

Science

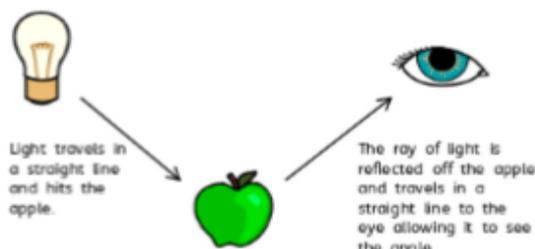
Light Year 6

Remember when

Certain things produce light, usually by burning (e.g. the Sun) or electricity (e.g. street lights) (Y3/Y4)
 Shadows are caused when certain materials block light. (Y3/Y5)
 Light travels in straight lines. When light is blocked by an opaque object, a dark shadow is formed. (Y3/Y5)
 The further away the light source is, the smaller the shadow is. The closer the source of the light, the bigger the shadow. (Y3)

Sticky knowledge

- Light travels in a straight line.
- Reflection is when light bounces off a surface this changes the direction in which the light travels.
- Refraction is when light travels from air through water or glass and bends.
- Because light travels in straight lines, when there is an opaque object blocking the light, a shadow is formed. These shadows have the same shape as the objects that cast them.
- The size of a shadow changes as the light source moves. Shadows can also change their shape. As light moves closer, the shadow becomes longer and wider.
- We see things because light travels from a light sources to our eyes or from light sources to objects and then to our eyes.



Key vocabulary

chemical reactions
 concave
 convex
 dark
 dim
 direction
 electricity
 emits
 filters
 light
 light wave
 mirror
 opaque
 reflect
 reflection
 shadow
 source
 surface
 translucent
 transparent
 travels

National Curriculum

- 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.

Common Misconceptions

Some children may think:

- we see objects because light travels from our eyes to the object

	focus / title	Lesson outline
Lesson 1 LO: To review our understanding of light Enquiry type: N/A	Remember when Certain things produce light, usually by burning (e.g. the Sun) or electricity (e.g. street lights) (Y3) Shadows are caused when certain materials block light. (Y3) Light travels in straight lines. When light is blocked by an opaque object, a dark shadow is formed. (Y3) The further away the light source is, the smaller the shadow is. The closer the source of the light, the bigger the shadow. (Y3)	Children to create a mindmap on what they already know about light. Discuss with class there thoughts and what they've written. The children will then watch a series of videos based around their 'remember whens' and in a different colour ,if they haven't already include the 'remember whens' https://www.youtube.com/watch?v=OGard5kTRWk https://www.youtube.com/watch?v=zLj35KNpMcq https://www.youtube.com/watch?v=YuUJCNzfoBw https://study.com/academy/lesson/light-energy-sources-lesson-for-kids.html#quiz-course-links Year ¾ Questions to build on previous learning – including how shadows are formed/can change size.
Lesson 2 LO: To understand that light appears to travel in straight lines. Enquiry type: Comparative and fair test	SK: Light travels in a straight line. We see things because light travels from a light source to our eyes or from light sources to objects and then to our eyes. Skill: Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations	Children will receive a small mirror, followed by the question can you see behind using the mirror? The children will then model how light travels in straight lines, using string or ribbon. Once the class has then completed this task whilst outside the children will be encouraged to use natural resources or chalk to show their understanding of how light travels, On the return to the classroom the children will write an explanation of how light travels in straight line.'Light travels in straight lines. Light does not come out of our eyes. Light comes from a light source- the sun. When light hits an object it reflects. It reflects into our eyes.' SEN- children will be supported with images. GDS- ask the children to show how it may look if multiple mirrors were used – can create a mirror maze to show their findings. Teaching Primary Science Outdoors! Page 115 TPSResources - Millgate (millgatehouse.co.uk)
Lesson 3 LO: To understand	SK: We see things because light travels from a light sources to	Where Does Light Come From? Recap the children's' understanding of light by discussing the questions on the Lesson Presentation (What about some reflectors of light?)

