

Knowledge Organiser
Subject: Science Unit: Light and sound part 1

Overview:

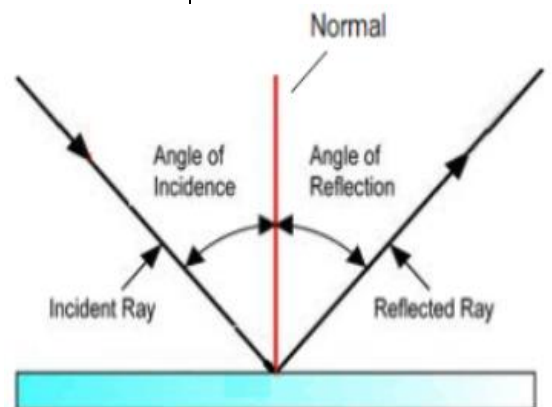
During this sequence of learning, pupils will look at the way light travels and how we are able to see things, and use the idea of light travelling in straight lines to explain why shadows have the same shape as the object that casts them.

What should I already know?

- Light is a form of energy.
- We need light in order to see things and the absence of light is darkness.
- Light only travels in straight lines.
- A light source is something that gives out light such as the sun, a lightbulb, torch, candle etc.
- We can see light sources as the light travels from them in a straight line into our eyes.
- Some objects like high visibility jackets are reflectors rather than light sources.
- We can see light sources as the light bounces off them and then into our eyes.
- The sun is a light source but the moon isn't as it just reflects the light from the sun.
- Many light sources also give off heat at the same time.
- The sun gives off light and heat when it turns hydrogen (a gas) into helium (another gas).
- The sun can be very harmful to both the skin and the eyes. You should never look directly at the sun as it can damage your eyes.
- The sun can also burn your skin and in some cases cause skin cancer.
- You can protect your eyes by wearing sunglasses and your skin by keeping it covered, staying in the shade or using sun cream.
- Opaque objects block light and cause a shadow to form where the light cannot reach.
- Transparent objects allow light to pass through and translucent objects allow some light through.
- When you move the light source closer to an object the shadow becomes larger in size.
- How to carry out an investigation and write a report.

Vocabulary:

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| 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. |



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| 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. |

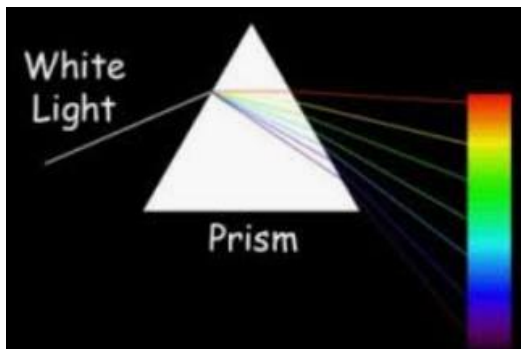
What will I know by the end of the unit?

- 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.

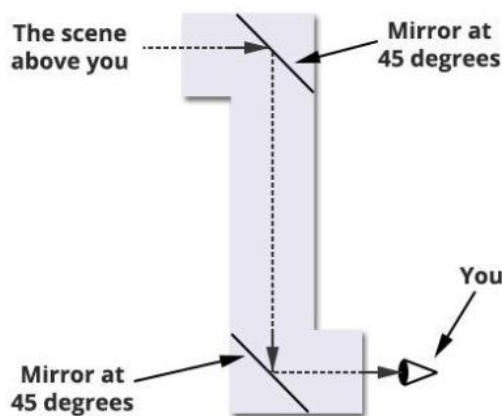
- When light passes from one medium to another (e.g. from air to water), it changes direction; this is called refraction; this happens because light travels at different speeds in different media. This is why some things look different when they are placed in water like the pencil shown in the picture.



- 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.



