ST LAWRENCE C.E. PRIMARY SCHOOL LEARNING JOURNEY

SUBJECT: Science UNIT: Light TERM: Autumn 1 YEAR GROUP: 3

THE BIG QUESTION	
How does light work?	
END OF UNIT OUTCOME	Vocappulary to explain how light works. Children to use key vocabulary and diagrams to help them answer the question.
OBJECTIVES	• recognise that they need light in order to see things and that dark is the absence of light • notice that light is reflected from surfaces • recognise that light from the sun can be dangerous and that there are ways to protect their eyes • recognise that shadows are formed when the light from a light source is blocked by a solid object • find patterns in the way that the size of shadows change
Working Scientifically	• asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings.
Safety in Science	CLEAPPS
CONCEPT: Achievement	
LESSON 1 QUESTION	**What is a source of light?**
KEY KNOWLEDGE	• Know the difference between light and dark. • Know that they need light in order to see things. • Know that the Sun and other stars, fires, torches and lamps all make their own light so are all examples of sources of light. • Know that there are man-made and natural light sources.

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<table>
<tr><td></td><td colspan="3">

- Know that there are primary (light bulb) and secondary (moon) sources of light.

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<tr><td>RICH TASK</td><td colspan="3">Introduce The Big Question – what do they already know?
Explore KO – copy in book after title page and paper copy home.

What is light? What do we need light for? Where does it come from? What do we know about light?
Watch: What is light? BBC.
Look at light source powerpoint and discuss the different sources - are they sources or reflections? Are they natural or man-made? Recap on definitions of each. Explain that sources of light are called primary sources and reflections are secondary sources.

Children to draw and label 6 sources of primary light – are they manmade or natural?</td></tr>
<tr><td>SUPPORT AND CHALLENGE</td><td colspan="3">S – word bank with examples and non-examples to choose from
C – Draw and label 3 secondary sources - are they manmade or natural?</td></tr>
<tr><td>KEY VOCABULARY</td><td>Light
Dark
Sun
Sources of light
Man-made
Natural
Primary
Secondary</td><td>RESOURCES</td><td>What is light? - BBC Bitesize
Sources of light photos (ppt)
KO, title page
Template for drawing source of light</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td>LESSON 2 QUESTION</td><td colspan="3">How does light travel?</td></tr>
<tr><td>KEY KNOWLEDGE</td><td colspan="3">

- Know that light travels in a straight line.
- Know that light travels faster than sound.
- Know that light is reflected from surfaces such as mirrors.

</td></tr>
<tr><td>RICH TASK</td><td colspan="3">Retrieval practice activity – Give me an example of…
Revise KO
Watch : https://www.bbc.co.uk/bitesize/topics/zbssgk7/articles/z2s4xfr
What is reflection? - reflections occur when a light beam changes direction on hitting a surface. Darken the room and switch on a high-powered torch to create a beam of light. Point the beam at a drawn target pinned to a wall, reminding the chn that light travels in straight lines from its source. Leave the torch on but shining away from the target. Provide a child with a mirror. Can they reflect the beam so that it hits the target? Try different angles of the torchlight reflecting off the mirror to hit the target. Try bouncing the beam off more than one mirror; can you still hit the target? Remind chn that all surfaces reflect light in some way so that light enters the eye and we can see them but some surfaces are more reflective than others.</td></tr>
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<tr><td></td><td colspan="3">Children to create a light maze using mirrors and an end target (photograph).
Children to explain how the light travels to target using scientific vocabulary.</td></tr>
<tr><td>SUPPORT AND CHALLENGE</td><td colspan="3">S – paired writing of explanation, key words given
C – create your own concept cartoon based on how light travels</td></tr>
<tr><td>KEY VOCABULARY</td><td>Light
Travel
Reflected
Surfaces
Mirror</td><td>RESOURCES</td><td>How does the eye detect light? - BBC Bitesize
What is reflection? - BBC Bitesize
Torches
Mirrors
Blu tack/pegs (to hold mirrors)</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td>LESSON 3 QUESTION</td><td colspan="3">Why do we need to protect ourselves from the sun?</td></tr>
<tr><td>KEY KNOWLEDGE</td><td colspan="3">• Know that light from the sun can be dangerous.
• Know that the sun emits (gives out) rays of light.
• Know that we can't see all the types of light that come from the sun.
• Know that the visible spectrum is the name for the light that we can see, and is made up of the colours of the rainbow: red, orange, yellow, green, blue, indigo and violet.
• Know that the amount of UV light that reaches us depends on different things:
- It is stronger at midday and in the summer.
- If there are no clouds there is more UV light.
- It also gets stronger nearer to the equator.
• Know that there are ways to protect their eyes and skin (e.g. sunglasses, sun cream, hat).
• Know that UV light causes sun burn, wrinkles and skin cancer, damages the eyes and can change the colour of some materials.
• Know that sunglasses have a UV rating to show how well they block UV rays.
• Know the difference between UVA (ages) and UVB (burns)</td></tr>
<tr><td>RICH TASK</td><td colspan="3">Retrieval practice activity – what were our 3 key facts?
Revise KO

