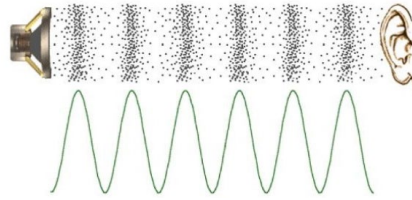


KNOWLEDGE ORGANISER
BIG IDEA: LIGHT AND SOUND
TOPIC: SOUND

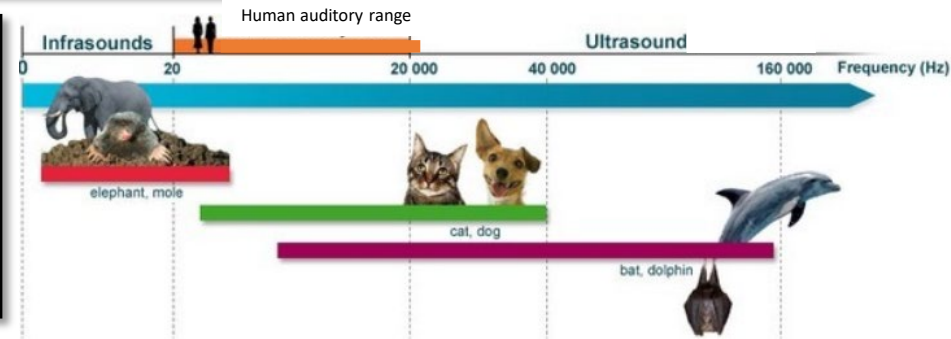
Key Word	Definition
vibration	A back and forth motion that repeats.
longitudinal wave	Where the vibration of the wave particles is parallel to the direction of energy transfers
volume	How loud or quiet a sound is, measured in decibels (dB).
pitch	How low or high a sound is.
amplitude	The maximum amount of vibration, measured from the middle position of the wave, in metres (m).
frequency	The number of waves produced in one second, in hertz (Hz).
vacuum	A space with no particles of matter in it.
oscilloscope	Device for viewing patterns of sound waves that have been turned into electrical current.
auditory range	The lowest and highest frequencies that a type of animal can hear.
echo	Reflection of sound waves from a surface back to the listener.
ultrasound	Sound waves with a frequency above the auditory range for humans (> 20,000 Hz).

Sound is a wave that transfers energy from one place to another. A sound is caused by a source **vibrating**. The energy is transferred by the vibrations being passed on. The vibrations are detected by our ears and our brain processes this information as sound.

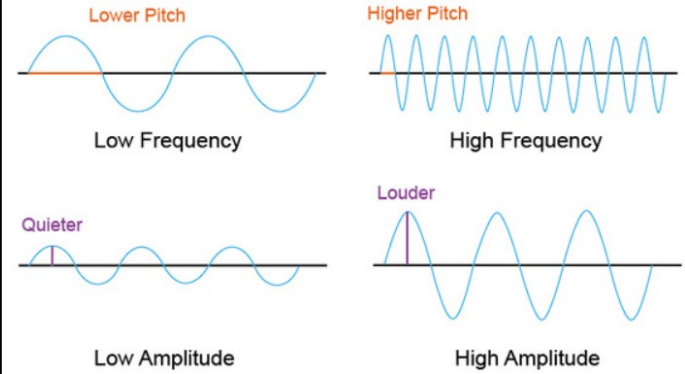
Sound can travel through any substance that is made up of matter. However, the **denser** the material, the faster the vibrations can be transferred. This means denser materials have a higher speed of sound. For example, sound travels about 10 times faster through gold than it does through air. Sound cannot travel through a **vacuum** because there are no particles to pass on the vibration.



Humans cannot detect all sound waves. The range of frequencies of waves that we can detect is called the auditory range. Humans can hear frequencies of about 20 – 20,000 Hz. This range narrows with age.



Sound has two basic properties: **volume** and **pitch**. A high volume (loud) sound is caused by a sound wave with a high amplitude. A high pitched sound is caused by a sound wave with a high frequency.



An oscilloscope is a piece of equipment which can help us visualise sound waves. Sound waves cannot usually be seen when they are transferred through a material. However, using a microphone and an oscilloscope, we can transform the longitudinal sound wave into a transverse wave that can be seen on the oscilloscope screen.