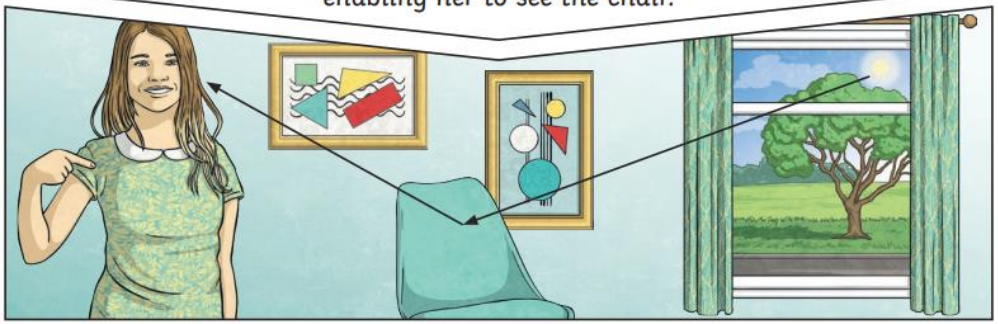
# Light Knowledge Organiser

| Key Vocabulary | |
|---|---|
| light | A form of energy that travels in a wave from a source. |
| light source | An object that makes its own light. |
| reflection | Reflection is when light bounces off a surface, changing the direction of a ray of light. |
| incident ray | A ray of light that hits a surface. |
| reflected ray | A ray of light that has bounced back after hitting a surface. |
| the law of reflection | The law states that the angle of the incident ray is equal to the angle of the reflected ray. |

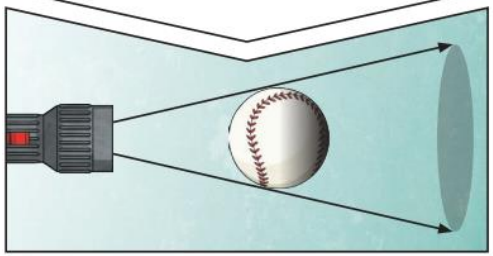
## Key Knowledge

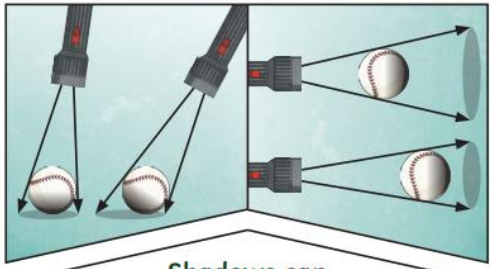
We need light to be able to see things. Light waves travel out from sources of light in straight lines. These lines are often called rays or beams of light.

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.



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.

## How does light travel?

**Luminous** objects are sources of light.

**Non-luminous** objects do not produce their own light.

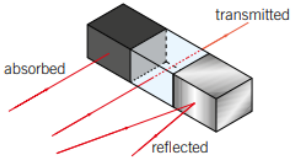
When light hits an object it can be **absorbed**, **reflected**, or **transmitted**.

If an object is:

**transparent** – most light is transmitted

**translucent** – light is scattered

**opaque** – no light is transmitted so a shadow is produced.




Light can travel through gases, some solids and liquids, and completely empty space (a vacuum).

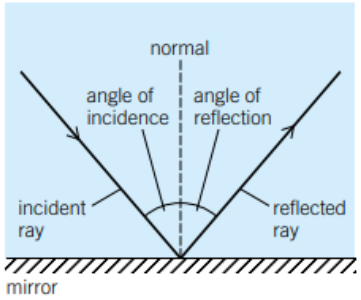
The speed of light in a **vacuum** is about 300 000 km/s.

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.

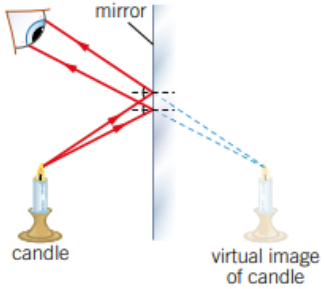
# Reflection and refraction of light

The **law of reflection** states that:

The **angle of incidence** is equal to the **angle of reflection**.




Images in mirrors are **virtual** – they look like they are behind the mirror.

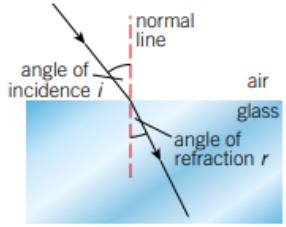



**Refraction** is when light changes direction when it travels from one **medium** (material, such as air or water) to another.

Refraction happens because light travels at different speeds in different materials.

Rays of light will be refracted:

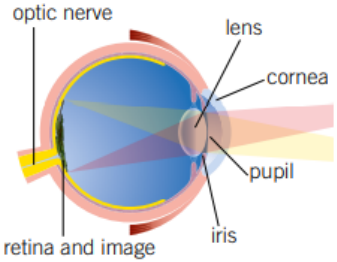
- towards the **normal** if they slow down, such as going from air to glass
- away from the normal if they speed up, such as going from water to air.




# How do eyes and cameras work?

Light entering your eye is refracted by the **lens**, focusing it on the **retina** and creating an inverted image.

**Photoreceptors** detect the light hitting your retina and send an electrical impulse to your brain.

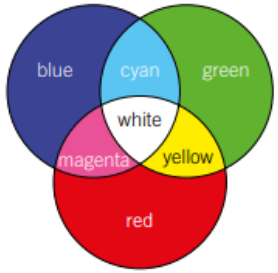



# Colours of light

A **prism** refracts different colours of light by different amounts. This disperses light into a continuous **spectrum** of colours.

The **primary colours** of light are **red**, **green**, and **blue**.

**Secondary colours** are produced when any two primary colours are mixed.




**Filters** subtract colours from white light, so that only one colour of light is transmitted.

Objects appear to be different colours because they reflect some colours of light and absorb others.

Black objects absorb all colours and white objects reflect all colours.