Explore Sun Safety powerpoint.
Create a poster outlining how we are going to keep safe and protect ourselves from the sun. Discuss UV and how this can affect our skin.
- Sun cream
- Clothing layers
- Hat
- Sunglasses.</td></tr>
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<tr><td></td><td colspan="3">Class investigation to see the effects of UV light. 1. Cut out several shapes from black card. 2. Place them on a piece of coloured paper, and position them in a sunny spot for a week. 3. When you take the shapes off, you should see that the paper around the shapes has changed colour slightly. 4. The paper under the shapes will still look the same. 5. The UV light could not get to the paper under the shapes, so the paper under the shapes has not been damaged by the UV rays.</td></tr>
<tr><td>SUPPORT AND CHALLENGE</td><td colspan="3">S – template given for poster with prompts (Why is the sun dangerous? What can protect you from the sun?)
C – Must use key words: ultraviolet light, emit, retina, UV rating</td></tr>
<tr><td>KEY VOCABULARY</td><td>Light
Dangerous
Emits
Visible spectrum
Rainbow
Equator
Protect
UV rays – ultraviolet
Retina
Pupils</td><td>RESOURCES</td><td>Ppt
Poster templates
Black shapes and coloured paper</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td>LESSON 4 QUESTION</td><td colspan="3">How are shadows formed?</td></tr>
<tr><td>KEY KNOWLEDGE</td><td colspan="3">• Know that some materials are translucent, transparent and opaque.
• Know that shadows are formed when the light from a light sources is blocked by an opaque object.
• Know that shadows can change in size depending on the position of the light source.
• Know that the closer the light source, the larger the shadow.
• Know that the further away the light source, the smaller the shadow.
• Know that the distance of the light source from the object affects the size of the shadow.</td></tr>
<tr><td>RICH TASK</td><td colspan="3">Retrieval practice activity – Using what we have learnt so far write 3 questions to ask the class.
Revise KO

Introduce vocab - opaque, translucent, transparent. Define each word. Explore a range of materials can we sort them into categories? Explain reasons.

Children find different objects around the room which are the three different types.

Children to record and label the objects and explain WHY the object is opaque/translucent/transparent.</td></tr>
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	Children to test different material and use template to create simple shadow puppet. Which do we think would work best and why? Demo each puppet and discuss findings. Explore what happens when we move closer/further away from light source – why is that?		
SUPPORT AND CHALLENGE	S – stem sentence provided C – explain why it is useful that an object is opaque, translucent, or transparent		
KEY VOCABULARY	Translucent Transparent Opaque Light Block Shadow	**RESOURCES**	Torches Materials for shadow puppets, lolly sticks
LESSON 5 QUESTION	**How do shadows change throughout a day?**		
KEY KNOWLEDGE	• Know that shadows are shortest when the sun is at its highest point (midday). • Know that shadows are longest when the sun is at its lowest point.		
RICH TASK	Retrieval practice activity – quickfire questions (see flipchart) Revise KO On a sunny day - go outside hourly to draw shadow of a post. Note the position of the sun. Observe what has happened to the shadows throughout the day and take photos. Why do you think they have changed? Investigation to find an answer to how shadows change when the distance between the light source and object changes. Look in the classroom at shadows cast by an object when a torch is shone from above and the side. Children to explore shadow size in classroom by making an object from cubes then measure how far the object is from the light source and the width of the shadow before moving the object and measuring again. What do they find? Why? Recording – what will we keep the same? What will we change? Prediction, results table (distance between the light source and the object AND size of the object's shadow), conclusion		
SUPPORT AND CHALLENGE	S – stem sentences for prediction and conclusion, small group work C – What would happen if another object was placed in front of your original object? What is your prediction and what happened when you tested it? Explain what happened using scientific vocabulary.		
KEY VOCABULARY	Shadow Light Dark Midday	**RESOURCES**	Shadow time lapse Sun's shadow time lapse (N arrow is off a little bit) Torches

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	Block Opaque		Cubes Rulers
BIG QUESTION	**How does light work?**		
KEY KNOWLEDGE	Revision of key knowledge		
END OF UNIT OUTCOME	KO quiz Vocappulary to explain how light works. Children to use key vocabulary and diagrams to help them answer the question. Add key fact at the top – light travels in straight lines. Light source (primary, secondary), darkness, reflection, opaque, translucent, transparent, shadow		
SUPPORT AND CHALLENGE	S – children to explain 6 words C - children to explain 8 words		
KEY VOCABULARY	Source of light Primary Secondary Darkness Reflection Opaque Translucent Transparent Shadow	**RESOURCES**	A3 white paper Torches Mirrors Blu tack (holding mirrors) / pegs Light Maze