Y8 Cycle 2 Science Scholar's Guide

Oxford Spires Academy

Full Name: _____
Tutor Group: _____
Science Class: _____
Science Teacher(s): _____

Science Y8

Cycle 2

The Knowledge Organisers contain all the knowledge you need to learn.
Below is what you need to be able to do.

Week	Date	Topic 8.3 Waves	Topic 8.4 Earth and Atmosphere
1&2	8th Dec	Describe the properties of different longitudinal and transverse waves. Explain observations of how sound travels using the idea of a longitudinal wave. Describe the amplitude and frequency of a wave from a diagram or oscilloscope picture. Use drawings of waves to describe how sound waves change with volume or pitch	Explain why a rock has a particular property based on how it was formed.
3&4	5th Jan	Explain observations where sound is reflected, transmitted or absorbed by different media.	Identify the causes of weathering and erosion and describe how they occur. Construct a labelled diagram to identify the processes of the rock cycle
5&6	19th Jan	Use the wave model to explain observations of the reflection, absorption and transmission of a wave	Use a diagram to show how carbon is recycled in the environment and through living things. Describe how human activities affect the carbon cycle.
7&8	2nd Feb	**Mid Point Assessment Re-teach.** Explain differences in the damage done to living cells by light and other waves, in terms of their frequency. Explain how audio equipment converts sound into a changing pattern of electric current	**Mid Point Assessment Re-teach.** Describe how global warming can impact on climate and local weather patterns.
9&10	23rd Feb	Explain observations where coloured lights are mixed or objects are viewed in different lights. Use ray diagrams to describe how light passes through lenses and transparent materials. Describe how lenses may be used to correct vision.	Explain why recycling of some materials is particularly important. Describe how Earth's resources are turned into useful materials or recycled.
11&12	9th Mar	Assessment & Reteach	Assessment & Reteach

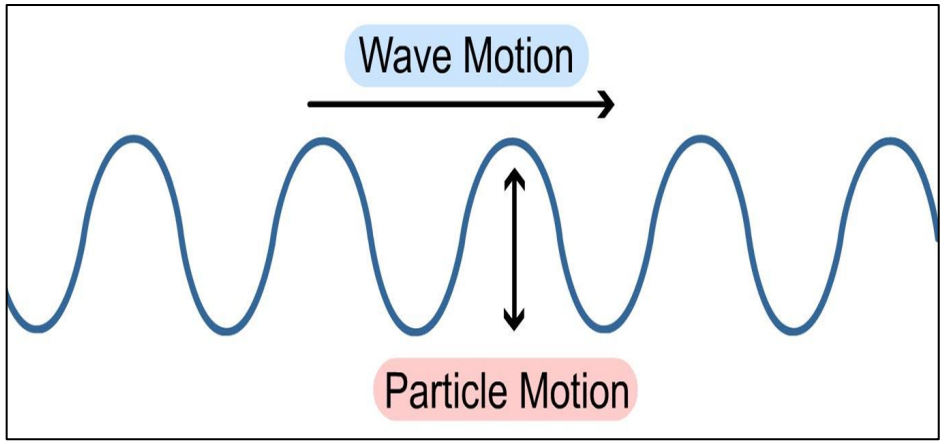
8.3 Waves KO 1 Wave Properties & Effects

