



Knowledge is Power...

Ivington C of E Primary and Preschool

Reaching together... stand firm in your faith, be courageous and strong - 1 Corinthians 16:13



Year 4/5 - Autumn 2023

Key Vocabulary

Incident ray	A ray of light that hits a surface
Light	A form of energy that travels in a wave from a source.
Light source	An object that makes its own light.
Opaque	Objects that do not let any light pass through them.
Reflection	When light bounces off a surface, changing the direction of a ray of light.
Reflected ray	A ray of light that has bounced back after hitting a surface.
Refraction	When light bends as it passes from one medium to another e.g. from air into water.
Shadow	An area of darkness where light has been blocked.
The law of reflection	The law states that the angle of the incident ray is equal to the angle of the reflected ray.
Translucent	Objects that let some light through but scatters the light so we cannot see through them properly.
Transparent	Objects that let light pass through them easily meaning you can see through the object.
Visible spectrum	Light that is visible to the human eye. It is made up of a colour spectrum.

Light

Aims (in line with the National Curriculum)

- Recognise that light appears to travel in straight lines.
- 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.
- 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.
- Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.

Working scientifically

- Planning different types of scientific enquiries to answer questions, including recognising, and controlling variables where necessary.
- Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
- Recording results using scientific diagrams and labels, tables, scatter graphs, bar, and line graphs.
- Using test results to make predictions to set up further comparative and fair tests.
- Reporting and presenting findings from enquiries, including conclusions, causal relationships, and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.
- Identifying scientific evidence that has been used to support or refute ideas or arguments.

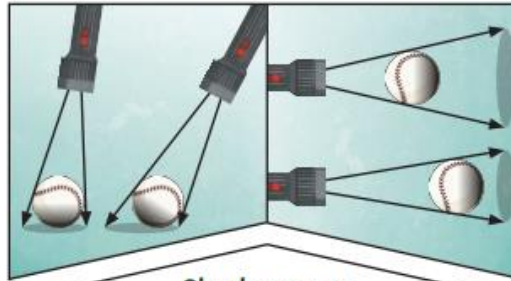
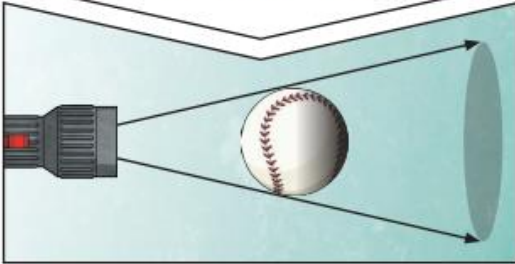
Prior knowledge

- Recognise that we need light in order to see things and that dark is the absence of light.
- Recognise that when light hits an object, some of it will be reflected from the surface.
- Recognise that shadows are formed when light cannot pass through an object and that an opaque object will make good shadows.
- Recognise that the size of a shadow can change depending on the position of the light source or on the distance between the light source and the object.
- Understand that light from the sun is so intense that it can damage our eyes and that we must therefore not look directly at the sun even when wearing dark glasses.

Subject Specific Knowledge - Pupils will learn:

- That light appears to travel in straight lines.
- That we see things because our eyes receive light.
- That we see most objects because light from a light source travels to the object and then to our eyes, unless it is a light source in which case, we see light that travels from it directly to our eyes.
- That we can use mirrors to see round corners.
- That mirrors reflect an image of any object because light bounces off a mirror in exactly the same pattern as it arrives.
- That light is reflected by different amounts depending on the roughness and colour of an object (for example, a white object reflects more light than a dark object).
- That shadows have the same shape as the objects that cast them because light travels in a straight line.
- That light passes through some material (transparent) and not others (opaque), and how this affects the ability of an object to form shadows.
- How the size of a shadow changes when the distance from the light source, or between the light source and the object, changes
- How the length and position of a shadow depends on the position of the Sun in the sky and that this will change depending on the time of the day and the time of the year.
- That when light travels through an object it can bend. This effect, known as refraction, can cause objects to appear distorted, for example, a pen at an angle in a glass of water. Refraction also explains why rainbows happen.

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**.

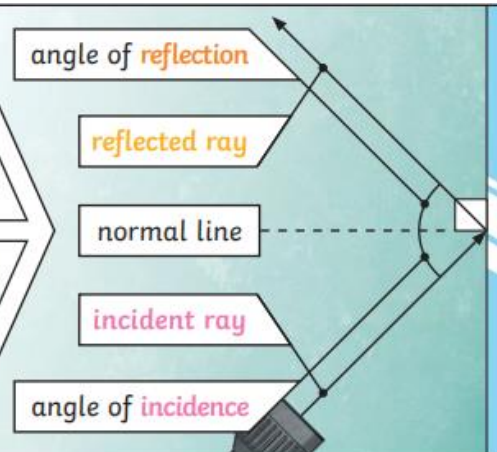
Isaac Newton shone a **light** through a transparent **prism**, separating out **light** into the colours of the rainbow (red, orange, yellow, green, blue, indigo and violet) - the colours of the **spectrum**. All the colours together merge and make visible **light**.



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.

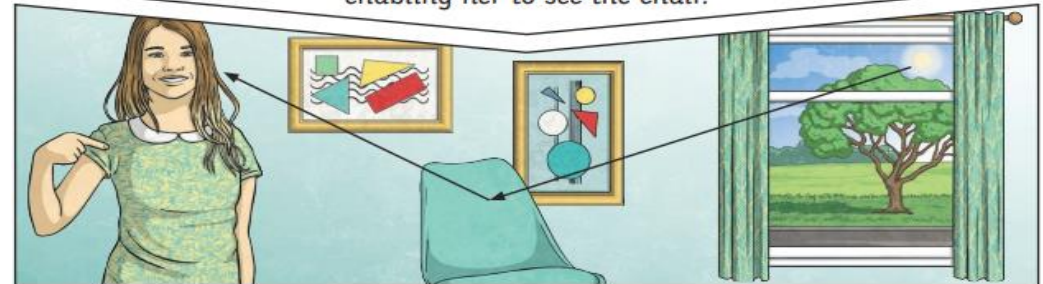
The angle of **reflection** is the angle between the normal line and the **reflected ray** **light**.

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



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.

