



Year: 6
Term: Spring

Science: Light

Prior Knowledge

Recognise that they need light in order to see things and that dark is the absence of light. (Y3 - Light)
Notice that light is reflected from surfaces. (Y3 - Light)
Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. (Y3 - Light)
Recognise that shadows are formed when the light from a light source is blocked by an opaque object. (Y3 - Light)
Find patterns in the way that the size of shadows change. (Y3 - Light)
Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. (Y5 - Properties and changes of materials)

Key Knowledge

Light Sources

We need light in order to see things.
What is a light source?
A light source is something that makes its own light.

Things you need to know about light

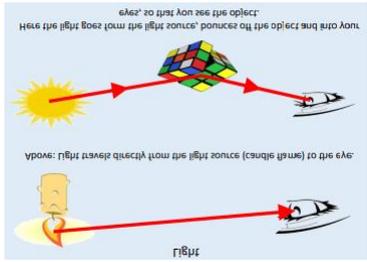
- 1) Light travels in straight lines
- 2) Light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye.
- 3) We see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.
- 4) Light travels very, very fast - 186,282 miles per second. (that's like travelling around the world over 7 times in a second)
- 5) If something gets in the way of light, a shadow is formed.

Shadows

How is a shadow formed?
When light from a source is blocked by an opaque object, you get a shadow. Shadows have the same shape as the objects that cast them.

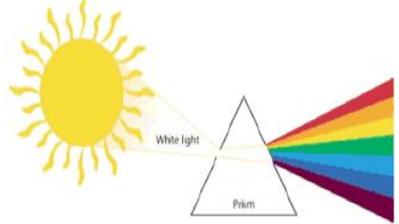
How does the size of the shadow change?

- 1) If an object is moved closer to the light sources, the shadow gets bigger.
If an object is moved further away from the light source, the shadow gets smaller.



Extend Learning

Look at phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters (they do not need to explain why these phenomena occur).



Key Vocabulary	
Prior vocabulary - light, light source, dark, darkness, reflected, surfaces, protect, shadows, change, distance, absence, size, dangerous, opaque, transparent, blocked, translucent, mirror, beam, solid	
Working scientifically vocabulary – prediction, measurement, enquiry, dependent variable, independent variable, fair test, similar, theory, hypothesis, line graph, relationship, outlier	
Eyes	Globular organs of sight in the head of humans and vertebrate animals
Filter	Pass through a device to remove unwanted material (liquid, gas, light or sound)
Periscope	An apparatus consisting of a tube of attached to a set of mirrors or prisms through which an observer can see things that are otherwise out of sight
Rainbow	An arch of colours visible in the sky, caused by the refraction and dispersion of the sun's light by rain or other water droplets in the atmosphere
Refraction	The bending of light as it passes from one substance to another with the bending caused by the difference in density between two substances
Spectrum	A band of colours, as seen in rainbows, produced by separation of the components of light by their different degrees of refraction
Additional vocabulary to discuss across the unit – particle, medium, angle of incidence, angle of reflection	

Key skills
<p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</p> <p>Make predictions about whether a circuit will work or not based on their understanding of what a circuit requires in order for it to work.</p> <p>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</p> <p>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</p> <p>Using test results to make predictions to set up further comparative and fair tests.</p> <p>Identifying scientific evidence that has been used to support or refute ideas or arguments.</p> <p>Understanding how to work safely with electricity and electrical circuits.</p>

Future Learning
<p>The similarities and differences between light waves and waves in matter. (KS3)</p> <p>Light waves travelling through a vacuum; speed of light. (KS3)</p> <p>The transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface. (KS3)</p> <p>Use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye. (KS3)</p> <p>Light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras. (KS3)</p> <p>Colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection. (KS3)</p>

<p><u>Deepening and broadening the knowledge and understanding for GDS learners:</u></p> <ul style="list-style-type: none"> • explains how a pinhole camera works • explains using diagrams, how light travels through a series of reflections then into your eye, such as viewing the back of your head using mirrors when at the hairdressers • predicts, using accurate drawings, how shadows formed by different objects might change when the direction or brightness of the light changes • knows that the size of a shadow depends not only on the size of the object casting the shadow but also on the position of the light source 	<p><u>Key Questions:</u></p> <p>1. How does light travel? <i>Children draw scientific diagrams to show how objects are seen because they give out or reflect light into the eye in straight lines.</i></p> <p>2. How is light reflected? <i>Children will explore the 'law of reflection' and use this knowledge to investigate why shadows are the same shape as the objects casting them.</i></p> <p>3. How can we see around a corner? <i>Children will investigate the law of reflection from last lesson using mirrors/periscope and use protractors to measure various angles of incidence and reflection. They draw conclusions about how to use reflection to see around corners</i></p> <p>4. Why do objects appear bent in water?</p>
---	--

Children predict why light 'bends' when travelling through water e.g. using concept cartoon. They explore refraction through various tests, make observations and draw conclusions based on their understanding of refraction that light travels more slowly in water. They could then come up with their own line of enquiry about refraction.

5. What colour is light?

What is a rainbow?

Children will use their knowledge and extend their experience of light by looking at a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water, looking at light through prisms and coloured filters

6. Can I create my own enquiry into the laws of reflection or refraction?

Children come up with their own line of enquiry based on their knowledge of light and draw conclusions that support or refute the laws.