

Year 3 NC - pupils should be taught to:	How we do this in Year 3	Year 3 Vocabulary	Year 6 NC - pupils should be taught to:	How we do this in Year 6	Year 6 Vocabulary
<p>Recognise that they need light in order to see things and that dark is the absence of light</p>	<p>Explain what light is, light sources and discuss examples. Children to identify light sources, using what they can see in the classroom as a starting point.</p>	<p>Light, source, dark, reflect, see, illuminate, visible.</p>	<p>Recognise that light appears to travel in straight lines</p>	<p>Recap their understanding of and discuss light sources and objects which appear to be light sources, such as the Moon, as well as how light travels. Look for children who have a good recall of their previous learning.</p>	<p>Light, source, travel, straight line, waves, ray, beam, wave, photon, energy, vacuum.</p>
<p><u>How working scientifically can be met</u></p> <ul style="list-style-type: none"> <li>Explain using accurate vocab</li> </ul>	<p>Sort their sets of cards into objects that are light sources and those that are not. Explain the reason why tricky objects like the moon, a window and a mirror are not light sources. Talk to the children about dark and explain that it is the absence of light.</p> <p>Place 5 feely bags around the room. Introduce the idea that it is dark inside the bags so we cannot see the objects they contain. Children visit each bag. Ask how we can illuminate the objects by getting light into the bags. Open the bags and allow children to revisit the bags.</p>		<p><u>How working scientifically can be met</u></p> <ul style="list-style-type: none"> <li>Explain using accurate vocab</li> </ul>	<p>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. Ask the children to work in groups to create a human model to show how light enables us to see. They should use yellow wool to symbolise a ray of light, and have two members of their group act as a light source and an object. They need to hold the wool to demonstrate how the light travels from the source to the object and then their eyes. Allow the</p>	

				<p>children to present their human models to the rest of the class.                  Children should work groups to produce an educational programme for children all about how light enables us to see.                  Children 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.                  Look for children who are able to articulate their understanding of how light travels to enable us to see.</p>	
<p>Notice that light is reflected from surfaces</p>	<p>Watch short film to see how reflective surfaces and materials can be useful, especially when outside at night.</p>	<p>Light, source, dark, reflect, see, illuminate, visible.</p>	<p>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</p>	<p>A child to decide which definition of how light is reflected is true and justify if peers disagree.</p>	<p>Reflection, angle, incidence, normal, periscope.</p>
<p><u>How working scientifically can be met</u></p> <ul style="list-style-type: none"> <li>• Make prediction</li> <li>• Record result</li> <li>• Explain</li> </ul>	<p>Explain reflection and its uses.                  Explain that the children have been asked to help design a new book bag with a reflective strip. They need to find the most reflective material for the bag. They should</p>		<p><u>How working scientifically can be met</u></p> <ul style="list-style-type: none"> <li>• Measure</li> <li>• Explain</li> </ul>	<p>Reveal the answer and go through the explanation. Explain what the angles of incidence and reflection are, and that they are always equal. Ask the children to prove this law - mini activity.                  Explain how light reflecting from a mirror</p>	

