




Pioneer Federation
Medium term plan
Cycle 1, Term 2
science



Subject: science	
Key Concept/ Theme: Light	
Prior Learning links: New unit for Year 3/ 4. Prior knowledge of the word light will be linked to the sun providing sunlight to plants and an understanding of a lack of sunlight leads to shady places when learning about damp habitats. They will have learnt about daylight when learning about the seasons and how the amount changes throughout the year. They will also understand the senses and know their eyes see light.	
Vocabulary: Simple comparisons: dark, dull, bright, very bright Comparative vocabulary: brighter, duller, and darker Superlative vocabulary: brightest, dullest, and darkest Light- a form of energy that travels in a wave from a source. Light Source – an object that emits its own light Ray- waves of light are called light rays. They can also be called light beams. Emits – to emit light means to produce it Opaque – you cannot see through it, block Reflects / reflective – when a light ray hits a surface and bounces off Shadow - a dark shape that appears on a surface when something stands between the light source and the surface, the absence of light. Transparent- Light can pass through and there is a clear view of objects on the other side. Translucent- Some light can travel through but objects on the other side are not clear. Absence of light- If light cannot get through. Surface/ dark	
School specific areas to cover (where applicable)	
1.	 Why are we able to see objects in our environment? Prior learning reconnection (year group, cycle & term): This is a new concept in science to learn. Find out what their prior understanding of the word light means. (see above in prior learning links) LO: Let's learn about why we are able to see objects. Enquiry focus: observation

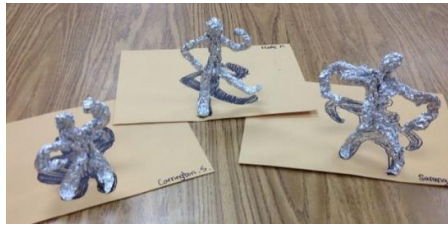
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	<p>Activity: This session is based around needing light in order to see objects and that dark is the absence of light. You will need the hall/large area for this session. Put tables together and use blankets/PE mats to create a dark 'cave(s)'. Place different objects in there- use different textures/maybe smells. Children to go in and guess what the objects are. They could go in in small groups and speak about what they feel so the other children waiting can record the clues and guess what they are describing. SEND to have communicate in print cards based around the senses so they understand that they will not be able to use sight (absence of light). They could point to the pictures when they hear their friend speak to identify the senses they are using (touch/smell).</p> <p>Children to record their objects based on the clues from the sense they used. Reveal at the end. Children to use vocabulary to explain that they see objects because of light and that the dark is absence of light. SEND- when recording use com in print symbols in the recording table. If finding it difficult, SEND could sort pictures based on dark and light places.</p> <p>Future learning links: In upper key stage 2 light is taught but focuses on light travelling on straight lines, objects are seen because they give out or reflect light into the eye, we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes, light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</p>
2.	<p> How are shadows different?</p> <p>Reconnection: Why can't we see objects in the dark?</p> <p>LO: Let's learn about how shadows are formed and how light is reflected form different surfaces. Let's know that the sun is dangerous to look at without protection.</p> <p>Enquiry focus: conclude, safety.</p> <p>Activity: Children to observe shadows around the school and identify the light source and the object blocking the light, safety session about looking at the sun and why we shouldn't do this. Use a darkness chart to compare shadows. SEND when writing conclusions, provide a cloze passage so the children start to learn the method of concluding but completing their understanding within it. Pictures of light sources for children to tick will help when on a shadow hunt to understand the meaning of light source.</p> <p>In this lesson talk about how the sun is dangerous to look at and that there are ways to protect their eyes. Make sure they show evidence of this in their books- this could be a fact bubble with a warning and how to protect eyes)</p> <p>Peter Pan clip would be good to use as a reflection at the end and explain why this isn't scientific and isn't possible from 0.55 on clip. <a data-bbox="226 1018 1912 1078" href="https://www.youtube-nocookie.com/embed/URTRyGtSQA4?playlist=URTRyGtSQA4&autoplay=1&iv_load_policy=3&loop=1&modestbranding=1&start=">https://www.youtube-nocookie.com/embed/URTRyGtSQA4?playlist=URTRyGtSQA4&autoplay=1&iv_load_policy=3&loop=1&modestbranding=1&start=</p> <p><a data-bbox="226 1123 1370 1150" href="https://www.bbc.co.uk/iplayer/episode/m0011f7t/bitesize-daily-79-year-olds-science-78-yearolds-2-light">https://www.bbc.co.uk/iplayer/episode/m0011f7t/bitesize-daily-79-year-olds-science-78-yearolds-2-light This is good for examples to use throughout the topic. It is 20 mins but you could clips from the video to support teaching throughout the next few lessons or you could model examples as they do in the video.</p>
3/4	<p> What happens to shadows when the light source moves or the distance between the light source and the object changes?</p> <p>Reconnection: What is a light source- are there any in this room? How do we see light?</p> <p>LO: Let's learn about changing the size of shadows.</p> <p>Enquiry focus: Recording, presenting results</p> <p>Activity: Learn the meanings of transparent, translucent and opaque- links to how shadows are made. Children to make a silver foil 3d person as a shadow puppet. Children to set up experiment to find different ways of changing the shape of the object. Model how to keep the investigation fair; i.e. the light source must remain the same and static, and the screen must remain stationery. Can the children produce some information for other puppeteers to use that will allow them to know exactly have far from the light</p>

