Sound

What's the science story?

The idea of waves is useful because it is the key to explaining how energy can be transferred from one object to another object by radiation, even when the objects are not touching. Waves carry information that can be detected by humans or manufactured detectors. Understanding waves helps us to communicate, explore the universe, and transfer energy to where we want it.

Previous knowledge:

KS2 – Sound (vibrations, pitch)

Next steps…

KS3

Year 8 Light

KS4

P6 Waves

Keywords

Wave	Vacuum	Amplitude
Energy	Reflection	Loud
Transverse	Superposition	Quiet
Oscillate	Construct	Volume
Vibration	Sound	Frequency
Waves	Distance	Pitch
Longitudinal	Time	Waveform
Parallel	Calculate	Decibel
	Ultrasound	Echo

Working scientifically skills:

WS8 Following a method
WS13 Constructing own results table
WS14 Drawing a bar chart
WS16 Using equations (s=d/t)

Assessments:

Exit tickets x 2/3 (formative)

- **Details of each exit ticket**
  - **ET Sound waves**
  - **ET Human ear**

KS3 – Year 8

Lesson No. and Title	Learning objectives	National Curriculum	Practical equipment
1. Transverse waves	ARE – To describe how transverse waves travel. AGD – To apply key terms to explain how transverse waves travel.		DEMO: Slinky
2. Longitudinal waves	ARE – To describe how longitudinal waves travel. AGD – To compare transverse and longitudinal waves.	• sound waves are longitudinal	
3. Reflecting and superposition	ARE – To define reflection and superposition. AGD – To explain how waves construct/cancel when combined.	• waves on water as undulations which travel through water with transverse motion; these waves can be reflected, and add or cancel – superposition • frequencies of sound waves, measured in hertz (Hz); echoes, reflection and absorption of sound	DEMO: Superposition Signal generator, two loudspeakers, leads, microphone, oscillscope
4. Speed of sound in air	ARE – To describe how sound travels in air. AGD – To investigate and calculate the speed of sound in air.	• sound needs a medium to travel, the speed of sound in air, in water, in solids	PRAC: How fast is sound? Balloons, trundle wheel
5. Speed of sound in liquids and solids	ARE – To describe how sound travels differently using the particle model. AGD – To model the speed of sound in different mediums.	• sound needs a medium to travel, the speed of sound in air, in water, in solids	PRAC: String telephones String, plastic cups

KS3 – Year 8

6. Waveform - Amplitude	ARE – To describe what happens with a sound when the amplitude changes. AGD – To compare the amplitudes of different sounds.		DEMO: Oscilloscope if possible
7. Waveform - Pitch	ARE – To describe the link between pitch and frequency. AGD – To compare waves of different frequencies using a diagram.	• frequencies of sound waves, measured in hertz (Hz)	DEMO: Oscilloscope if possible
8. The ear	ARE – To identify the main components of the eat and their functions. AGD – To explain how the ear works.	• sound produced by vibrations of objects, in loudspeakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal • the auditory range of humans and animals	DEMO: Model of the ear
9. Detecting sound	ARE – To describe how hearing can be damaged. AGD – To compare the ear to a microphone.	• the auditory range of humans and animals	
10. Echo's and ultrasound	ARE – To describe ultrasound and some of its uses. AGD – To explain how ultrasound is used to detect objects.	• frequencies of sound waves, measured in hertz (Hz); echoes, reflection and absorption of sound • pressure waves transferring energy; use for cleaning and physiotherapy by ultrasound; waves transferring information for conversion to electrical signals by microphone	