

# YEAR 6: AUTUMN 1 : LIGHT

## Science:

### CHRONOLOGICAL UNDERSTANDING:

#### Recall/vocabulary

To recognise that light appears to travel in straight lines.  
 To 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.  
 To 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.  
 To use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.

Light	Light source	Reflection	Angle of Incidence	Angle of reflection	Refraction	Visible spectrum	Prism
Shadow	Transparent	Translucent	Opaque				

**Light** appears to travel in straight lines and we see objects when light from them goes into our eyes. The **light** may come directly from **light sources** but for other objects, some light must be reflected from the object into our eyes for the object to be seen.

Objects that block light (are not fully **transparent**) will cause **shadows**. Because light travels in straight lines, the shape of the shadow will be the same as the outline shape of the object and the size of the shadow is larger when the light source and object move closer to each other as more of the light is blocked.

#### **We need light to see**

*Sight is one of our senses. Our receptor for light is the eye. The ancients thought that something emerged from our eyes to sense or feel the environment. It is now realised that light enters into the eye and is detected there and hence we see. If there is no light, we see nothing – darkness is the absence of light. Have you ever been anywhere where there is no light at all, e.g. a deep cave or a tunnel? You can lift your hand in front of your face and you will see nothing – rather scary!*



**Light travels in a straight line from a light source. We can see this if we shine a torch across a dark room.**

#### THINKING POINT:

How would life be different in a world without human made light?



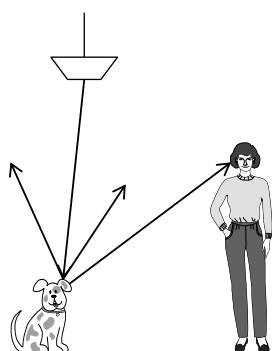
- Learning links:**
- History WWII:**
- Searchlights during bombing raids.
- Learning links:**
- Computing:**
- Time lapse videos

So light travels from a source. The daylight has travelled to Earth from the Sun but between us and the Sun there is space, which is mostly quite empty, i.e. it is a vacuum. This must mean that light can travel through a vacuum, or in scientific jargon, light does not need a medium in which to travel. This is very different to sound which does not travel in a vacuum.

We can see other things, such as a dog, not because a dog emits light but because light from a source, such as the room light reflects off the dog and some of that reflected light enters our eye. So if the dog is somewhere where there is no light source, such as in a completely darkened room, no light will be reflected off it and so we will not see it and will probably trip over it!

Everything that we see that is not itself a light source is only seen because light from a source has been reflected from its surface.

The light from an uneven surface, such as a dog or a desk, is reflected from the surface in all directions – the scientific term for this is ‘scattering’.



#### THINKING POINT:

Why are we unable to see colours in poor light?



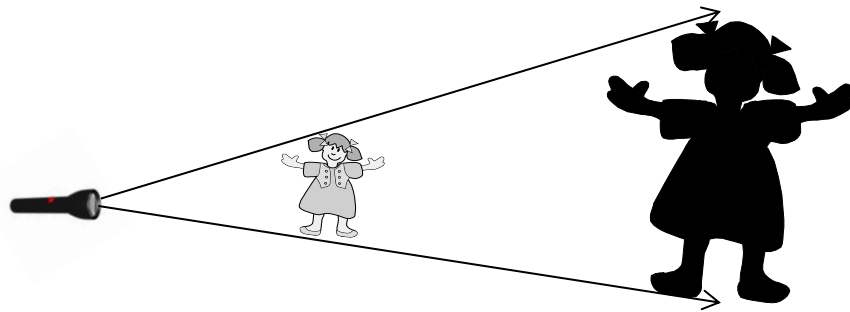
## Transparency

Light can travel through certain materials, such as glass, water, clear plastic and such materials are called transparent. Translucent materials, like greaseproof paper and frosted glass let some but not all light through. They diffuse the light.

## Opaque materials and shadows

Most materials do not allow light through at all and these are called opaque. When light from a source cannot travel through a material then a shadow can be formed.

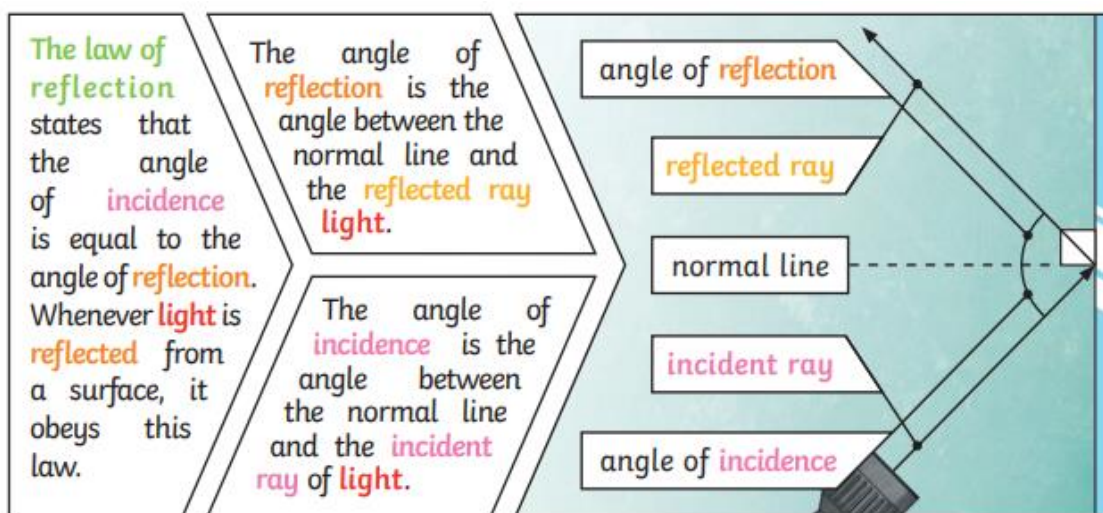
The size of the shadow changes depending on the distance between the light source and the object causing the shadow.



### THINKING POINT:

How does the distance between the torch and the object blocking the light influence the size of the shadow?

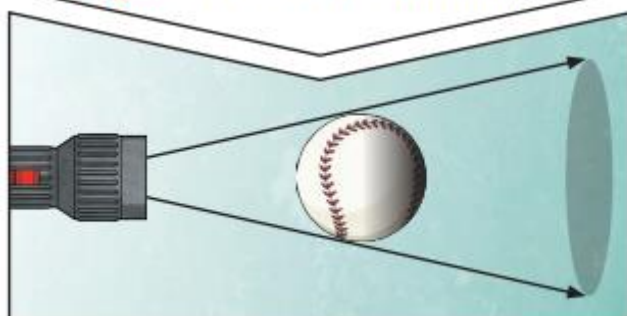
## Reflection



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.



### THINKING POINT:

How can you increase the number of reflections in a mirror?

## KEY ASSESSMENT AND APPLICATION OPPORTUNITIES:

### EXS:

Can light travel round corners? How could you prove or disprove your answer?

What is refraction?

How is a rainbow formed?

### GDS:

Can you explain why if you hold a pen in your right hand, your reflection will hold the pen in your left?

Can you think of an everyday use for convex and concave mirrors?