

**Topci 5: 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  
 Longitudinal  
 Parallel  
 Perpendicular  
 Compression  
 Transparent

Energy  
 Opaque  
 Rarefaction  
 Density  
 Medium  
 Reflection  
 Absorption

Incidence  
 Refraction  
 Emergence  
 Refractive index  
 Spectrum  
 Dispersion  
 Wavelength



Lesson No. and Title	Learning objectives	Working Scientifically 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.		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.		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
<b>Assessment 1: Reflection</b>			
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
<b>Assessment 2: Refraction</b>			
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

KS3 – Year 8

<p>6. Pin Hole Camera</p>	<p>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.</p>	<p>WS8 – working with a method</p>	<p>PRAC – Making a pin hole camera Paper/card, scissors</p>
<p>7. Colour</p>	<p>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.</p>		<p>PRAC – Dispersion of white light Ray boxes, prisms, screen</p>
<p>8. The colours we see</p>	<p>ARE – Explain why we see things the colours we do. AGD – Deduce the colour objects will look using different coloured filters.</p>	<p>WS8 – working with a method WS10 – using equipment correctly.</p>	<p>PRAC – Coloured filters Ray boxes, filters, coloured plastercine</p>



**Assessment Criteria**



Assessment No. & Title	Working Towards	Age Related Expectations	At Greater Depth
n/a	Describe some ways that light interacts with materials	Describe what happens when light interacts with materials	Predict how light will interact with different materials
1. Reflection	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.
2. Refraction	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
n/a	Name parts of the eye and the camera	Describe how the eye works	Explain how the eye forms an image
n/a	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
n/a	State the primary and secondary colours of light	Explain what happens when light passes through a prism	Explain the formation of secondary colours
n/a	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