Subject Knowledge Organiser

Science – Sound

Year 5

What I have already learnt

Year 4:

- Sound is caused by vibrations that travel through air, water, and solids.
- The faster the vibrations, the higher the pitch; the bigger the vibrations, the louder the sound.
- Sound travels better through solids than through air.
- How materials absorb or reflect sound and how echoes are created.

Year 3:

- Learned how to change the pitch and volume of sounds and explored the basic workings of the ear.

What I will have learnt by the end of this unit

- How sound is produced, travels, and is heard by humans and animals.
- The relationship between pitch, volume, and vibration.
- How different environments and materials affect sound.
- How to investigate sound scientifically using observations and measurements.
- How to use knowledge of sound to solve problems like reducing noise pollution.

What I will have learnt by the end of my Key Stage

That sound is a form of energy and how it travels in waves.

How humans and animals detect sound and use it to communicate.

How to measure and describe sound scientifically, including pitch and volume.

How to apply knowledge of sound in practical ways, such as reducing noise or designing instruments.

Key Knowledge

How sound is produced: All sounds come from vibrations, which create sound waves that travel through different materials.

How sound travels: Sound moves faster in solids, slower in liquids, and slowest in gases because particles are closer together in solids.

How we hear sound: Vibrations travel through the ear and are detected by the eardrum and tiny bones, which send signals to the brain.

Changing sound: The pitch of a sound depends on how fast an object vibrates (frequency), and volume depends on the strength of vibrations (amplitude).

Sound over distance: Sound becomes quieter over distance because the vibrations spread out and lose energy.

Materials and soundproofing: Materials like foam or fabric absorb sound, while hard surfaces reflect it to create echoes.

Wider opportunities
Diversity and Cultural Capital

Explore how sound is used in different cultures, such as traditional instruments from around the world.

Learn about careers like sound engineers, acousticians, and audio technicians.

Visit a theatre or music studio to explore how sound is controlled and amplified.

Investigate how animals like bats and dolphins use echolocation to navigate.

Discuss the impact of sound pollution and ways to reduce it in cities and natural environments.

My Skills and Knowledge that I may use from other subjects

Music: Understanding how instruments produce different pitches and volumes.

Maths: Using measurements, graphs, and tables to record sound data.

Design & Technology: Creating models to explore soundproofing or amplifying sound.

Geography: Considering soundscapes in different environments and how sound affects animals in the wild.

Key Skills I will learn/use

Designing and conducting experiments to test how sound travels through different materials.

Measuring and recording sound using decibel meters or apps.

Making observations about how sound changes over distance.

Evaluating the effectiveness of materials for soundproofing or amplifying sound.

Explaining and presenting scientific findings using diagrams, charts, and models.

Key Scientific Concepts

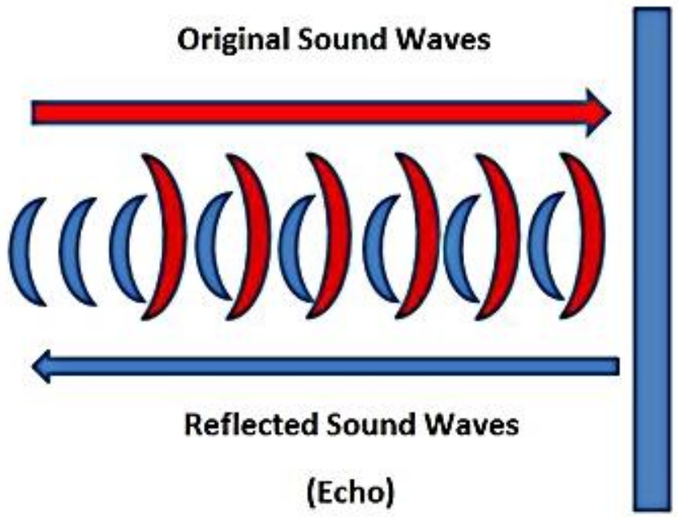
Biology

Chemistry

Physics

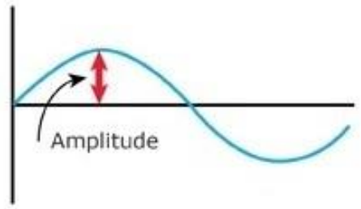
Scientific enquiry

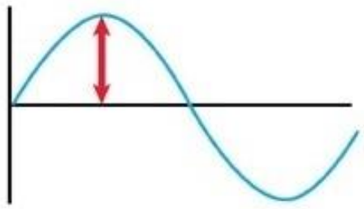
Science for the future

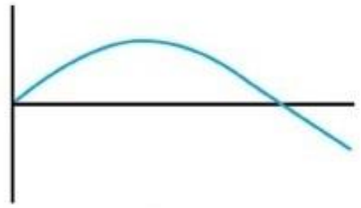


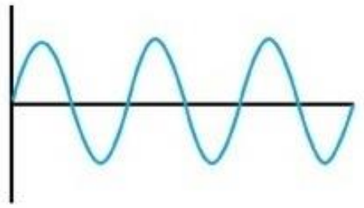
Recall and Remember

1. What causes sound to be produced?
2. How does sound travel through air, water, and solids?
3. What is the relationship between vibration speed and pitch?
4. How does sound change over distance?
5. What materials are best for soundproofing, and why?
6. How does the ear work to help us hear sound?



