

## Key Facts

### How sound travels

Sounds are caused by a material vibrating. For sounds to travel they need something to pass through. This can be a solid, liquid or gas.

We hear/detect sounds because the vibrations produced by the source pass through the air. When they reach our ears they cause our eardrums to vibrate, stimulating the nerve endings in the ear so we hear the sound. In space no one would be able to hear you scream because there is no air. It is a vacuum.

Unlike light, sounds travel in all directions from a source, including above and below. Sounds travel round corners and through materials, therefore we can hear sounds that are not in view.

Sounds can be **high** or **low**. This is known as the **pitch** of the sound. In music the pitch of the sound is referred to as its note. Some instruments are high pitched and play high notes e.g. violin and flute, some instruments are low pitched and play low notes, e.g. cello and tuba.

The speed of the vibrations is known as their **frequency**. The higher the frequency, i.e. the faster the vibrations, the higher the pitch. This is measured in **Hertz** (Hz). An orchestra tunes to concert A, which has a frequency of 440 Hz. This means that the prongs of a concert A tuning fork will vibrate back and forth 440 times in a second.



# Science Year 4 Spring 1 Good Vibrations



## Vocabulary

Word	Definition
Amplitude	The loudness of a sound is dependent on how strong the vibrations are. The size of these vibrations is known as the <b>amplitude</b> . The higher the amplitude, i.e. the stronger the vibrations, the louder the sound.
Continuous	Going on without pausing or stopping.
Decibels	A unit used to measure the loudness of sounds. It is abbreviated to dB.
Faint	A sound with very little strength.
Frequency	The speed of the vibrations is known as their <b>frequency</b> . The higher the frequency, i.e. the faster the vibrations, the higher the pitch.
Hertz	Frequency is measured in hertz
Pitch	Sounds can be <b>high</b> or <b>low</b> . This is known as the <b>pitch</b> of the sound.
Vibration	Vibrations are invisible waves that move quickly up and down.
Volume	Sounds can also be <b>loud</b> or <b>quiet</b> . This is known as the <b>volume</b> of the sound.

### Common misconceptions:

- Children sometimes find it hard to grasp the way sound travels, because they confuse it with light which travels in straight lines, is blocked by opaque materials and does not go round corners. Make sure that they notice that sounds can be heard in all directions from a sound source, including above and below, and that they can hear objects that they cannot see making a sound.
- Children often wrongly conclude that sounds do not travel well through solids. This is because they experience sounds becoming quieter when muffled e.g. closing a door or window and wearing ear defenders.
- Sounds actually travel more easily through a solid than through a liquid or a gas. This is because the particles in a solid are packed more closely together so it is easier for

### Knowledge and Understanding:

#### Children will learn:

- In this module children will build on their understanding of hearing, which was covered in Year 1 (Using our senses) during work around the senses.
- They will develop their vocabulary for describing sounds and identify different sound sources. They will learn that sounds are made by something vibrating and that these vibrations travel through a medium to the ear so that we hear them. They will learn that sounds get fainter as the distance from the sound source increases.
- They will explore ways to change the pitch and volume of sounds.

### Key skills and concepts:

#### Children will be able to:

- When working scientifically children will **look for patterns** between the volume of a sound and the strength of the vibrations that produced it.
- They will also explore the pitch of a sound and ways in which it can be changed. They will do this by investigating how to make and change the sounds produced in a range of different ways.
- They will have the opportunity to **set up simple comparative and fair tests**, take measurements, including using data loggers, and report on their findings.

### Key Questions

What do we know about sounds?

How are sounds made?

How do sounds travel?

What can make a sound louder or quieter?

How do sounds change as we move away from the source?

How can we change the pitch of a plucked note?

How does the length of air column affect the pitch of a note?

What is the best way to make a string telephone?

How can sounds be muffled?