<ul style="list-style-type: none"> <li>• Explanations using accurate vocab</li> </ul>	<p>make a prediction and record it.                  Explain how to make a reflection tester. Give children time to make their reflection testers in pairs. The children should then work together, using their reflection tester to test the reflectivity of the different materials on their tables.                  Children to put them in order from most reflective to least reflective. Which Material Is Most Reflective? The children need to come to a conclusion as to which material would be best for the reflective strip on the new book bag. Children to draw and label the material they choose, and explain why they have chosen it.</p> <p>Discuss the characteristics of reflective surfaces.                  Explain how mirrors are commonly made, and that the image in a plain mirror appears to be reversed.                  Model the effect of the mirrors.                  Explain to the children that they will be playing</p>	<p>Reflect, mirror, light, smooth, shiny, rays, rough, scatter, reverse, beam.</p>	<ul style="list-style-type: none"> <li>• Predict</li> <li>• Close observations</li> <li>• Record observations</li> <li>• Conclusion</li> </ul>	<p>enables us to see an image. Children to explain how light is travelling in order to allow the boy to see the computer behind a wall.                  Make a Periscope: Explain what a periscope (link to history and war). Ask children to use given instructions to make a periscope using a cereal box and two mirrors.                  Allow children to test their periscopes out by looking over or around objects. Children to explain how their periscope works. Look for children who have a good understanding of how the mirrors reflect light through the periscope to enable them to see over or around objects.</p> <p>Show children the photo of a straw in a glass of water and ask them to discuss what is happening. Then introduce the concept cartoon - discuss which explanation they agree with and why.                  Show children the short</p>	<p>Refraction, bend, lens, focus, focal point, transparent.</p>
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	<p>two different games using mirrors. Children to draw what they did and explain what happened - mirror messages and mirror maze games.                  Children use their knowledge of mirrors and reflective surfaces to create a quiz.                  Once they are complete, the children should swap quizzes and try them out.</p>		<ul style="list-style-type: none"> <li>• Predict</li> <li>• Describe</li> <li>• Explain</li> </ul>	<p>film about refraction to demonstrate some examples of refraction and explain.  <a href="https://www.youtube.com/watch?v=95V-QJYZ2Dw">https://www.youtube.com/watch?v=95V-QJYZ2Dw</a>                  Explain to the children that they will be carrying out two different investigations to explore refraction - amazing arrows and incredible images. For both, children are to predict, record observations and conclude.                  Ask children to share their thoughts and conclusions. Explain how refraction caused the effects see in each investigation.</p> <p>Ask the children to think about what colour they believe light to be. Explain who Isaac Newton was and introduce his investigation using a prism to alter a ray of light. Explain what a prism is. Ask the children to recall their earlier work on refraction, and explain that a prism refracts light, causing it to bend. In pairs, children use a torch</p>	<p>Refract, spectrum, wavelength, colour, prism, visible, transparent, rainbow.</p>
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<p>Recognise that light from the sun can be dangerous and that there are ways to protect their eyes</p>	<p>The Sun: Hero or Villain? Children sort the statements according to whether they are beneficial or dangerous by moving around the classroom to stand under either the ‘Hero’ sign or the ‘Villain’ sign. Discuss UV light. Explain</p>	<p>Light, sun, beneficial, dangerous, glare, bright, damage, UV light, UV rating, visible spectrum, pupil, retina, protect, direct, sunglasses, hat, brim.</p>	<p>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>	<p>Explore Newton’s discovery for background information. Fun with Filters - children to predict what they will see when they look at the coloured counters or sweets through different coloured filters, filling in their ideas. When</p>	<p>Filter, colour, light, see, reflect, absorb.</p>
<p><u>How working scientifically can be met</u></p> <ul style="list-style-type: none"> <li>Describe and explain</li> </ul>			<p><u>How working scientifically</u></p>		

