KS3 – Year 8

Light

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.

This topic focuses on the behaviour of light waves in both reflection and refraction, and the colour spectrum. Students will learn about the structures in the eye and how the camera is similar in how it captures light.

Previous knowledge:

KS2

Light and sound

KS3

Sound

Next steps…

KS4

P1 - Energy

P5 - Waves

Keywords

Transverse	Energy	Incidence
Longitudinal	Opaque	Refraction
Parallel	Rarefaction	Emergence
Perpendicular	Density	Refractive index
Compression	Medium	Spectrum
Transparent	Reflection	Dispersion
	Absorption	Wavelength

Working scientifically skills:

WS8 – working with a method

WS10 – using equipment correctly.

Key Skills:

New vocabulary introduced	Reading given texts
Group discussions	Concluding
Summary writing/Note taking	Graph sketching

Assessments:

Exit tickets x 2

ET Refraction

ET Colour & Reflection

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Assessment grid

Working Towards		Age Related Expectations		At Greater Depth	
Describe some ways that light interacts with materials		Describe what happens when light interacts with materials		Predict how light will interact with different materials	
Describe the features of a mirror image		Explain how images are formed in a plane mirror		Draw a ray diagram showing how an image is formed in a plane mirror	
Identify examples of specular reflection and diffuse scattering.		Explain the difference between specular reflection and diffuse scattering		Apply the concept of specular reflection and diffuse scattering to models and other examples.	
Describe what happens when light is refracted		Describe and explain what happens when light is refracted		Predict the path of light using a model of light refraction	
Name parts of the eye and the camera		Describe how the eye works		Explain how the eye forms an image	
State what happens to light when it passes through a prism		Describe how a simple camera forms an image		Compare a simple camera with the eye	
State the primary and secondary colours of light		Explain what happens when light passes through a prism		Explain the formation of secondary colours	
State the effect of coloured filters on light		Explain how filters and coloured materials subtract light		Predict how coloured objects will appear given different coloured lights and filters	

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Lesson No. and Title	Learning objectives	Skills	Practical equipment
1. Light vs Sound	ARE – Describe the two types of waves and give behaviours of light waves. AGD – Link behaviours of light waves to real like examples.	Conclusions – Making deductions	DEMO – Slinky PRAC – Behaviours of light Tray of different objects, torches/ray boxes
2. Speed of light	ARE – Explain how speed of light changes in different materials. AGD – Link the use of a model to explain the change in speed of light.	Models	PRAC – Speed of light Wall paper paste, measuring cylinder, plastercin, string, stop watch
3. Absorption & reflection	ARE – Describe the law of reflection and properties of surfaces that reflect well. AGD – Apply the law of reflection to various contexts.	WS8 – working with a method WS10 – using equipment correctly.	PRAC – Reflection Ray boxes, protractors, mirrors, pencils, rulers
4. Refraction	ARE – Describe what refraction is and why it occurs. AGD – Apply the theory of refraction to different scenarios and link to refractive index.	WS8 – working with a method WS10 – using equipment correctly.	PRAC – Refraction Ray boxes, glass block, protractors, pencils, rulers
5. The Eye	ARE – Identify and give the function of main structures in the eye. AGD – Explain the effect of a convex lens using a ray diagram.	WS8 – working with a method WS10 – using equipment correctly.	PRAC – What happens to the arrow? Arrow picture, convex lens, screen
6. Pin Hole Camera	ARE – Follow a method sheet accurately and relate parts of a camera to part of the eye. AGD – Identify differences between how the eye works compared to a camera.	WS8 – working with a method	PRAC – Making a pin hole camera Paper/card, scissors

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7. Colour	ARE – Be able to summarise reading on the colour spectrum. ARE – Explain how white light is dispersed into colour spectrum. AGD – Describe the differences in wavelengths.	Reading	PRAC – Dispersion of white light Ray boxes, prisms, screen
8. The colours we see	ARE – Explain why we see things the colours we do. AGD – Deduce the colour objects will look using different coloured filters.	WS8 – working with a method WS10 – using equipment correctly.	PRAC – Coloured filters Ray boxes, filters, coloured plastercine