<p>how we see objects.</p> <p>Enquiry type: Research</p>	<p>our eyes or from light sources to objects and then to our eyes.</p> <p>Skill: Record data and results of increasing complexity using scientific diagrams and labels</p>	<p>These can look like light sources, but are really reflecting light. How does light travel from a light source?) Gather some responses, and discuss light sources and objects which appear to be light sources, such as the Moon, as well as how light travels.</p> <p>How Does Light Help Us See? Explain what light is, and how it travels. Explain how light rays travel in a straight line from a light source, reflect off an object and into our eyes, enabling us to see the object. Ask children to describe how light is travelling to enable them to see some objects around them (prior knowledge from previous lesson) Model- if needed.</p> <p>Task 1: Children to work in groups to create a human model to show how light enables us to see. Allow the children to present their human models to the rest of the class. Only resource given is string)</p> <p>Task 2: The Light Learning Lab: The children should work in groups to produce an educational programme for children all about how light enables us to see. This will be differentiated depending on ability. They may want to use pictures or diagrams, or even props to support their explanations in the programme. Encourage them to get into character as scientists! If possible, you could allow them to film their programmes, or act them out to the class when they are complete.</p> <p>SEN/GDS- Differentiated depending on ability through pictures and questioning.</p>
<p>Lesson 4</p> <p>LO: To understand that the direction of light can be changed when it passes through a liquid</p> <p>Enquiry type: Comparative and fair test</p>	<p>SK: Refraction is when light travels from air through water or glass and bends.</p> <p>Skill: Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</p>	<p>What Is Refraction? Show the children of refraction in the real world- on PowerPoint. Ask the children if they have ever noticed any examples of refraction. Explain refraction 'Light waves travel at a different speed when they go through other transparent materials, such as water or glass. This causes the rays of light to change direction and bend. This is known as refraction. Refraction creates illusions. Because light bends when it travels between air and water or glass, objects seen through these materials look bent or distorted.' Address any misconceptions.</p> <p>Refraction Investigations: Explain to the children that they will be carrying out two different investigations to explore refraction. (split the class in half so that each half does one investigation, then swap over).</p> <p>Task 1: Amazing Arrow: The first investigation asks children to draw a horizontal arrow on a small piece of paper, and hold it behind a glass of water. They should use their differentiated Amazing Arrow Activity Sheet to make a prediction before carrying out the investigation and recording their observations and conclusion. (The arrow should appear to change direction.) Look for children who use the fact that refraction causes light to bend in their explanations.</p> <p>SEN-Children should use the suggested words and phrases to explain what happened.</p> <p>GDS-Children should explain why it happened using their understanding of refraction.</p> <p>Task 2: Incredible Images: The children need to draw a small picture (or stick a small sticker) on a piece of paper. They should put a glass of water on top of the picture, then look at their picture through the side of the glass while slowly pouring water in. Once it is full, they should place a saucer on top. Again, they will make a prediction first, then describe their observations and make a conclusion using their differentiated questions (printout.)</p>
<p>Lesson 5</p> <p>LO: To understand why shadows are the same shape as the objects that cast them</p> <p>Enquiry type: Pattern seeking</p>	<p>SK: Because light travels in straight lines, when there is an opaque object blocking the light, a shadow is formed. These shadows have the same shape as the objects that cast them.</p> <p>Skill: Record data and results of increasing complexity using scientific diagrams and labels</p>	<p>Shadows: Recap Year 3 - Ask the children to discuss whether shadows are the same shape as the object that casts them. 'Shadows are formed when an opaque object blocks a ray of light. Is a shadow always the same shape as the object that casts it?</p> <p>Children should be challenged to choose an object and try to alter the shape of the shadow without physically altering the object itself (this should not actually be possible!) Children to write an explanation to demonstrate why this happens.</p> <p>A shadow can change size depending on the distance the object casting it is from the light source. Shadows can also be elongated or shortened depending on the angle of the light source. However, a shadow is always the same shape as the object that casts it. This is because when an object is in the path of light travelling from a light source, it will block the light rays that hit it, while the rest of the light can continue travelling. Therefore, the shadow it casts is exactly the same shape.'</p> <p>SEN/GDS- Differentiated depending on ability through pictures and questioning</p> <p>+SK quiz</p>
<p>Lesson 6</p> <p>LO: To know that rainbows are a refraction of light.</p> <p>Enquiry type:</p>	<p>SK: Refraction is when light travels from air through water or glass and bends.</p> <p>Skill:</p>	<p>Is light white? How is a rainbow formed? Concept cartoon to examine the different theories. Discuss as a class</p> <p>We see rainbows when it is sunny and rainy at the same time. Raindrops in the air split white light from the Sun into lots of colours, in a similar way that your spectroscope just did. What colours do you see when you look at a rainbow?</p> <p>STEM: The Magic of Light LSTEM</p> <p>Children will use the STEM resources to create a spectroscope and use this to view different light sources. Children should record the colours they can see from each light source.</p>
<p>Working towards</p>	<p style="text-align: center;">End of unit assessment</p> <p>Working at Age related expectations</p> <p style="text-align: right;">Working at a greater depth</p>	

