# Topic Overview

# Year 8 - Light

## KNOW IT

1. I know how a pinhole camera works
2. I know why an image in a pinhole camera is upside down
3. I can explain the law of reflection
4. I can draw ray diagrams to show the incident and reflected ray
5. I can explain what refractions is
6. I can measure the angle of refraction and explain factors which affect it
7. I can explain the path of light through a convex and concave lens.
8. I know how the eye works to produce a clear image
9. I know how to correct sight defects and can explain how lenses are used in this way
10. I can describe how to make the visible spectrum using scientific equipment
11. I can describe energy transfers which take place in a solar panel
12. I can conduct an investigation to see how I can make the most electricity using a solar panel

## PROVE IT

- End of unit test
- DIRT task to investigate correcting sight defects

## LINK IT

Remember, you will have covered some of this knowledge. You have measured angles, drawn complex ray diagrams to explain light as a phenomena.

## SAY IT

| VOCABULARY | DEFINITION |
|---|---|
| Light | Electromagnetic wave from a source, can be detected by the eye allowing us to see. Travels at 300 000 000 m/s |
| Ray | A single beam of light |
| Medium | A material that light can pass through e.g. air, water, glass, perspex |
| Reflection | When a light ray bounces off a surface |
| Refraction | When a light ray bends as it passes from one medium to another e.g. from air to glass. Caused by the light changing speed. |
| Normal | A line draw at right angles to the surface of interest at the point a light ray hits it |
| Convex Lens | A lens whose surface bends outwards. |
| Concave Lens | A lens whose surface curves inwards. |
| Spectrum | The seven colours that white light can be split into - red, orange, yellow, green, blue, indigo and violet. |
| Dispersion | When the colours of light are separated by passing through a triangular glass block |
| Photovoltaic | A solar panel that changes light directly into electricity |

# 13. Light

**Incident ray:** The incoming ray.

**Reflected ray:** The outgoing ray.

**Normal line:** From which angles are measured, at right angles to the surface.

**Angle of reflection:** Between the normal and reflected ray.

**Angle of incidence:** Between the normal and incident ray.

**Refraction:** Change in the direction of light going from one material into another.

**Absorption:** When energy is transferred from light to a material.

**Scattering:** When light bounces off an object in all directions.

**Transparent:** A material that allows all light to pass through it.

**Translucent:** A material that allows some light to pass through it.

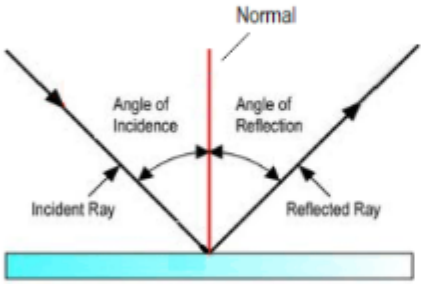
**Opaque:** A material that allows no light to pass through it.

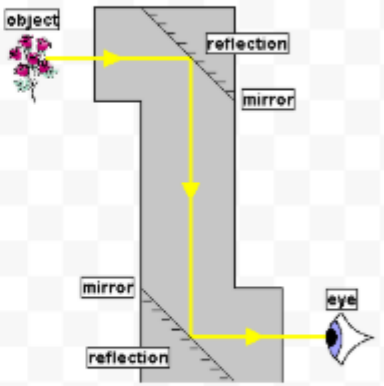
**Convex lens:** A lens that is thicker in the middle which bends light rays towards each other.

**Concave lens:** A lens that is thinner in the middle which spreads out light rays.

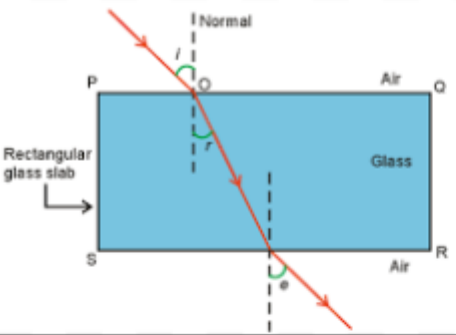
**Retina:** Layer at the back of the eye with light detecting cells and where an image is formed.

## Reflection



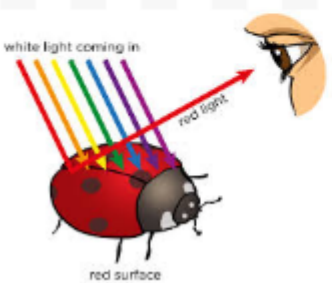

When a light ray is reflected at a plane mirror the angle of incidence is equal to the angle of reflection. A periscope uses this rule.




## Refraction

When light enters a denser medium it bends towards the normal; when it enters a less dense medium it bends away from the normal.

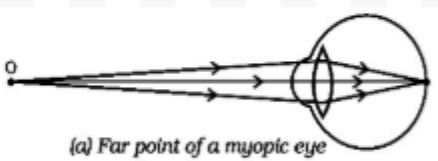
## Seeing Colour




White light is a mixture of all the colours in the spectrum.

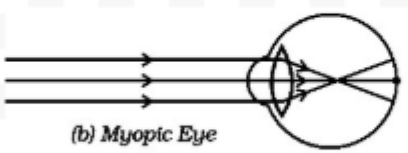
When white lights hits a coloured object most of the colours in the spectrum are absorbed only the light which matches the colour of the object is reflected.

## Vision and Sight Defects



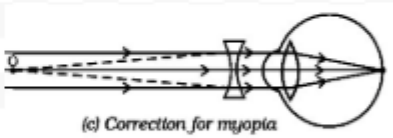
*(a) Far point of a myopic eye*

The lens in the eye of a person with normal vision will refract light and focus the light on the retina, allowing the person to see clearly.



*(b) Myopic Eye*

People with problems with their vision do not see clearly because the light does not focus on the back of their eyes.
The diagram above shows someone who is short sighted.



*(c) Correction for myopia*

Sight defects can be corrected using different shaped lenses. The diagram above shows someone using a concave lens to correct short sightedness.