

## Overview:

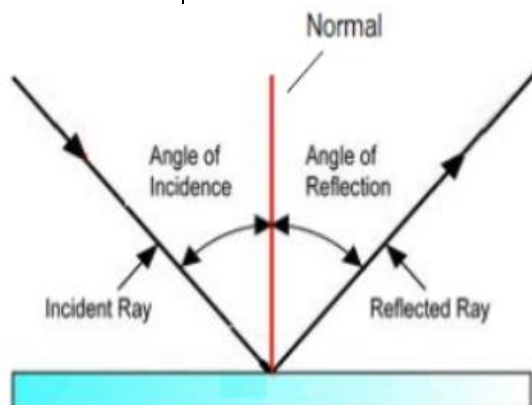
During this sequence of learning, pupils will look at the way light travels and how we are able to see things, and use the idea of light travelling in straight lines to explain why shadows have the same shape as the object that casts them.

## What should I already know?

- Light is a form of energy.
- Energy comes in different forms and can be neither created nor destroyed, only changed from one form to another.
- We need light to see things and that darkness is the absence of light.
- Light travels in straight lines.
- Light is reflected when it travels from a light source and then 'bounces' off an object.
- Everything that we can see is either a light source or something that is reflecting light from a light source into our eyes.
- The Sun is a light source, but the Moon is not and is merely reflecting light from the Sun.
- Many light sources give off light and heat.
- The Sun gives off light and heat when hydrogen turns into helium.
- Sunglasses can protect eyes from sunlight but looking at the Sun directly - even with sunglasses - can damage the eyes.
- Opaque objects block light creating shadows and light passes through transparent objects.
- Opacity/transparency and reflectiveness are properties of a material.
- As objects move towards a light source, the size of the shadow increases.

## Vocabulary:

reflection (revision)	When light bounces off an object allowing us to see it.
incident ray (revision)	A ray of light that points towards and hits a surface.
translucent (revision)	Allows some light to pass through e.g. a pair of sunglasses.
angle of incidence	The angle that a ray of light, makes when it hits a surface.
angle of reflection	The angle that a ray of light, makes when it bounces off a surface.



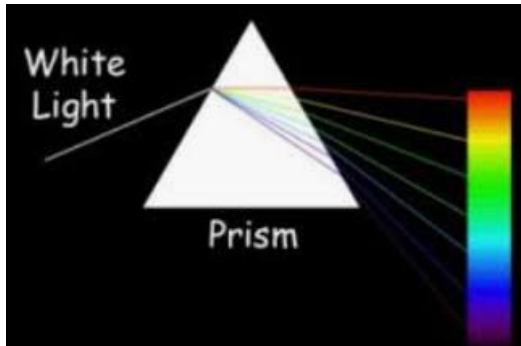
## What will I know by the end of the unit?

- Translucent objects allow some light to pass through, but some of the light changes direction as it passes through the object; this means that something seen through a translucent object is not clearly defined.
- When light passes from one medium to another (e.g. from air to water), it changes direction; this is called refraction; this happens because light travels at different speeds in different media. This is why some things look different when they are placed in water like the pencil shown in the picture.

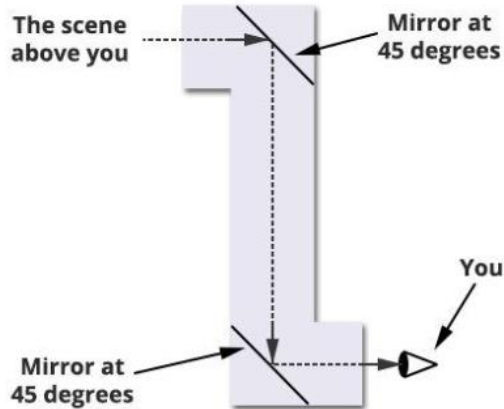


refraction	The bending of light as it passes from one substance to another.
spectrum	A band of colours, as seen in rainbows, produced by the separation of the components of light.
medium	A substance or a material that carries a wave.

- White light comprises all the colours of light.
- White light refracted by two surfaces in a prism will spread out so that all of its constituent colours can be seen; this array of colours is called a spectrum; it happens because the different colours that constitute white light travel at different speeds.



- How to draw a diagram to show why the shape of a shadow will match the shape of an object.
- When light reflects off an object, the angle of incidence is equal to the angle of reflection.
- A periscope takes advantage of the predictable angles of incidence and reflection to allow an image to be shown to a viewer. A periscope has mirrors that are fitted into it at the angle of 45 degrees meaning the light bounces off them allowing the person to see.



periscope

An instrument people use to look at something from a hidden position. These are used by submarines to see above the water.

