Science – Light

Year: 3

Term: Spring

Prior knowledge

Explore how things work. (Nursery - Light)
Talk about the differences in materials and changes they notice. (Nursery - Light)
Describe what they see, hear and feel whilst outside. (Reception - Light)
Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y1 - Animals, including humans)
Describe the simple physical properties of a variety of everyday materials. (Y1 - Materials)

Key Knowledge

Light sources
A source of light makes light. The Sun and other stars, fires, torches and lamps all make their own light and so are examples of sources of light. Some animals, such as fireflies and glow-worms, are light sources. They make their own light to attract mates.

Reflection
When light from an object is reflected by a surface, it changes direction. It bounces off the surface at the same angle as it hits it. Smooth, shiny surfaces such as mirrors and polished metals reflect light well. Dull and dark surfaces such as dark fabrics do not reflect light well.

How does the eye detect light?

Light travels in straight lines. When light hits an object, it is reflected (bounces off) and enters our eyes. This is how we see the object. Darkness is the absence of light. Light travels in a straight line. Light can travel through some materials and not others. Light from the sun can be dangerous and we can protect our eyes in many ways including sunglasses or a hat.

How shadows are formed
An object that does not allows any light to pass through will form a shadow. Shadows are formed by light, because if light shines onto an object, and the object blocks the light, the light will go sideways of the object, and therefore, a shadow is formed. The size of the shadow changes according to the distance between the light source and object.

Key skills
a. I use my results to draw a conclusion and make predictions for answering a different question. b. I can identify some simple differences or similarities when making comparisons. c. I support my answers by pointing out the scientific evidence. d. I can report my conclusion from the results of my experiment. e. I can gather the data I need to answer a scientific question and then present them in a table, grid or graph. f. I can record my findings in simple labelled diagrams, keys, bar charts or tables. g. I can set up a simple fair test experiment to answer a scientific question. h. I can make observations and record measurements (for example in mm or g). i. I can ask relevant scientific questions.
Future Learning
Recognise that light appears to travel in straight lines. (Y6 - Light) 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. (Y6 - Light) 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. (Y6 - Light) Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. (Y6 - Light)

Key Vocabulary	
Working scientifically key vocabulary – observe, test, record, equipment, prediction, measurement, enquiry, dependent variable, independent variable, fair test, similar, theory, hypothesis	
Light/ light source – something that makes things visible.	**Opaque** - not able to be seen through; not transparent.
Dark/ darkness - the partial or total absence of light.	**Transparent** - allowing light to pass through so that objects behind can be seen.
Reflected – something bounces back	**Blocked** – to come in the way of something.
Surfaces - the outside part or uppermost layer of something (often used when describing its texture, form, or extent).	**Translucent** - If a material blocks some of the light but also lets some through.
Protect - keep safe from harm or injury.	**Beam –** a ray of light from a light source
Shadows - dark area or shape produced by a body or object blocking the rays of light.	
Additional vocabulary to discuss across the unit – change, distance, absence, size, dangerous, mirror, solid	
<u>Deepening and broadening the knowledge and understanding for GDS learners:</u> • explains why animals, including humans, are unable to see when it is completely dark • explains that we see objects because light reflected from the object enters our eyes • understands that some surfaces are better than others at reflecting light and can give examples of how this information could be used in everyday life, *e.g. to provide reflective stripes on an item of clothing* • understands that light can be absorbed in different ways by different coloured materials and how this information can be used in everyday life, *e.g. deciding*	**<u>Key Outcomes</u>** **1. Can I make observations about how light reflects off various surfaces?** *Children will use torches to reflect light and draw diagrams to show how light reflects, explaining their findings.* **2. Can I explain how light from the sun can be dangerous and how we can protect our skin and eyes?** *Children will research and report their findings about what UVA is, the effect it can have and how certain materials can protect us from this.* **3. How are shadows are formed when the light from a light source is blocked by an opaque object?**

whether to wear a black or a white t-shirt on a hot sunny day • is beginning to observe that water and other liquids can change the path of light (refraction) • knows that light is scattered off objects • knows that light travels in straight lines • knows that the darkness of a shadow can vary depending upon whether the object blocking the light is opaque, translucent or transparent • knows that the position, shape and size of a shadow depends upon the position of the object in relation to the light source • explains how shadows move when the object causing the shadow moves • explains why shadows vary in length according to the time of day • explains why shadows vary in length according to the time of the year • explains the difference between a reflection and a shadow	*Children will use light sources (sun/torches) to investigate and observe what causes shadows and where they are formed in relation to the light source, what happens to the shadows when the opaque object is moved.* **4. How do shadows change when the object or source of light is moved?** *Children will make predictions with reasons about how a shadow may change when is the object blocking light closer or further from the light source. They'll investigate this by measuring and record results.* **5: Can I can identify patterns in the way that the size of shadows change?** *Children will use their findings (results) to identify and explain any patterns.* **6: Can I identify materials that are transparent, translucent, opaque and explain why they are suitable for specific purposes?** *Children will investigate and identify transparent, translucent and opaque properties of materials.*