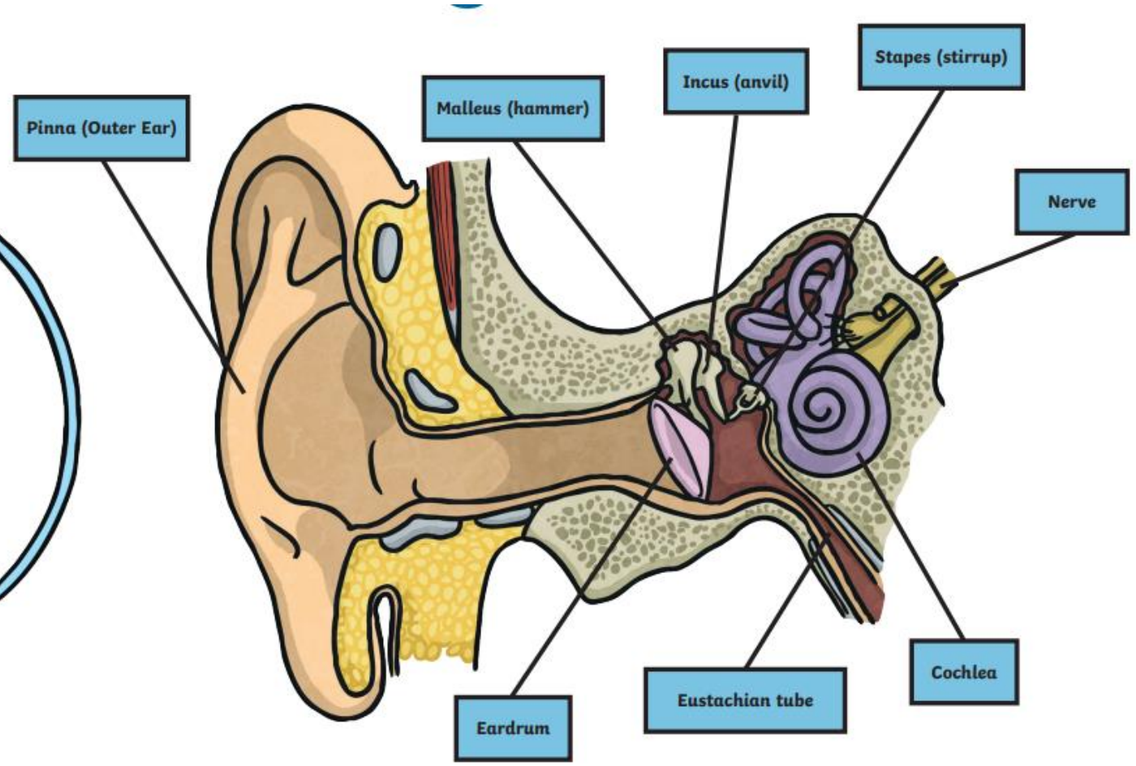






Sound travels fastest through solids where molecules are packed tightly together.

Sound can't travel through empty space where there are no molecules to vibrate.



When an object gives off sound it vibrates.

→ The vibrations bump into air molecules.

→ A wave of these vibrations travel to the eardrum.

→ The eardrum vibrates and sends the vibrations to three tiny bones in the ear.

→ The bones amplify the vibration and send it to the cochlea.

→ The cochlea is filled with fluid and tiny hairs.

→ The hairs bump into each other and an electrical impulse is created.

→ The impulse sends a message to the brain via the auditory nerve and is understood as sounds.

Key Vocabulary

Sound: Vibrations that travel through air, water, or solids and can be heard.

Vibration: A rapid back-and-forth motion that produces sound.

Sound Wave: Invisible waves that carry sound from one place to another.

Pitch: How high or low a sound is, based on the speed of vibrations.

Volume: How loud or quiet a sound is, depending on the strength of vibrations.

Amplitude: The size of the vibration; larger amplitude means louder sound.

Frequency: The number of vibrations per second; higher frequency means higher pitch.

Echo: A sound that bounces back when it hits a surface.

Absorption: When a material takes in sound energy and reduces noise.

Decibel (dB): A unit used to measure the loudness of sound.

Eardrum: A thin membrane in the ear that vibrates when sound waves hit it.

Soundproofing: Using materials to block or reduce unwanted noise.

Sonar: A system that uses sound waves to detect objects underwater.

Echolocation: The use of echoes to locate objects, used by animals like bats and dolphins.