
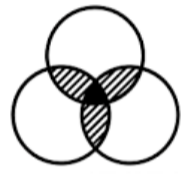





National Curriculum:

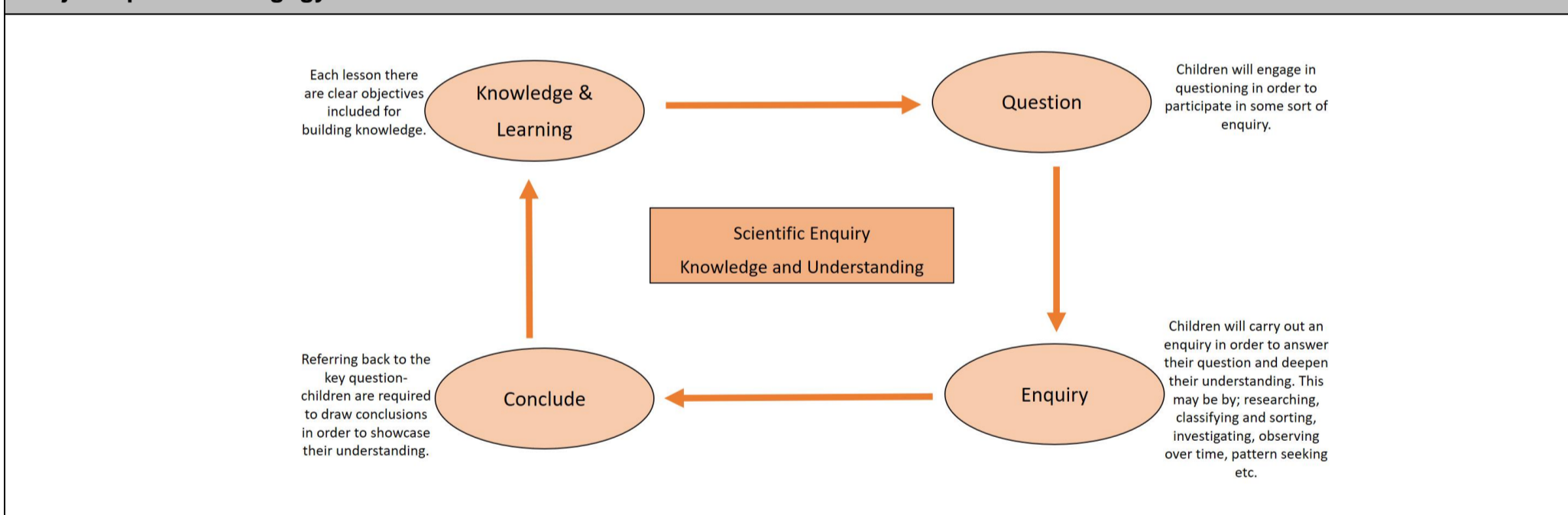
- Pupils should be taught to:**
- Recognise that they need light in order to see things and that dark is the absence of light.
 - Notice that light is reflected from surfaces.
 - Recognise that light from the sun can be dangerous and that there are ways to protect their eyes
 - Recognise that shadows are formed when the light from a light source is blocked by an opaque object.
 - Find patterns in the way that the size of shadows change.

Prior Learning - What children have learned previously	Current Learning - What children will learn now and build on previous knowledge	Future Learning - What children will learn building on what they are learning now
In Year 1, children learnt to: <ul style="list-style-type: none"> • Observe changes across the four seasons • Observed and describe weather associated with the seasons and how day length varies. Children may: <ul style="list-style-type: none"> • have some knowledge of where light comes from. • have seen their shadows and may know they appear when it is sunny. • have some understanding of a reflection. • understand they need light to be able to see things. 	In Year 3, children should be taught: <ul style="list-style-type: none"> - What is light? - Why do we protect our eyes? - What keeps us safe in the dark? - Why are mirrors good reflectors? - How are shadows formed? - How do shadows change? 	In Year 6, children will be taught: <ul style="list-style-type: none"> • Light travels 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 in to the eye. • Explain we see things because light travels from light sources or light sources to objects and then to our eyes. • Use the idea that light travels in straight lines to explain why shadows have the shape as the object that cast them.

Threshold Concepts:

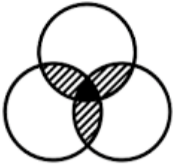



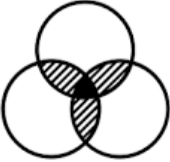

 Comparative Tests	 Identifying and classifying	 Observation over time	 Pattern Seeking	 Research
• Changing one variable to see its effect on another, whilst keeping the others the same.	• Making observations to name, sort and organise items.	• Observing changes that occur over a period of time ranging from minutes to months.	• Identifying patterns and looking for relationships in enquiries where variables are difficult to control.	• Using secondary sources of information to answer scientific questions.