	<p>what it is and its effects. Children work in groups to set up a simple investigation into the effects of UV light. They should place card shapes onto coloured paper, then position the paper in sunlight for a week. When they come back to it, the paper around the shapes will have lightened, showing the effects of UV. Explain the function of the pupil and the retina. Ask children to look at their pupil in a mirror, then to close their eyes for 30 seconds. They should then open their eyes to see that the light quickly makes their pupil smaller. Discuss the damaging effect of bright lights. Emphasise the importance of never looking directly at the sun, or other bright lights. Ask children how they think we can protect our eyes from damage from the Sun. Explain ways to keep our eyes safe.</p> <p>The children should use their knowledge of the Sun and ways to protect</p>		<p><u>can be met</u></p> <ul style="list-style-type: none"> <li>• Close observations</li> <li>• Explain</li> <li>• Investigate</li> </ul>	<p>complete, they should look at their results to spot anything interesting, and form a conclusion. Filtering Facts: Explain how we see colours and how filters work using the information and diagrams. Ask the children to look again at their results, and discuss reliability and ways to check any ambiguous results. Secret Messages: Introduce the secret message challenge to children. Ask the children to follow the instructions to create their message, then swap with a partner. They should use filters to try to read each other's messages, then explain how this worked. Look for children who are able to explain how they created their secret message using their knowledge of how we see colour.</p>	
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	our eyes to design a pair of sunglasses or a sun hat then create an advert for it, explaining the harmful effects of the sun and how their sunglasses or sun hat protect against them.				
Recognise that shadows are formed when the light from a light source is blocked by a solid object	Explain how light travels. Ask the children to work in groups to set up a model demonstrating that light travels in a straight line.	Light, energy, beam, ray, travel, straight, opaque, translucent, transparent, block, shadow.	Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them	Children to discuss whether shadows are the same shape as the object that casts them. Explain why this is the case.	Shadow, light, source, opaque, size, distance, change, tilt, cast.
<p><u>How working scientifically can be met</u></p> <ul style="list-style-type: none"> <li>• Test</li> <li>• Explain and conclude</li> </ul>	<p>Explain and discuss opaque, translucent and transparent objects, focusing on the fact that opaque objects block light. Ask children to look around the classroom to name objects that are opaque, transparent or translucent.</p> <p>Looking at given statements, ask the children to decide if each item would be best made out of an opaque, translucent or transparent material and justify.</p> <p>Explain how opaque objects block light, creating shadows.</p> <p>Introduce the context of the investigation. Explain that a boy wants to choose a material to make some new curtains for his</p>		<p><u>How working scientifically can be met</u></p> <ul style="list-style-type: none"> <li>• Close observations</li> <li>• Explain</li> <li>• Investigate</li> </ul>	<p>Shadow Theatre: Ask the children to work in groups to perform a shadow puppet about the dispute between Isaac Newton and Robert Hooke over Newton’s theory of light and colour. They should create shadow puppets of the scientists, as well as any props they need.</p> <p>The children should use cardboard and straws or craft sticks to make their shadow puppets.</p> <p>Encourage the children to use their shadow puppets creatively, tilting them or changing their distance from the light source. If possible, allow the groups time to perform their shadow puppet shows to the rest of the class.</p> <p>Look for children who are</p>	

	<p>baby sister’s bedroom. The curtains need to block light so that the baby doesn’t wake up too early. Ask the children to test the different materials on their table by shining a torch onto each material and observing the shadow it creates. They should decide if each material is opaque, translucent or transparent, and record their ideas. The children should decide which material would be best for the curtains. They should draw and label curtains and should write an explanation of why they chose this material, referring to their investigation.</p>			<p>able to recognise that the shadows of their puppets will be the same shape as the puppet itself. Look for children who understand how Isaac Newton used his experiment to prove his theory to others.</p>	
<p>Find patterns in the way that the size of shadows change</p>	<p>Discuss ideas for the concept cartoon about shadows and reflections. Explain the ideas from the concept cartoon and ask the children to think about how and when shadows change.</p>	<p>Shadow, light, source, observe, pattern, opaque, size, distance, change.</p>			
<p><u>How working scientifically can be met</u></p> <ul style="list-style-type: none"> <li>• plan and set up an investigation</li> <li>• observe patterns</li> <li>• explain patterns</li> </ul>	<p>Noticing Patterns: Introduce the subject of the investigation. Show the image and ask the</p>				



class what they notice about the shadows. Give children the equipment they need and explain the investigation. Children plan their investigation and make a prediction.

How Do Shadows Change When the Distance Between the Light Source and the Object Changes? Children complete their investigation and record results.

Encourage children to look at their results to try to find a pattern. They should notice that the shadow of the object gets bigger the closer it gets to the light source. They should also look for any results that do not fit the pattern and try to suggest a reason for them.