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source the puppet must be for a particular size of shadow? The children could record on a table and bar chart the sizes of the shadows the further back from the light source ones travels.

<https://www.bbc.co.uk/teach/class-clips-video/science-ks2-how-are-shadows-made/zgxm6g8>



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How can we be systematic scientists?

Reconnection: What is a shadow and how do we see them?

LO: Let's learn about how to make systematic observations to find patterns in the way the size of shadows change.

Enquiry focus: Measuring, fair test


Activity: Give the children a picture of a streetlamp with a person underneath. You could turn this into your own concept cartoon. What happens to the length of shadow of a person as they approach a street lamp, walk under it and then walk further away. Children to draw on previous lessons to complete these.

Use an opaque object like a domino. On a piece of paper each group given a diagram (use a protractor to draw line coming out from a point at the corner of the paper at intervals of 10 degrees, starting at 30 degrees. SEND create one from them and maybe colour in the lines different colours, so that you can all refer to the 'red' line, etc.) Stick this paper on the side of a cereal box. The object can be placed at the bottom corner of the box, where the drawn lines start from. Now the children are able to shine the torch at the object from different angles. The children can draw a table to record the length of shadow when the torch is at 30, 40, 50, 60, 70, 80 and 90 degrees.



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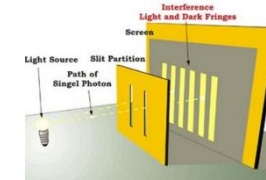
 How do scientists in history have an impact today?

Reconnection: Can we change the size of a shadow?

LO: Let's learn about the impact of scientists in history.

Activity: Understanding key scientists in history. Thomas Young (1773 – 1829). Explain that he found out how light moves in waves and that what Isaac Newton described as free moving particles could not be true when he used the slit experiment- link to opaque objects blocking light creating shadows. How does this help us explain a shadow puppet show? Over the next two weeks the children to make their own shadow puppet show linked to topic. They need to write an introduction to their puppet show explaining how the puppets are seen- children to use all the key vocabulary and reference the key scientist to show understanding. They can draw diagrams to prove their understanding. Explain that scientists have to prove to others their understanding so they are going to be proving this to ks1.

Whilst doing this T to take groups for quiz to assess key understanding of concepts.



End points:

Children will be able to say that dark is the absence of light. They will be able to describe how shadows are formed and how these can appear different depending on the object making the shadow. Children will be able to identify different light sources. Children will be able to identify how to be safe when learning about light from the sun. Children will find patterns when working systematically when investigating, They will be able to observe, measure, record and create a fair test when investigating shadows then draw conclusions. They will then relate their understanding to the real world around them and draw on key historical scientist to show their understanding of scientific theories.