

Year 6

Unit: Light

Prior learning

Year 3 – We need light to see things and that dark is the absence of light.

Year 3 – Light is reflected from surfaces.

Year 3 – Light from the sun can be dangerous and that there are ways to protect our eyes.

Year 3 – Shadows are formed when the light from a source is blocked by an opaque object.

Later learning (not in Year 6)

KS3 – There are similarities and differences between light waves and waves in matter.

KS3 – Light waves travelling through a vacuum; speed of light.

KS3 – The transmission of light through materials: absorption, diffuse scattering, and specular reflection at a surface.

Key Questions:

What happens when light bounces off a surface?

How are shadows formed?

What do you call an object that does not allow light to travel through it?

How do we see an object?

A child says that a shadow takes the shape of the light source. Is this true or false? Explain your reasoning.

Intent:

To recognise that light appears to travel in straight lines.

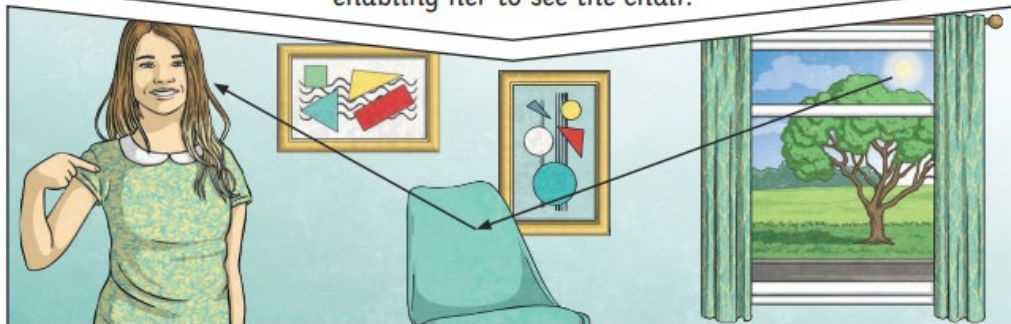
To understand that objects are seen because they give out or reflect light into the eye.

To understand that we see things because light travels from a source to our eyes or from a source to an object and then our eyes.

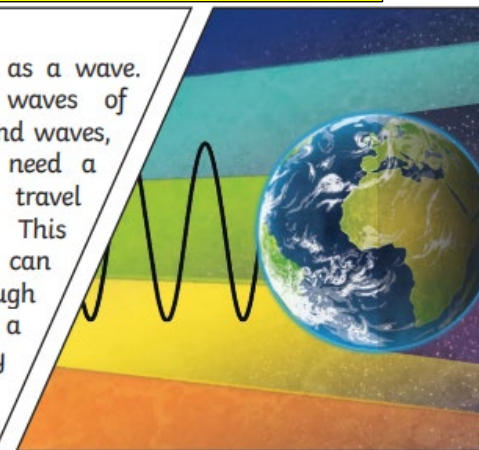
To recognise the connection between light and shadows.

We need **light** to be able to see things. **Light** waves travel out from sources of **light** in straight lines. These lines are often called rays or beams of **light**.

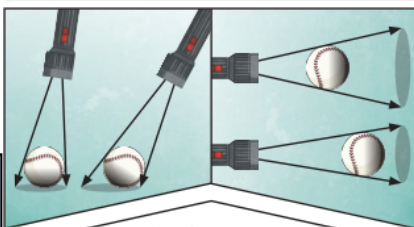
Light from the sun travels in a straight line and hits the chair. The **light** ray is then **reflected** off the chair and travels in a straight line to the girl's eye, enabling her to see the chair.



Light travels as a wave. But unlike waves of water or sound waves, it does not need a medium to travel through. This means **light** can travel through a vacuum - a completely airless space.



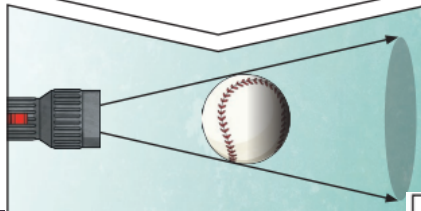
Isaac Newton shone a **light** through a transparent **prism**, separating out **light** into the colours of the rainbow (red, orange, yellow, green, blue, indigo and violet) - the colours of the **spectrum**. All the colours together merge and make visible **light**.



A **shadow** is always the same shape as the object that casts it. This is because when an **opaque** object is in the path of **light** travelling from a **light** source, it will block the **light** rays that hit it, while the rest of the **light** can continue travelling.

Shadows can

also be elongated or shortened depending on the angle of the **light** source. A **shadow** is also larger when the object is closer to the **light** source. This is because it blocks more of the **light**.



The spoon in this water looks as if it is bent. This is because **light** bends when it moves from air to water. When **light** bends in this way, it is called **refraction**.

The **law of reflection** states that the angle of **incidence** is equal to the angle of **reflection**. Whenever **light** is **reflected** from a surface, it obeys this law.

The angle of **reflection** is the angle between the normal line and the **reflected ray** **light**.

The angle of **incidence** is the angle between the normal line and the **incident ray** of **light**.

angle of **reflection**

reflected ray

normal line

incident ray

angle of **incidence**



Vocabulary

Angle	The direction from which you look at something.
Dark	The absence of light.
Dim	A light that is not bright.
Electricity	A form of energy that can be carried by wires and is used for heating and lighting, and to provide power for machines.
Emits	To emit a sound or a light means to produce it.
Light	A brightness that lets you see things.
Mirror	A flat piece of glass which reflects light, so that when you look at it you can see yourself reflected in it.
Opaque	If an object or substance is opaque, you cannot see through it.
Reflects	Sent back from the surface and not pass through it.
Shadow	A dark shape on a surface that is made when something stands between a light and the surface.
Source	Where something comes from.
Surface	The flat top part of something or the outside of it.
Torch	A small electric light which is powered by batteries and which you can carry.
Translucent	If a material is translucent, some light can pass through it.
Transparent	If an object or substance is transparent, you can see through it.