Know

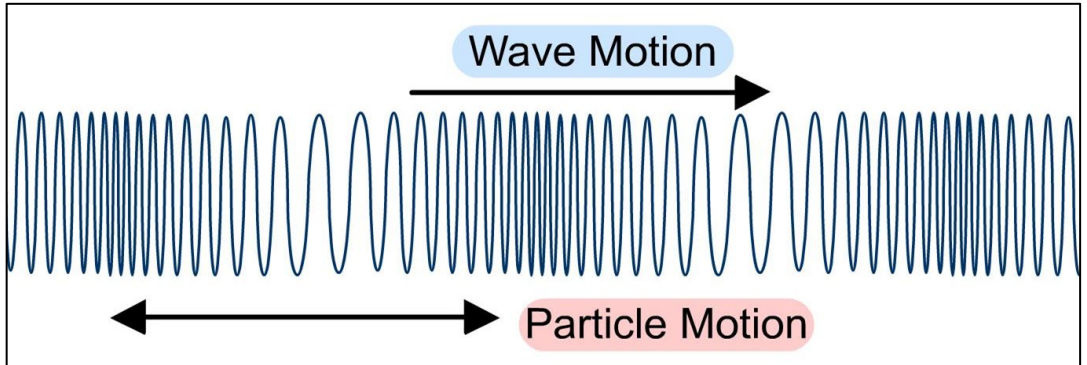
A physical model of a transverse wave demonstrates it moves from place to place, while the material it travels through does not, and describes the properties of speed, wavelength and reflection.

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

Transverse Wave



Longitudinal Wave

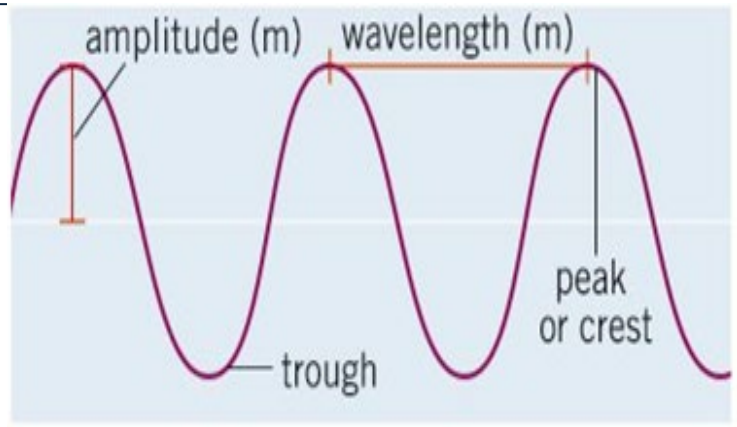


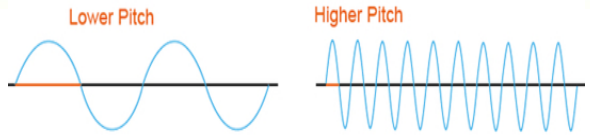
Key Word	Meaning
Waves	Vibrations that transport energy from place to place without transporting matter
Transverse wave	Where the direction of vibration is perpendicular to that of the wave
Longitudinal wave	Where the direction of vibration is the same as that of the wave.
Vibration	A back and forth motion that repeats.
Transmission	Where waves travel through a medium rather than be absorbed or reflected.
Ultrasound	Sound waves with frequencies higher than the human auditory range.
Ultraviolet (UV)	Waves with frequencies higher than light, which human eyes cannot detect.
Microphone	Turns the pressure wave of sound hitting it into an electrical signal.
Loudspeaker	Turns an electrical signal into a pressure wave of sound.
Pressure wave	An example is sound, which has repeating patterns of high-pressure and low-pressure regions.

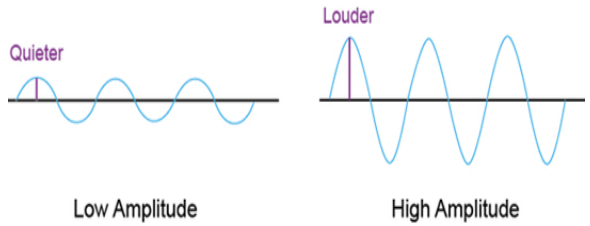
8.3 Waves KO 2 Sound

Know

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.







Fact

Sound does not travel through a vacuum.

