Children's prior learning in this area	Cultural Capital Opportunities	Key vocabulary and glossary
Observe and describe weather associated with the seasons and how day length varies. (Discussion of amount of daylight hours related to seasons) Describe the simple physical properties of a variety of everyday materials. (This will have included shiny, not shiny and is a building block to learning that light is reflected from surfaces). Know that sight is a sense and we use eyes to see.	Sun safety 	light light source waves dark absence dangerous blocked shadow reflect reflection opaque translucent transparent

Enquiry Question What is light and what is darkness?	**Enquiry Question** What is reflection? Can different materials reflect different amounts of light?
Working Scientifically skill: take measurements **Enquiry type:** Identifying, grouping and classifying; pattern seeking	**Working Scientifically skill:** plan, set up and perform an enquiry, observe closely, present and report on findings **Enquiry type:** comparative and fair testing
Remember: seasons and which season has more /less daylight hours (Do not go into why day length varies – this is Yr 5 knowledge – Yr 1 knowledge is just observing that day length varies). *Materials knowledge – shiny and dull.* Learning point 1: Light comes from a source and travels in waves. A light source makes light. Some people might think shiny materials make light but light is shining on them and the light reflects. Shiny things are not light sources. *Check: In table groups, classify objects according to whether or not they are a light source. Include misconceptions such as the moon, a mirror, a metal spoon as these reflect light and do not produce light. Therefore they are not a light source. Does not need recording in books.* Learning point 2: We need light to see things. Darkness is the absence of light. Therefore, we cannot see anything in the dark, even shiny things. We can measure light intensity in lux using a light meter/data logger.  Cloudy day Total darkness Sunny day Starry night Dusk *Practise: Show the scale above: I do/we do/you do adding the muddled labels to the scale. In books. Then, model and practise using data logger in the classroom to take measurements.* *Apply: measure the light intensity in different areas around the school/school grounds: Where are the lightest places at school? Record in a table that they draw – applying knowledge of drawing a table from previous unit.* *Deepen: What patterns did you find in your data? (Encourage children to notice a pattern that outside areas were lighter than inside areas). Orally discuss and children then write answer.*	*Remember: Show a video of a star-nosed mole (The Weird and Wonderful Star-Nosed Mole | Mammals | BBC Earth (youtube.com) on mute. Explain this animal relies on its star nose to feel and smell, it has tiny eyes and is virtually blind. Why do you think this animal has adapted to having such an unusual nose? Encourage children to refer to darkness being the absence of light and we need light in order to see, therefore it doesn't need good eyes in its habitat as there is no light there. (The light in the video has been put there by humans).* Learning point 1: When light hits the surface of an object, it is reflected. (bounces off). If the reflected light hits our eyes, we can see the object. *Check: Image of moon and light on ocean – what is the light source? How is there light on the ocean?* Learning point 2: Shiny materials reflect light beams better than non-shiny materials. A more scientific way of describing shiny materials would be to say that they are reflective materials. Learning point 3: how to plan, set up and perform an enquiry:, observe closely, present and report: *Practise: Investigation comparing how reflective materials are by shining a torch on them and closely observing the amount of light reflected (or using data loggers if feasible). Plan enquiry as a class, with children suggesting variables to keep the same and recognise when the test isn't fair. Children suggest what variable is being measured/observed and which variable is changing. With modelling, show best way to report findings to teacher: lead to the fact that as we are comparing objects, drawings or diagrams of the investigation wouldn't be helpful. Lead to the fact that they need to show best to worst material for reflection to indicate that different materials reflect different amounts of light. Because we used observations rather than measurements, a graph wouldn't be a good choice as there is no unit of measurement. However, an ordered list on a scale from best to worst would present the findings in a clear, organised way.* *Apply: Carry out enquiry and present findings.* *Deepen: Why do we need/use reflective materials?*

Enquiry Question How can we protect our eyes from the sun?

Working Scientifically skill: plan, set up and perform an enquiry; take measurements; gather and record results; present and report our findings

Enquiry type: comparative and fair testing

Remember: *Explorify: What if all your clothes were shiny?*

Set up a demonstration that sunlight causing damage over time could be carried out to make the concept more concrete – placing dark sugar paper in the window sill with an object on top. After a week, remove the object to show the paper not covered has faded. Set up demo a week or two prior to this lesson – place a question by the paper on the window sill – e.g. Will the sunlight damage the sugar paper over time? This can then act as an intro to this lesson's sticky knowledge.

Light from the sun can be dangerous.

It is very important that you never look directly at the sun, as the UV rays of light can damage your eyes very quickly.

Bright lights indoors can also damage your eyes, so you should never look at them, or shine lights into anyone's eyes.

Sunglasses with a UV filter can protect our eyes from the sun by blocking UV rays.

Sunhats with a wide brim or peak can protect our eyes by shading them from the sun.

Practise: *True/false quiz related to above info. This lesson is about protecting eyes so no knowledge or questions about suncream and sunburn.*

Apply: *Which colour makes the best sunglasses for teddy? Show the children different cellophane colours and ask to predict.orally which will reduce the light the eyes can see. Plan enquiry as a class, with children suggesting variables to keep the same and recognise when the test isn't fair. Children suggest what variable is being measured/observed and which variable is changing. With modelling, show best way to report findings to teacher. Use data loggers to take measurements.*

Deepen: *Present findings in appropriate way – scale/bar graph and answer the question, referring to results. Make it clear that real sunglasses also have a UV filter, and play sunglasses like we could make for teddy or you can but from a toyshop do not protect your eyes from UV light.*

Enquiry Question What is a shadow? Do all objects cast shadows?	**Enquiry Question** Can the size of shadows change?
Working Scientifically skill: plan, set up and perform an enquiry, observe closely, present and report on findings **Enquiry type:** pattern seeking	**Working Scientifically skill:** plan, set up and perform an enquiry, take measurements, present and report on findings **Enquiry type:** comparative and fair testing
Remember: Short multiple choice quiz on learning so far in unit. Learning point 1:Shadows are made when light from a light source is blocked. Objects that can block light are opaque - ones that do not let light pass through. Demonstrate above with a torch/lamp and your hand and other opaque objects. Children should explore making shadows with torches too. (Safety point – don't shine torches in eyes). *Check: Label a diagram with light source, light, opaque object and shadow. Orally explain to a partner what is happening in the diagram, using the vocabulary.* Learning point 2:Transparent materials do not cast shadows because light passes through the material. Translucent materials allow some light to pass through so faint shadows are cast. *Practise: Sort the pieces of paper as a table group – opaque, translucent and transparent.* *Apply:* *Deepen:* *Suggested task: Explore a range of opaque, translucent and transparent materials for casting shadows. Report findings either written or labelled diagrams.* 	Children will know how to take accurate measurements of length. ***Practise:** I do/we do/you do: Practise using ruler to take accurate measurements between two lines on worksheets and mark as a class.* Learning point 1: The size of shadows change due to how near or far the light source is from the object blocking the light. Learning point 2: Learn how to plan, set up and perform enquiry as before – working through planning format. *Apply: Carry out enquiry,* *Deepen 1: Look at results and conclude this sticky knowledge:* The closer an object is to a light source, the larger the shadow it casts. This is because the object will block a larger area of light. *Deepen 2: Look at application of shadows in real world – link below – 3rd video on x-rays.* Click on the link below to see how to sey up changing shadow investigation. | STEM