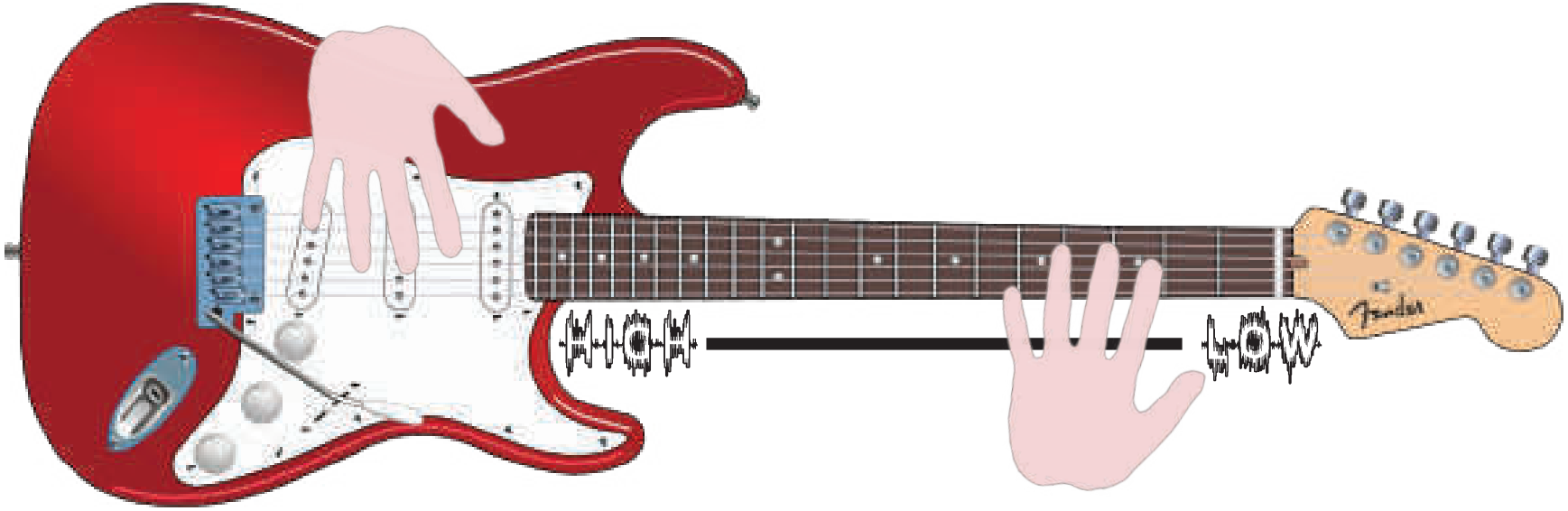
A high frequency produces a high-pitched sound.

A low frequency produces a low-pitched sound.

GUITAR

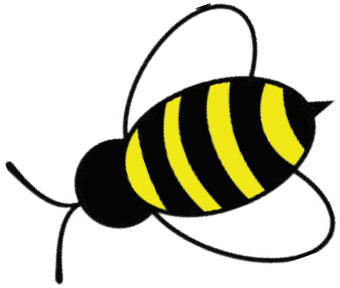
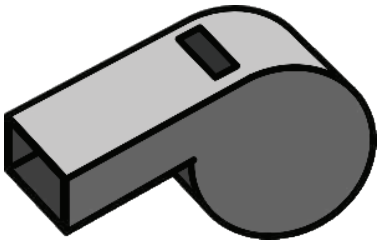
A guitar has strings that you pluck. The strings vibrate and make a sound.

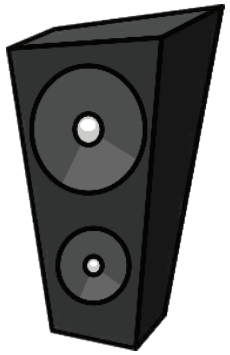
You can change the pitch of the sound you play by moving your fingers to change the string length.



The longer the string, the lower the pitch. The sound wave stretches, making a lower frequency sound.

SOURCES OF SOUND



Sources of sound are all around us.



