

Science Knowledge Organiser—Light

Key Knowledge

Learn these key facts—**key points in red**

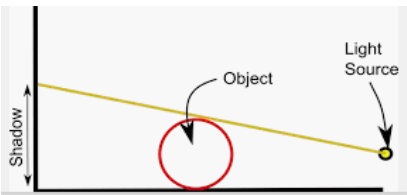
What should I already know?

Light sources produce light and other objects reflect light. Shiny objects reflect light more than dull objects. Shadows are caused when certain materials block light. Opaque, translucent and transparent objects block light in different ways. The further away the light source is, the smaller the shadow and vice-versa.

What is light and how does it behave?

Light is a form of energy made up of photons, which allows us to see things. Light travels very quickly and appears to travel in straight lines (**rays**) but when passing through transparent materials such as water and glass, light bends or turns – known as **refraction**.

Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them and to explain how periscopes work.



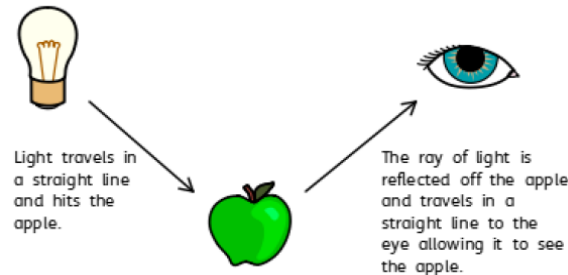
Spectrum of light:

Light is made of many different colours (white light), known as the **spectrum**. When light hits an object, some of the colours are absorbed by the object and some are reflected. This enables us to see objects in different colours.



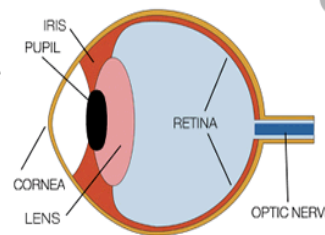
How do we see?

We see through our **eyes**, which are organs that take in light and images and turn them into impulses that our brain can understand. We can see things because light either comes from an object—a **light source**—or is **reflected** by an object in straight lines. **Reflection** is when light bounces off a surface changing its direction of travel. Light rays reflect (bounce) off objects and into our **eyes**, allowing us to see.



Parts of the eye:

Light enters the eye through the **pupil**. The iris helps the pupil change size depending on how bright the light is. Light then hits the retina at the back of the eye. The retina turns light into signals the brain understands. The optic nerve takes signals from the rods and cones to the brain. The brain sends feedback signals to the lens telling it how to focus so we can see clearly.



Key Vocabulary

Understand these key words

Word	Definition
eyes	globular organs of sight in the head of humans and vertebrate animals.
filter	a device to remove unwanted material (liquid, gas, light or sound).
light	the natural agent that stimulates sight and makes things visible.
light source	something that provides light, whether it be a natural or artificial source of light (e.g. the sun, a torch).
opaque	an object which does not allow light to pass through (e.g. wood).
translucent	an object which allows some light to pass through it. It may be possible to see some unclear images through the object (tissue paper).
transparent	an object which allows light to pass through it so that objects behind it can be easily seen (glass).
periscope	An apparatus consisting of a tube of attached to a set of mirrors or prisms through which an observer can see things that are otherwise out of sight.
prism	when light passes through a different object and its direction changes.
rainbow	an arch of colours visible in the sky, caused by the refraction and dispersion of the sun's light by rain or other water droplets in the atmosphere.
ray	a beam of light given off by a light source.
reflection	the throwing back by a body or surface of light, heat or sound without absorbing it.
refraction	the bending of light as it passes from one substance to another with the bending caused by the difference in density between two substances.
shadow	a dark area or shape produced by a body coming between rays of light and a surface.
spectrum	a band of colours, as seen in rainbows, produced by separation of the components of light by their different degrees of refraction.

Focus Scientist — Neil deGrasse Tyson

Neil deGrasse Tyson (b.1958) is an American astrophysicist, cosmologist and planetary scientist. He is also a passionate advocate for the power of science and presented the wonderful TV show Cosmos: A Spacetime Odyssey.



Focus Scientist — Sir Isaac Newton

Sir Isaac Newton (1643-1727) studied Science and philosophy at the University of Cambridge. Among other things he discovered when light travels through a prism it is refracted and this proves that white light is made up of the colours of the rainbow.