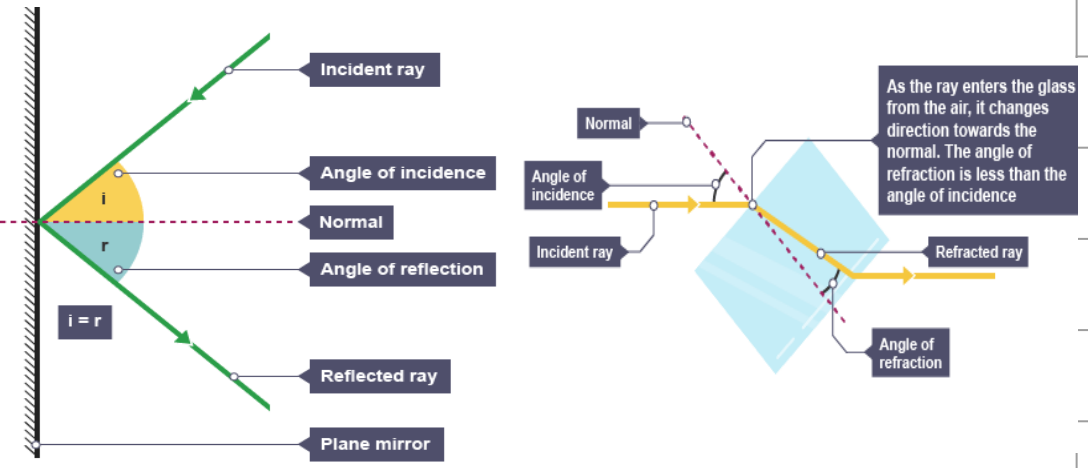
The speed of sound in air is 330 m/s, a million times slower than light.

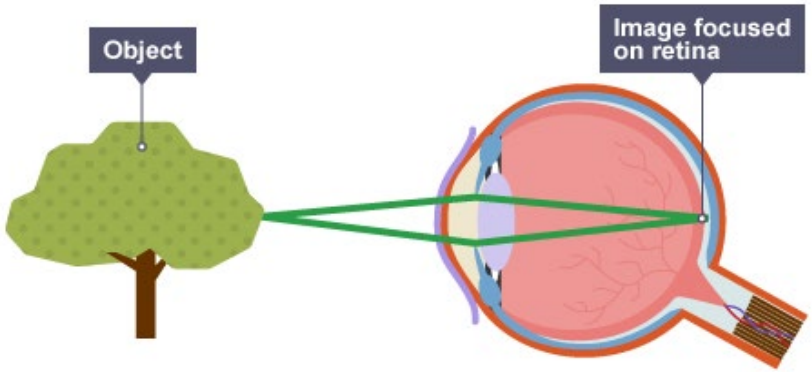
Key Word	Meaning
Volume	How loud or quiet a sound is, in decibels (dB).
Pitch	How low or high a sound is. A low (high) pitch sound has a low (high) frequency.
Amplitude	The maximum amount of vibration, measured from the middle position of the wave, in metres.
Wavelength	Distance between two corresponding points on a wave, in metres.
Frequency	The number of waves produced in one second, in hertz.
Vacuum	A space with no particles of matter in it.
Oscilloscope	Device able to view patterns of sound waves that have been turned into electrical signals.
Absorption	When energy is transferred from sound to a material.
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.

8.3 Waves KO 3 Light

Know

When a light ray meets a different medium, it can be absorbed, transmitted or reflected. We can use ray models to describe how images form in a mirror and how objects appear different colours.





