

Year 4 Physics Knowledge Organiser: Hearing and Sound

Prior Knowledge

Year 1: Where does sound come from?

Year 2: Sorting different sounds using different criteria.

Year 3: How sounds are made and which material allow sounds to pass through them.

Subsequent Knowledge

Year 5: Pitch of sound in relation to the object that produces it.

VIBRATIONS

Sound is made when an object vibrates and therefore causes the air around it to vibrate too. These vibrations are carried to your ear for you to hear them.



Sound vibrations can travel through different materials:

SOLIDS: metals, stone, wood
LIQUIDS: water
GASES: air

Sound travels better through some materials than others. It travels very well through metal pipes for example.

The louder the volume, the bigger the vibrations. The size of the vibration is called the amplitude. Quieter volumes have smaller amplitudes and louder sounds have larger amplitudes.



Sounds travel in a wave. The vibrations make air particles close to the object vibrate, which then passes the vibrations to the particle next to it and so on - like dominoes falling!



Outer Ear

Middle ear bones which include the hammer, anvil and stirrup. (The smallest bones in the human body!)

DID YOU KNOW?

Sounds get fainter (quieter) as the distance from the sound source increases.

Nerve

sends electrical signals to the brain.

Cochlea

contains thousands of tiny hair cells which change the vibrations to electrical signals.

Ear drum

which passes vibrations to the middle ear bones.



SOUND

PITCH

The pitch of a sound is how high or how low it sounds. A high pitch has a high sound and a low pitch has a low sound.

Stringed Instruments

Tighter, thinner or shorter strings make higher pitches. Faster vibrations make pitches high and slower vibrations make pitches low.



Wind Instruments

The column of air inside the instrument causes it to vibrate. Shortening this makes a higher sound, lengthening it makes a lower sound.



Percussion Instruments

The surface is struck and it therefore vibrates. Smaller instruments have higher sounds (smaller keys of a xylophone, hand bells etc.). The tighter or thinner the skin on a drum, the higher the pitch.