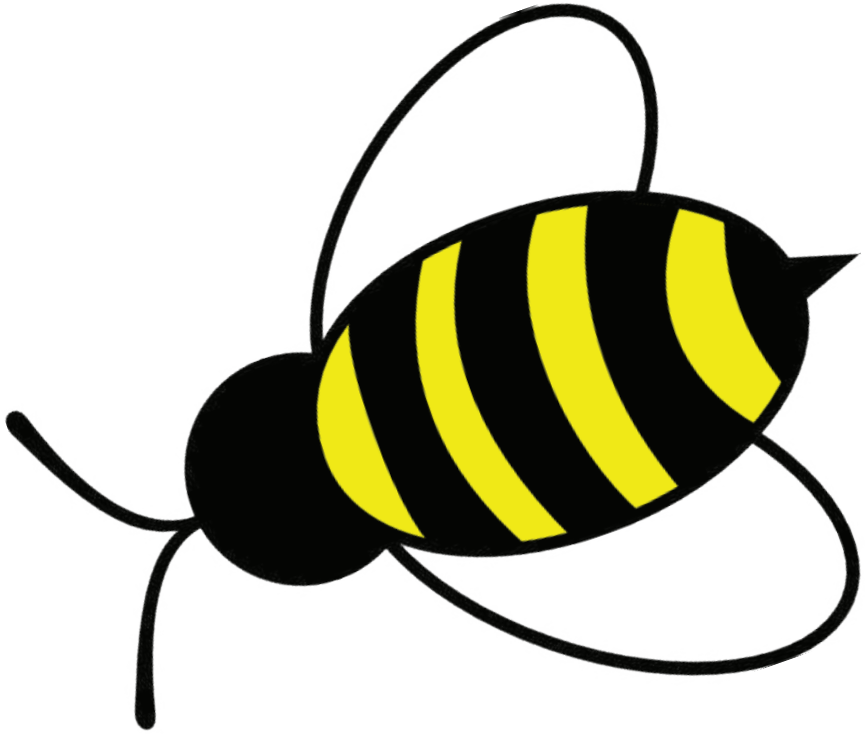


What causes all these different types of sound?

SOURCES OF SOUND

Things that vibrate (move backwards and forwards very quickly) make a sound.
Often we can't see vibrations because they are so fast, but we can still hear the sounds.

Insects make a "buzzing" sound because their wings are flapping very quickly.

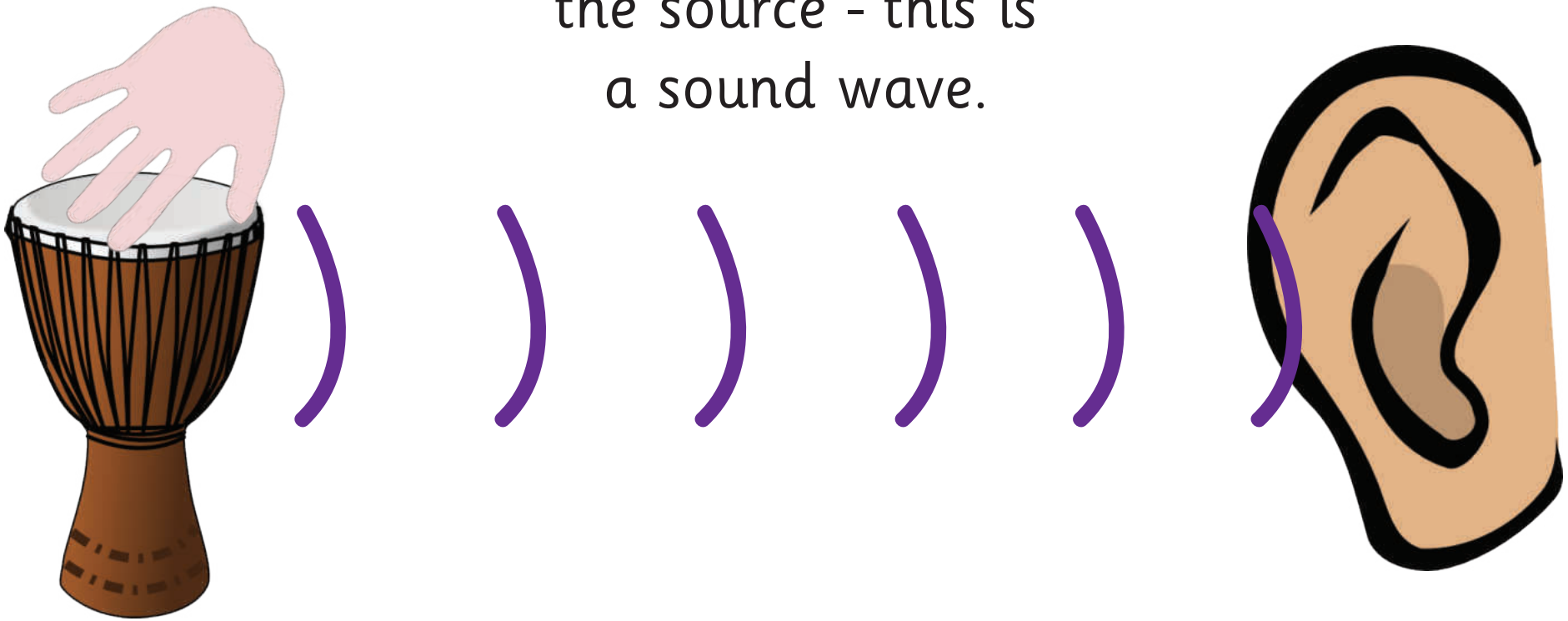


SOURCES OF SOUND

The drum skin vibrates and makes the air around the drum vibrate.

