



Hartford Primary School

YEAR GROUP	6	SUBJECT	Science	TERM	Autumn
National Curriculum Statements	<ul style="list-style-type: none"> 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. 				
Prior Learning (What should they already know)	<ul style="list-style-type: none"> 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) 				
Misconceptions	<ul style="list-style-type: none"> Without light it is hard to see. We see objects because light travels from our eyes to the objects. Shadows are formed when objects give off dark. 				
RETRIEVAL VOCABULARY		NEW VOCABULARY	light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous, straight lines, light rays		

	Essential Learning for this lesson	Suggested teaching tasks/approaches	New Knowledge – What I'm leaving the lesson with
LESSON 1	I can recognise that light appears to travel in straight lines.	Discuss the question 'why is light so important?' List and compare images of different light sources, what similarities are there? What differences?	<ul style="list-style-type: none"> Light travels in straight lines. Objects are seen because they give out or reflect light.

	I can explain that objects are seen because they give out or reflect light.	Discuss new vocabulary luminous and non-luminous, explain with examples linking back to year 5 space e.g. sun/stars vs moon, link non-luminous to mirrors also. Look at more examples of light sources and sort into luminous/non-luminous, include natural and artificial light sources within thin - create a carol diagram. Can you bend or curve light? Give children a range of torches, mirrors and reflective materials to see if children can investigate this question. Children to work in small groups to investigate. Plymouth Science has a great 'light maze' activity in 'Lesson 1' which could then be drawn into books.	<ul style="list-style-type: none"> Light sources can be natural or artificial, and luminous or non-luminous.
LESSON 2	<p>I can recognise that light appears to travel in straight lines.</p> <p>I can explain that objects are seen because they give out or reflect light into the eye and link my knowledge that light travels in straight lines.</p>	<p>Use concept cartoon exploring why something can't be seen in the dark despite torch (light can't bend). Explore 'what will happen if I shine light at an object and then block it with card/different objects'. Draw as a diagram. Children write up conclusion of findings with emphasis that they have proven that light travels in straight lines.</p>	<ul style="list-style-type: none"> Light cannot bend around objects. We see objects only when light travels in straight lines to our eyes. Blocking light creates shadows because it cannot go around or through opaque objects.
LESSON 3	I can 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.	<p>Use an object, string and a torch, children work in groups to create a human diagram showing how light travels from a luminous object into our eyes. Discuss reflection. Introduce reflective surfaces and explore the impact. Draw human diagram with labels and an explanation into your book. Challenge - use 3 mirrors, a dark piece of card and a torch to prove that light travels in straight lines and reflects off objects to travel to our eyes?</p>	<ul style="list-style-type: none"> We see things because light travels from a source to an object and then to our eyes. Reflective surfaces can redirect light. Light reflects off objects and enters our eyes, allowing us to see.
LESSON 4 (Non-statutory lesson)	I can identify and label different parts of the human eye.	<p>Show children a diagram of the different parts of the eye (cornea, retina, pupil, optic nerve, lens, and iris). Talk through the main function of each part. Highlight how the pupil will widen and dilate depending on the amount of light – show children a video clip of this happening with a close up. Children label a diagram in books with the different parts of the eye as listed above and write a short summary of the main function for each in books.</p>	<ul style="list-style-type: none"> The eye has different parts (cornea, pupil, lens, retina, optic nerve, iris), each with a specific function. The pupil changes size depending on light levels to protect the eye and help us see.

LESSON 5	I can 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.	Post it note challenge – Children draw an image on a post it note without anyone see it and place it on their partners back. Can their partner draw it on whiteboards without removing it? No? Give them a mirror and try again! Children to create their own periscopes, test them out and draw diagrams in books.	<ul style="list-style-type: none"> • Periscopes use mirrors to reflect light and allow us to see around corners. • Light can be redirected using mirrors, but still travels in straight lines. • We need light to see, and mirrors can help us see things not directly in our line of sight.
LESSON 6	I can explain why shadows have the same shape as the objects that cast them and link my knowledge that light travels in straight lines.	<p>Provide the children with torches and three different materials , one being transparent (for example a plastic wallet), one being translucent (for example tracing paper) and one being opaque (for example an exercise book. Children to explore how much light passes through the three objects when they shine the torch through them – can a partner correctly tell when the torch is switched on and off?</p> <p>Children look at concept cartoon discussing shadows 'What affects the size of a shadow? Why do you agree with and why?' Write their explanation in books.</p> <p>Provide the children with a variety of shaped opaque, translucent and transparent objects (e.g., cut-out stars, animals, and letters. In pairs, children shine a torch on each object and trace the shadow onto paper or whiteboards. Ask the children to try rotating or tilting the object—does the shadow shape change?</p> <p>Why does the shadow keep the same shape? What happens when the object is tilted or turned?</p> <p>Children conclude that shadows maintain the shape of the object because light travels in straight lines and cannot bend around the edges.</p>	<ul style="list-style-type: none"> • Shadows form when light is blocked by an opaque object. • The shape of a shadow matches the shape of the object because light travels in straight lines. • Transparent and translucent materials allow some or all light to pass through, affecting shadow clarity.
LESSON 7	WS: Take measurements, using a range of scientific equipment, with	Recap findings from last lesson that 'shadows maintain the shape of the object because light travels in straight lines and cannot bend around the edges.' Pose the question 'Can the size of shadows change?'	<ul style="list-style-type: none"> • Shadows are formed when light is blocked by an opaque object.

	<p>increasing accuracy and precision, taking repeat readings when appropriate.</p> <p>WS: Recording data and results of increasing complexity using line graphs.</p>	<p>(No longer planning focused as focus shifted to measuring and recording results.) Explain to the children the investigation they will carry out:</p> <ol style="list-style-type: none"> 1. Set up the torch so it shines directly onto a whiteboard in a darkened area. 2. Place the opaque object a set distance (e.g. 10 cm) from the whiteboard. 3. Turn on the torch and observe the shadow formed on the whiteboard. 4. Use a ruler to measure the height or length of the shadow and record it. 5. Move the object further away from the whiteboard in regular intervals (e.g. 20 cm, 30 cm, 40 cm), keeping the torch in the same place. 6. At each distance, measure and record the size of the shadow. 7. Repeat the process at least three times to ensure accuracy. 8. Plot the results on a line graph to show how shadow size changes with distance. <p>Before the investigation, ask children to predict what will happen to the shadow size as the object moves closer to the light. Encourage them to justify their predictions using prior knowledge.</p> <p>Children will analyse their results to determine the relationship between distance and shadow size, reinforcing the idea that light travels in straight lines and shadows change predictably.</p>	<ul style="list-style-type: none"> • Light travels in straight lines, which is why the shape of a shadow matches the shape of the object. • The size of a shadow changes depending on the distance between the object and the light source: <ul style="list-style-type: none"> • When the object is closer to the light source, the shadow is larger. • When the object is further away, the shadow is smaller. • A fair test in science involves changing one variable (distance) while keeping others the same (object, light source, environment). • Scientific investigations involve making predictions, measuring accurately, and recording results to draw conclusions.
Helpful resources to reference			