

# Year 7 Science knowledge organiser

**Module** – Waves

**Topic** – Sound and Light

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

**Method of assessment** – Levelled assessment

## Links to prior learning

KS2 Year 4 Sound topic

- Use the idea that sounds are associated with vibrations, and that they require a medium to travel through, to explain how sounds are made and heard
- Describe the relationship between the pitch of a sound and the features of its source; and between the volume of a sound, the strength of the vibrations and the distance from its source

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.

## Knowledge to be taught.

- 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.

## Skills to be covered

- Construct ray diagrams to show how light reflects off mirrors, forms images and refracts.

## Working scientifically strands covered

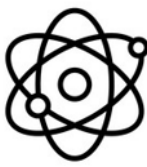
Analyse patterns	✓
Discuss limitations	
Draw conclusions	✓
Present data	
Communicate ideas	✓
Construct explanations	✓
Critique claims	
Justify opinions	
Collect data	
Devise questions	
Plan variables	
Test hypothesis	✓
Estimate risks	
Examine consequences	
Review theories	
Interrogate	

## Assessment

Levelled assessment – Light effects

Pupils will need to show they can:

- Identify and explain what the light source is.
- Explain what happens when the light ray is shone at each object.
- Draw and label ray diagrams that show what happens when the ray is shone at each object.
- Use the ray diagrams to show how light travels

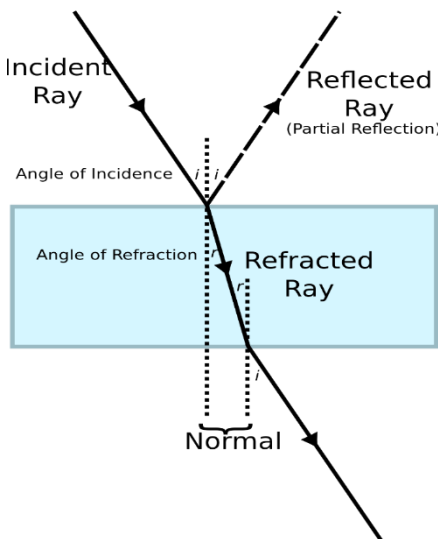
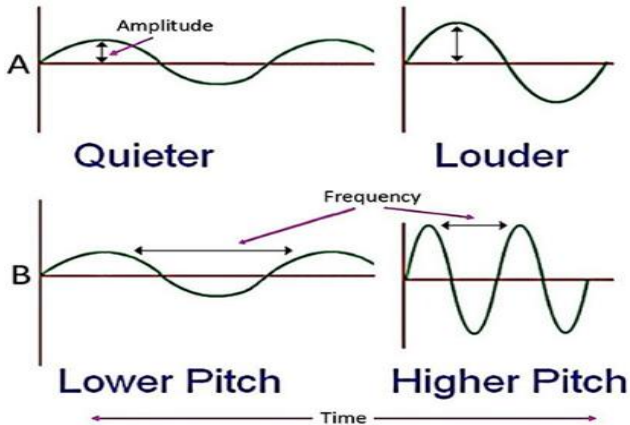


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## Facts

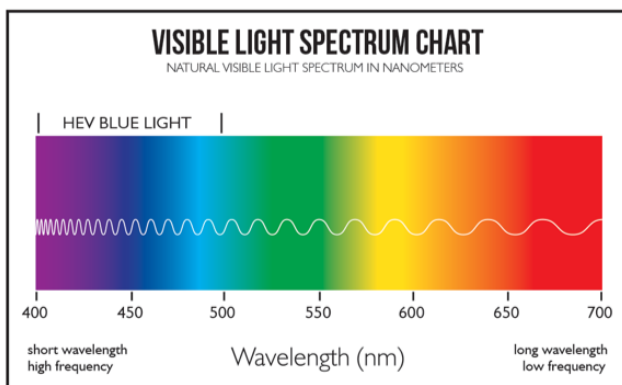
Sound does not travel through a vacuum.

The volume of a sound depends on the amplitude of the wave whereas pitch depends on the frequency of the wave.



Refraction through lenses and prisms can be described using a ray diagram as a model.

Light travels at 300 million metres per second in a vacuum. The speed of sound in air is 340 m/s, a million times slower than light.



## Keywords

**Absorption:** When energy is transferred from sound or light to a material.

**Amplitude:** The maximum amount of vibration, measured from the middle position of the wave, in metres.

**Angle of incidence:** Between the normal and incident ray.

**Angle of reflection:** Between the normal and reflected ray.

**Auditory range:** The lowest and highest frequencies that a type of animal can hear.

**Concave lens:** A lens that is thinner in the middle which spreads out light rays.

**Convex lens:** A lens that is thicker in the middle which bends light rays towards each other.

**Echo:** Reflection of sound waves from a surface back to the listener.

**Frequency:** The number of waves produced in one second, in hertz.

**Incident ray:** The incoming ray.

**Longitudinal wave:** Where the direction of vibration is the same as that of the wave.

**Normal line:** From which angles are measured, at right angles to the surface.

**Opaque:** A material that allows no light to pass through it.

**Oscilloscope:** Device able to view patterns of sound waves that have been turned into electrical signals.

**Pitch:** How low or high a sound is. A low (high) pitch sound has a low (high) frequency.

**Reflected ray:** The outgoing ray.

**Refraction:** Change in the direction of light going from one material into another.

**Retina:** Layer at the back of the eye with light detecting cells and where an image is formed.

**Scattering:** When light bounces off an object in all directions.

**Translucent:** A material that allows some light to pass through it.

**Transparent:** A material that allows all light to pass through it.

**Vacuum:** A space with no particles of matter in it.

**Vibration:** A back and forth motion that repeats.

**Volume:** How loud or quiet a sound is, in decibels (dB).

**Wavelength:** Distance between two corresponding points on a wave, in metres.