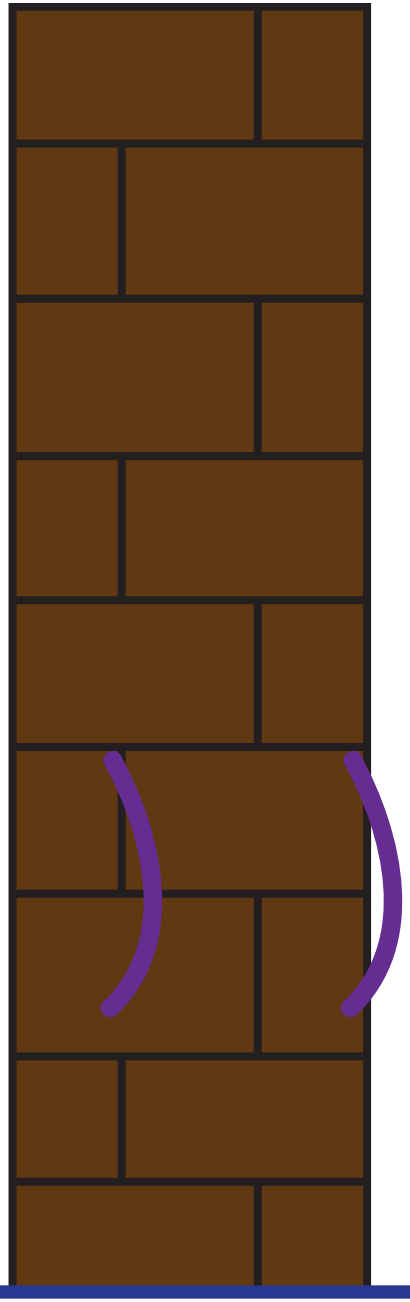
The vibrating air spreads away from the source - this is a sound wave.

Finally, your ear picks up the sound wave and your brain translates the sound.



SOURCES OF SOUND

Even if the drum is bashed outside of the room you can still hear it.

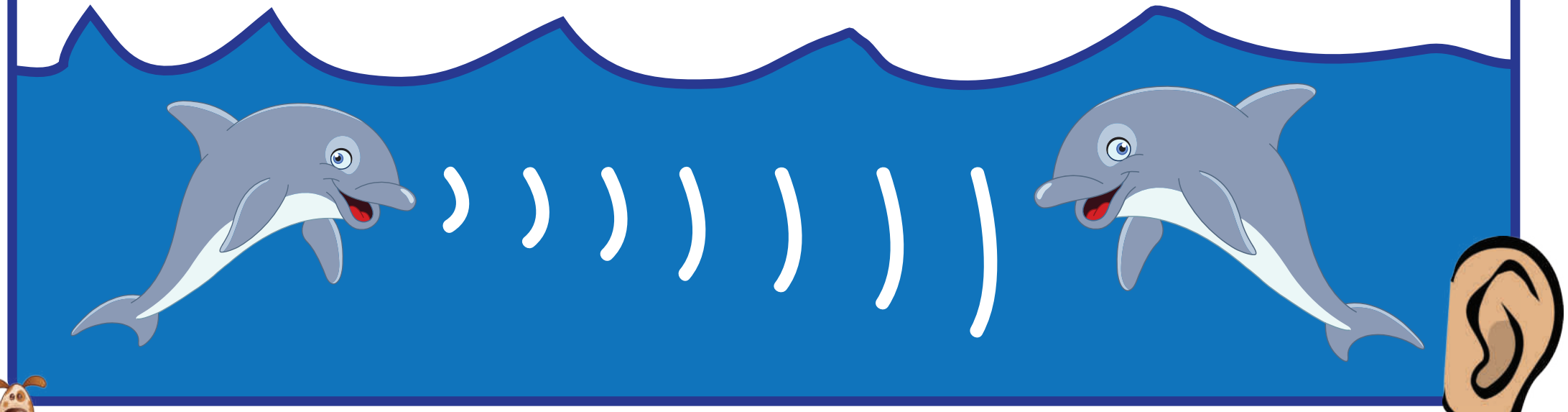


The noise travels through the air and the wall. The air and wall are both mediums for the sound to travel through.

UNDER WATER

Sound needs to travel through a medium. This can be a solid (like wood), gas (like air) or liquid (like water).

This is how dolphins communicate with each other in the ocean.



SPACE

In space there is no medium for sound to travel through. It is a vacuum, which means there is no air.

If you are in space and you beat the drum, would you hear it?

"No" - that's right! In space, sound has no way of travelling.