# Light (Physics)

## Year 3

**End Points:**

- Light enables us to see things
- Darkness it the absence of light
- The sun is an important source of light for life on earth
- Light travels in straight lines
- Transparent material allows light to pass through it
- Opaque material blocks light from passing through it
- Mirrors reflect light
- Mirrors of different shapes reflect light differently
- A shadow is created when an object blocks the path of light
- The sun appears to move across the sky as our planet revolves on its axis
- Shadows change in size and shape throughout the day

In this unit children will learn that light is an energy that enables us to see, and interact with, the world around us. They will learn there are many different sources of light and the light of the sun is vital for life on earth. Children will work scientifically to find out if materials are transparent or opaque using torches. They will learn that light travels in straight lines and sometimes bounces off from an object or material and that scientists call this reflection. There are frequent opportunities for observing and investigating how light behaves and how materials interact with light during this unit. Going beyond the requirements of the National Curriculum at this stage, children will have the opportunity to investigate mirrors and how light reflects from plane, concave and convex mirrors.

Working scientifically, children will plan and undertake an investigation to answer the question, ‘Do shadows stay the same throughout the day?’ Planning this investigation will require children to think about the best ways to investigate things, how to make sure their investigation is fair, and how to record their findings. Children should understand that the Earth is rotating on an axis, the sun is not orbiting the earth as it may appear from the sun seeming to move across our sky. Children will understand that the sun’s position in our sky determines the shape and size of our shadows. Children will see a time-lapse video of a sundial and will learn that this way of measuring time was used thousands of years ago. (Links to Ancient Greece in History.)

To assess their understanding, there are two options at the end of this unit. The first option requires children to draw a scientific diagram to show how shadows are made before providing a short-written explanation. The second is an extended piece of writing, or essay, that answers the question ‘Why is light important?’ Drawing scientific diagrams and organising writing to explain something will help children to understand how scientists work and communicate their thinking.

Alongside the link to History with sundials, this unit also links to Visual Arts in Year 4 where children look at how artists represent shadows in their work.

**Lesson Sequencing:**

In lesson one, children will learn that light enables us to see things and that the absence of light is darkness, where seeing becomes harder. They will also learn about light sources. In the second lesson, they will learn that light travels in straight lines and that it can either pass through material or be blocked by it, causing a shadow. Next, children will build upon their understanding of how light travels by learning that mirrors reflect light and that the shape of the mirror can affect the reflection. In lessons four and five, children will investigate how shadows change throughout the day, exploring how the Earth's movement affects the size and shape of the shadow. In the assessment lesson, children can apply the knowledge learnt by drawing a scientific diagram to explain how shadows are made or by writing short-written answers to a series of scientific questions.

**Misconceptions:**

- We can still see even where there is an absence of any light
- Our eyes 'get used to' the dark
- Light is only found in bright areas
- We see things because light travels from our eyes to objects
- Opaque objects do not reflect any light
- The moon and reflective surfaces are light sources
- A transparent object is a light source
- Shadows contain details of the object and not just the outline
- Shadows result from objects giving off darkness

**Working Scientifically criteria met in this unit:**

- 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