Subject Specific Pedagogy:



Key Vocabulary:	Light, light source, dark, reflect, visible, bounce, mirror, ray, sun, glare, travel, straight, opaque, translucent, transparent, block, shadow, material and surface.		
Key Scientist	James Clerk Maxwell (Visible and Invisible Waves of Light)		
Number of weeks:	6	Number of sessions:	6

Resources					
Session 1	Session 2	Session 3	Session 4	Session 5	Session 6
Black out blinds Light sources and non-light sources (plug in light, torches, candle, mirror, tinfoil, coin, book, glass, iPad, digital clock, reflector, yellow paint.) Question spinners.	A range of sunglasses, umbrellas and hats.	Torch Range of materials.	Mirrors, Lego, torches.	Opaque, translucent and transparent objects. Torch	Torch. Tape measure Question spinners Object

Session 1	<p>Threshold Concepts:</p> 	<p>Key Question: What is light?</p> <p>Scientific Knowledge There must be light for us to see. Light comes from a source. Without light it is dark. We need light to see things even shiny things.</p> <p>Scientific Skill Classify objects to answer a question. Record findings. Use results to draw simple conclusions.</p> <p>Assessment statement: Recognise that they need light in order to see things and that dark is the absence of light.</p>	<p>Knowledge: Explain that there are lots of light sources that give us light and it is a type of energy. Light is what enables us to see things. If we don't have light, we can't see. Dark is what happens when you don't have any light.</p> <p>Question: Which of these are light sources?</p> <p>Enquire: As a class go into a darkened room and explore which ones are light sources. Provide the children with images of light sources and not light sources for them to sort. Give children the question spinner (which, how, who, what, why, where) (electrical, man-made, brightest, natural, dark, light) and ask them create 4 questions on post it notes. Pick one question as a class that focuses on them recording information and drawing simple conclusions. For example 'Which light source is the brightest?' Work together to answer it.</p> <p>Conclude: Children to explain what is light and why we need it and what is darkness. Children to use their above findings to add to their conclusion.</p>
Session 2	<p>Threshold Concepts:</p> 	<p>Key Question: Why do we protect our eyes?</p> <p>Scientific Knowledge The sun is dangerous and emits UV rays of light.</p> <p>Scientific Skill</p> <p>Assessment statement: Recognise that light from the sun can be dangerous and that there are ways to protect our eyes.</p>	<p>Knowledge: Explain that the sun is a star that is extremely powerful. It is dangerous to look directly at it. It is the biggest light source that we use and it gives us heat as well as light. Children must be warned that it is not safe to look directly at the sun even when wearing dark glasses.</p> <p>Question: Which item will give you the most protection?</p> <p>Enquire: Children research which item will offer the most protection and then share this by advertising it for others with five key selling points.</p> <p>Conclude: Children to explain why we need to protect our eyes from the sun and know how they can do this.</p>
Session 3	<p>Threshold Concepts:</p> 	<p>Key Question: What keeps us safe in the dark?</p> <p>Scientific Knowledge We need light to see even shiny things. Shiny materials reflect light beams better than non-shiny materials.</p> <p>Scientific Skill Make careful observations. Report on findings from enquiries.</p> <p>Assessment statement: Notice that light is reflected from surfaces.</p>	<p>Knowledge: We can see objects because light is reflected off their surfaces. The light travels in a straight line from the light source and bounces off the object to our eyes. Some objects are designed to reflect a lot of light.</p> <p>Question: Which material reflects the most light?</p> <p>Enquire: Using a torch test the different materials</p> <p>Conclude: Children to explain which material keeps us the safest in the dark making reference to their enquiry.</p>
Session 4	<p>Threshold Concepts:</p> 	<p>Key Question: Why are mirrors good reflectors?</p> <p>Scientific Knowledge Beams of light reflect off some materials.</p> <p>Scientific Skill Make careful observations. Make predictions.</p>	<p>Knowledge: Mirrors work by reflecting light at the same angle that it hits it. The surface of a mirror is so smooth; it reflects light without disrupting the image that is being reflected. It creates a mirror image.</p> <p>Question: How can we use a mirror to see something that is blocked?</p> <p>Enquire: Model seeing your friend behind you, as a reflection in a mirror. Discuss what you notice. What if an object was in the way? Can we still use mirrors to see? Children to use the challenge cards to explore this.</p> <p>Conclude: Children to explain if the mirror helped them to see a blocked object and explain why.</p>
Session 5	<p>Threshold Concepts:</p>  	<p>Key Question: How are shadows formed?</p> <p>Scientific Knowledge A shadow is formed when light is blocked.</p> <p>Scientific Skill Record findings using simple scientific language.</p>	<p>Question: Which objects create shadows?</p> <p>Enquire: Explore a range of opaque, translucent and transparent objects using a torch to see a shadow is cast. Children to record using scientific words what they notice.</p> <p>Conclude: Children to use their results to report which objects created the best shadows and why.</p> <p>Knowledge:</p>

		<p>Use results to draw simple conclusions.</p> <p>Assessment statement: Recognise that shadows are formed when the light from a light source is blocked by an opaque object.</p>	<p>Explain what opaque, translucent and transparent are. Shadows are formed when the light from a light source is blocked by an opaque object. Conclude: Reflect on your conclusion</p>
<p>Session 6</p>	<p>Threshold Concepts:</p>  	<p>Key Question: How do shadows change?</p> <p>Scientific Knowledge A shadow's shape and size can be changed.</p> <p>Scientific Skill Set up simple fair tests. Make systematic and careful observations. Take accurate measurements using standard units.</p> <p>Assessment statement: Find patterns in the way that the size of shadows change.</p>	<p>Question: How can you change the size of a shadow?</p> <p>Enquire: Set up a fair experiment to test how shadows change when the light source is moved closer or further away from an object. As a class discuss the importance of keeping it a fair test. Give children the question spinner (which, how) (height, distance, angle, shortest, longest.) and ask them to write down one question. They work in pairs to enquire into their question.</p> <p>Conclude: Children to use their results to report how the shadows changed.</p> <p>Knowledge: Explain and show using a video that your shadow changes during the day.</p>