Fact

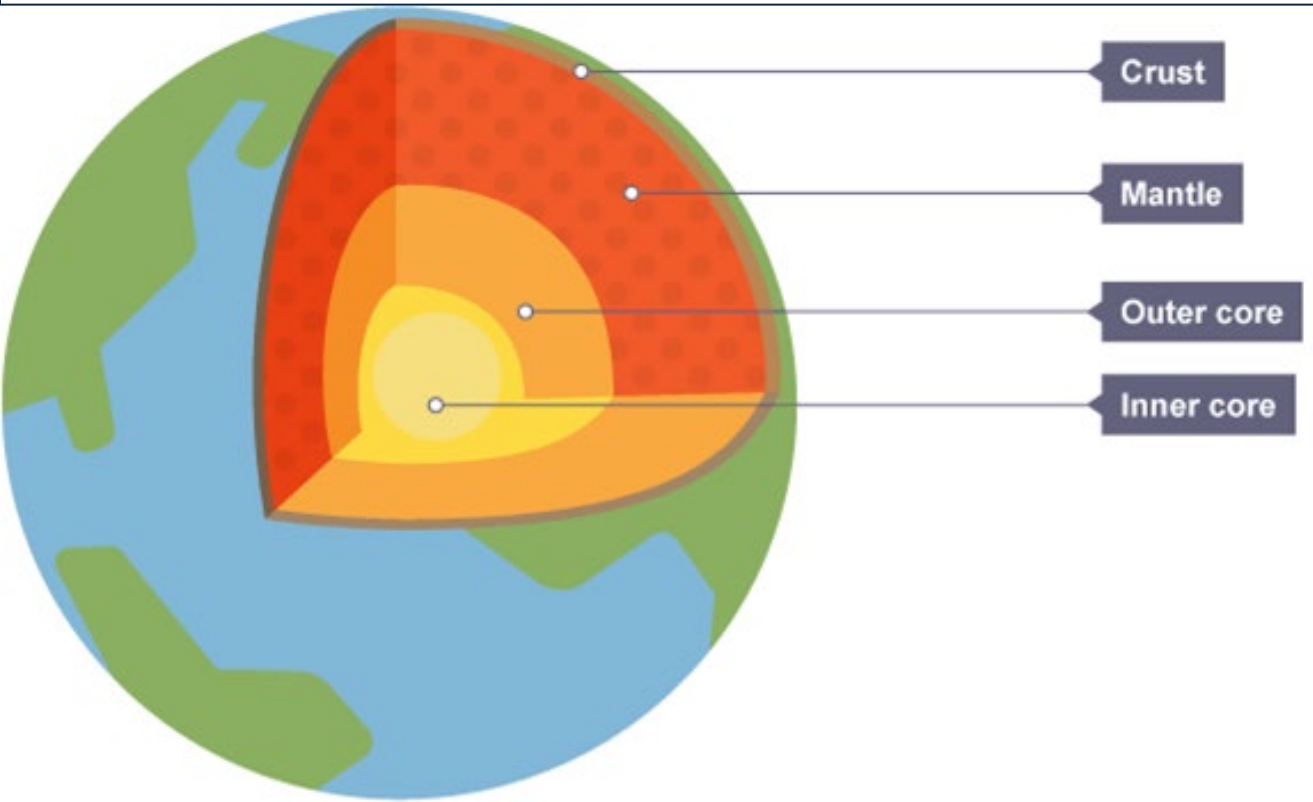
Light travels at 300 million metres per second in a vacuum. Different colours of light have different frequencies.

Key Word	Meaning
Incident ray	The incoming ray.
Reflected ray	The outgoing ray.
Normal line	From which angles are measured, at right angles to the surface.
Angle of reflection	Between the normal and reflected ray.
Angle of incidence	Between the normal and incident ray.
Refraction	Change in the direction of light going from one material into another.
Absorption	When energy is transferred from light to a material.
Scattering	When light bounces off an object in all directions.
Transparent	A material that allows all light to pass through it.
Translucent	A material that allows some light to pass through it.
Opaque	A material that allows no light to pass through it.
Convex lens	A lens that is thicker in the middle which bends light rays towards each other.
Concave lens	A lens that is thinner in the middle which spreads out light rays.
Retina	Layer at the back of the eye with light detecting cells and where an image is formed

8.4 Earth & Atmosphere KO1

Know

Sedimentary, igneous and metamorphic rocks can be inter converted over millions of years through weathering and erosion, heat and pressure, and melting and cooling.



Fact

The three rock layers inside Earth are the crust, the mantle and the core.

