



# KNOWLEDGE ORGANISER

## SCIENCE: GOOD VIBRATIONS

## YEAR FOUR

### KEY KNOWLEDGE:

QUESTION 1: How are sounds made?

#### ANSWER

Sound is a vibration, or wave, that travels through matter (solid, liquid, or gas) and can be heard.

#### How does sound move or propagate?

The vibration is started by some mechanical movement, such as someone plucking a guitar string or knocking on a door. This causes a vibration on the molecules next to the mechanical event (i.e. where your hand hit the door when knocking). When these molecules vibrate, they in turn cause the molecules around them to vibrate. The vibration will spread from molecule to molecule causing the sound to travel. Sound must travel through matter because it needs the vibration of molecules to propagate. Because outer space is a vacuum with no matter, it's very quiet. The matter that transports the sound is called the medium.

#### Speed of Sound

The speed of sound is how fast the wave or vibrations pass through the medium or matter. The type of matter has a large impact on the speed at which the sound will travel. For example, sound travels faster in water than air. Sound travels even faster in steel.



In dry air, sound travels at 343 meters per second (768 mph). At this rate sound will travel one mile in around five seconds. Sound travels 4 times faster in water (1,482 meters per second) and around 13 times faster through steel (4,512 meters per second).

QUESTION 2: How can you insulate against sound?

#### ANSWER

Sound is a vibration – it needs something to pass on these vibrations (unlike light which can pass through a vacuum). Some materials allow sound pass through them very easily, especially hard rigid ones like metals. Other materials, especially soft ones like cotton wool, absorb sound. Ears are delicate and need to be looked after. They can easily be damaged in various ways: by very loud sounds especially if over a long time; by poking things in them; through old age or some disease. Most pop stars wear ear plugs. Foam rubber blocks are often used for sound-proofing because they contain many empty spaces in them, so sound does not pass through them easily. Household items such as egg boxes and popcorn are quite good for soundproofing also!

QUESTION 3: What is an Echo?

#### ANSWER

Sound is caused by the vibration of a medium (usually air) and it travels in waves. Sound can also bounce off solids - when this happens we hear an echo. An echo is a reflection of a sound wave.



# KNOWLEDGE ORGANISER

SCIENCE: GOOD VIBRATIONS

YEAR FOUR