

# Year 8 Science knowledge organiser

**Module** – Waves

**Topic** – Wave effects and wave properties

**Length of topic** – Approx. 10 lessons

**Method of assessment** – Levelled assessment

## Links to prior learning

KS2 Year 6 Light topic

- Recognise that light appears to travel in straight lines
- Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye
- Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes
- Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.

KS3 Year 7 Waves topic

- Sound consists of vibrations which travel as a longitudinal wave through substances. The denser the medium, the faster sound travels.
- The greater the amplitude of the waveform, the louder the sound. The greater the frequency (and therefore the shorter the wavelength), the higher the pitch.
- When a light ray meets a different medium, some of it is absorbed and some reflected. For a mirror, the angle of incidence equals the angle of reflection.
- The ray model can describe the formation of an image in a mirror and how objects appear different colours.
- When light enters a denser medium it bends towards the normal; when it enters a less dense medium it bends away from the normal.

## Knowledge to be taught.

- When a wave travels through a substance, particles move to and fro. Energy is transferred in the direction of movement of the wave. Waves of higher amplitude or higher frequency transfer more energy.
- A physical model of a transverse wave demonstrates it moves from place to place, while the material it travels through does not, and describes the properties of speed, wavelength and reflection.

## Skills to be covered

- Communicate ideas when discussing similarities and differences between properties of sound and light waves.
- Examine the consequences of damage to either the ear or eye.

## Working scientifically strands covered

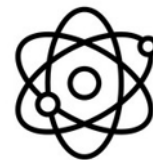
Analyse patterns	✓
Discuss limitations	
Draw conclusions	✓
Present data	
Communicate ideas	✓
Construct explanations	✓
Critique claims	
Justify opinions	✓
Collect data	
Devise questions	
Plan variables	
Test hypothesis	
Estimate risks	
Examine consequences	✓
Review theories	
Interrogate	

## Assessment

**Levelled assessment – Investigating hearing with age.**

**Pupils will need to show they can:**

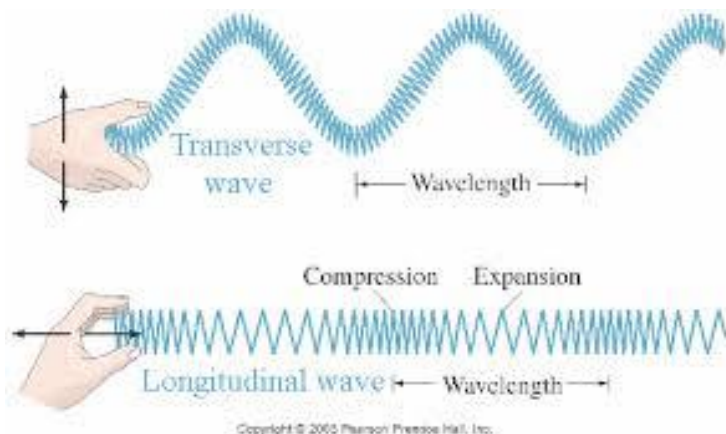
- Describe any patterns shown in the evidence.
- Give a conclusion and explain this using scientific knowledge and understanding.
- Evaluate the evidence and describe whether there is enough data to support your conclusion.
- Explain how the method could be improved.
- Draw a diagram of the ear with parts labelled.
- Suggest ways to look after our hearing.



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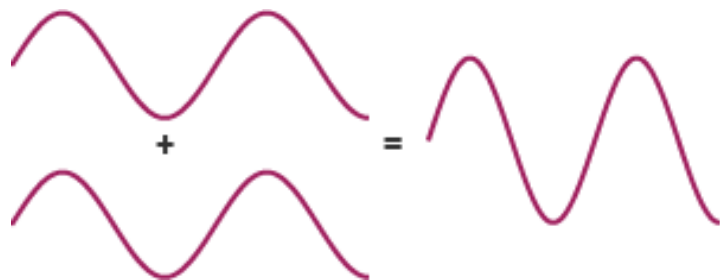
## Facts

If you throw a pebble into a pond, ripples spread out from where it went in. These ripples are waves travelling through the water. The waves move with a transverse motion. The undulations (up and down movement) are at  $90^\circ$  to the direction of travel.

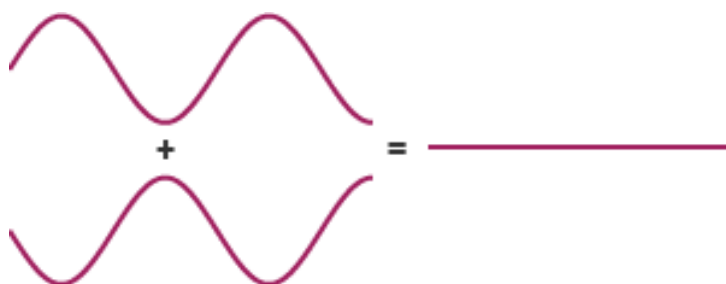


Waves at sea are reflected when they hit a harbour wall.

If two waves meet each other in step, they add together and reinforce each other. They produce a much higher wave, a wave with a greater amplitude.



If two waves meet each other out of step, they cancel out.



## Keywords

**Amplitude:** The maximum height of a wave from the middle of the wave to its peak or trough.

**Loudspeaker:** Turns an electrical signal into a pressure wave of sound.

**Microphone:** Turns the pressure wave of sound hitting it into an electrical signal.

**Pressure wave:** An example is sound, which has repeating patterns of high-pressure and low-pressure regions.

**Reflect:** Bounce off. Shiny surfaces, such as mirrors, reflect light well. Hard surfaces, such as walls, reflect sound well (producing echoes).

**Reflected:** There is a reflection when waves bounce off a surface.

**Superposition:** When two waves meet and affect each other.

**Transmission:** Where waves travel through a medium rather than be absorbed or reflected.

**Transverse wave:** Where the direction of vibration is perpendicular to that of the wave.

**Ultrasound:** Sound waves with frequencies higher than the human auditory range.

**Ultraviolet (UV):** Waves with frequencies higher than light, which human eyes cannot detect.

**Waves:** Vibrations that transport energy from place to place without transporting matter.