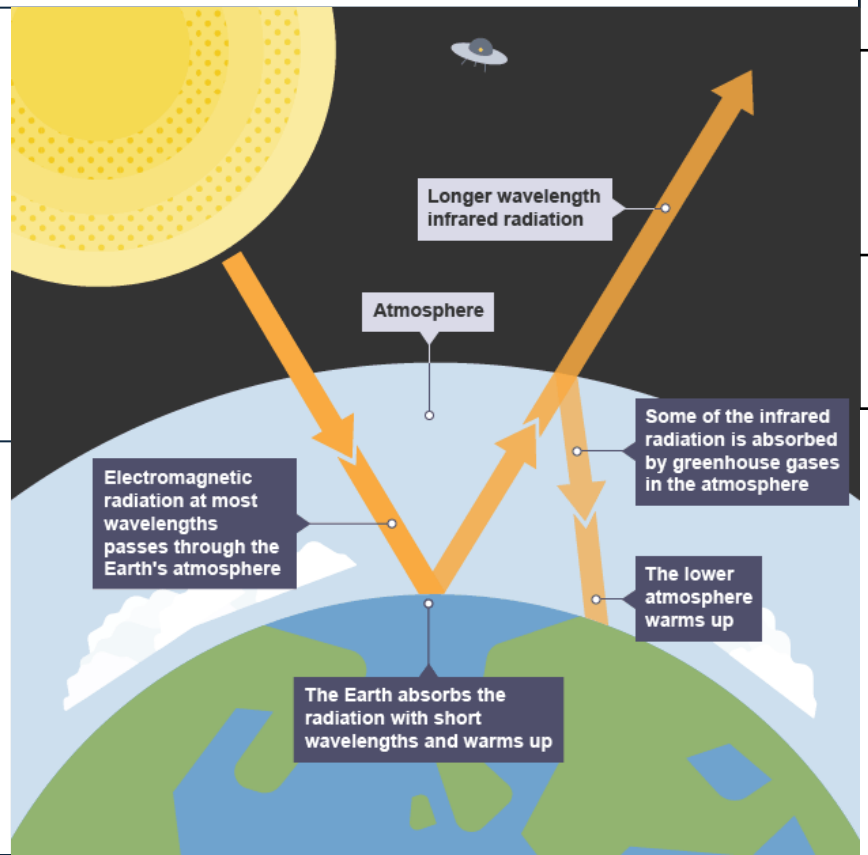
Key Word	Meaning
Rock cycle	Sequence of processes where rocks change from one type to another.
Weathering	The wearing down of rock by physical, chemical or biological processes.
Erosion	Movement of rock by water, ice or wind (transportation).
Minerals	Chemicals that rocks are made from.
Sedimentary rocks	Formed from layers of sediment, and which can contain fossils. Examples are limestone, chalk and sandstone.
Igneous rocks	Formed from cooled magma, with minerals arranged in crystals. Examples are granite, basalt and obsidian.
Metamorphic rocks	Formed from existing rocks exposed to heat and pressure over a long time. Examples are marble, slate and schist.
Strata	Layers of sedimentary rock.

8.4 Earth & atmosphere KO 2

Know

Carbon is recycled through natural processes in the atmosphere, ecosystems, oceans and the Earth's crust (such as photosynthesis and respiration) as well as human activities (burning fuels). Greenhouse gases reduce the amount of energy lost from the Earth through radiation and therefore the temperature has been rising as the concentration of those gases has risen. Scientists have evidence that global warming caused by human activity is causing changes in climate.

There is only a certain quantity of any resource on Earth, so the faster it is extracted, the sooner it will run out. Recycling reduces the need to extract resources.



Fact

Methane and carbon dioxide are greenhouse gases. Earth's atmosphere contains around 78% nitrogen, 21% oxygen, <1% carbon dioxide, plus small amounts of other gases.

Key Word	Meaning
Global warming	The gradual increase in surface temperature of the Earth.
Fossil fuels	Remains of dead organisms that are burned as fuels, releasing carbon dioxide.
Carbon sink	Areas of vegetation, the ocean or the soil, which absorb and store carbon.
Greenhouse effect	When energy from the sun is transferred to the thermal energy store of gases in Earth's atmosphere.
Recycling	Processing a material so that it can be used again.