



# Sound travels through air in invisible waves

KS4 PHYSICS

Ages 11-14 ⌚ 3 min read

## What is sound?

**Sound** is a type of energy that travels through the air as **vibrations**. When something moves back and forth really quickly — like a guitar string or a drum — it shakes the air molecules around it. These molecules bump into each other, creating waves of movement that spread outward in all directions, a bit like ripples in a pond.

Sound needs something to travel through, unlike **light**, which can move through empty space. Sound can travel through air, water, and solid objects, but it cannot travel through a vacuum (completely empty space with no air or anything else).

Think of it like dropping a stone in water. The ripples spread outward in circles, getting bigger and bigger. Sound waves work the same way, but instead of moving water, they move air molecules.

## How fast does sound travel?

Sound moves through air at roughly **343 metres per second** — that's incredibly fast, but still much slower than light, which travels at about **300,000 kilometres per second**. This is why you see lightning before you hear thunder: light reaches your eyes almost instantly, but sound takes a few seconds longer to arrive.

## Sound waves and their journey

When sound vibrations reach your ear, they pass through three important parts: the **outer ear** collects the sound, the **middle ear** contains tiny bones that shake and amplify it, and the **inner ear** converts these vibrations into signals your **brain** understands as noise, music, or speech.

Sound waves bounce off hard surfaces like walls and floors — this is called **reflection**. In a large, empty room, you might hear an **echo**, which is the same sound bouncing back at you. Soft materials like carpets and curtains **absorb** sound instead of

bouncing it, which is why music sounds different in a quiet, carpeted bedroom than in a tiled bathroom.

Think of it like throwing a ball at a wall. A hard wall bounces it back to you (reflection), but a soft cushion absorbs it and keeps it from bouncing (absorption).

## **The speed of sound matters**

Understanding how sound travels helps us design better concert halls, create quieter cars, and even develop **sonar** technology that lets submarines see underwater using sound waves. The **frequency** and **amplitude** (loudness) of these vibrations determine what we hear — whether a sound is high or low, quiet or loud.