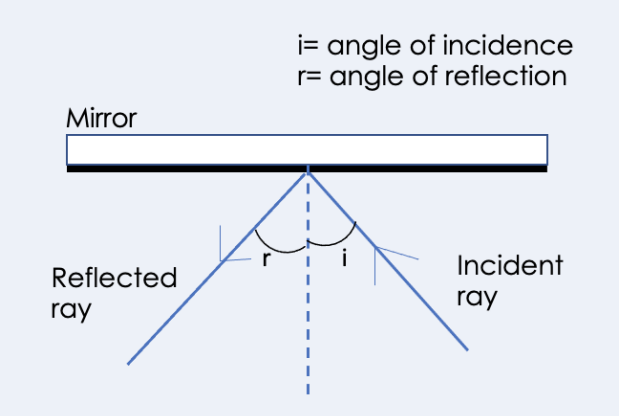
Understanding Light

1. Light travels at 300 million metres per second (m/s).
2. Light travels faster than sound.
3. Light always travels in straight lines from a **luminous** object.
4. **Shadows** form when light is blocked by an **opaque** object.
5. **Ray diagrams** can show how light reflects off mirrors, forms images, and refracts.
6. Ray diagrams are always drawn with a ruler and pencil.
7. Angles are measured from the normal line with a protractor.
8. **The normal line** is the dotted line from which angles are measured, at right angles (90°) to the surface.
9. Arrows are used to show the direction the light is travelling in.
10. **Transparent**: A material that allows most light to pass through it.
11. **Translucent**: A material that allows some light to pass through it.
12. **Opaque**: A material that allows no light to pass through it.

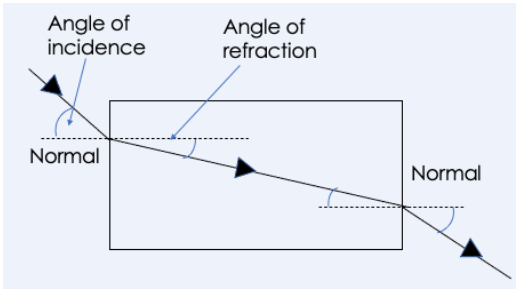
Reflection

13. Reflection occurs when light hits a smooth surface (e.g. a mirror).
14. The light hits the surface and is reflected into the eye.
15. The angle of incidence is equal to the angle of reflection – this is the law of reflection.



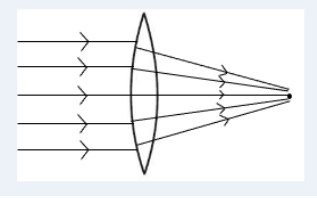
Refraction

16. Refraction is the **change** in the **direction** of light going from one material (**medium**) into another.
17. This change in direction is because light changes **speed** when it moves from one medium to another.
18. When light enters a **more dense** medium it bends **towards** the normal.
19. When light enters a **less dense** medium it bends **away** from the normal.
20. Refraction in water makes objects look as though they are nearer the surface than they actually are.

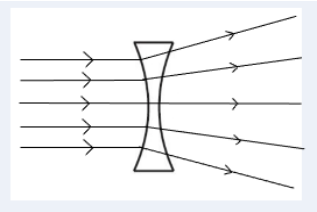


Lenses

21. Lenses refract light.
22. **Convex** lenses are thicker in the middle and refract light to a focal point.



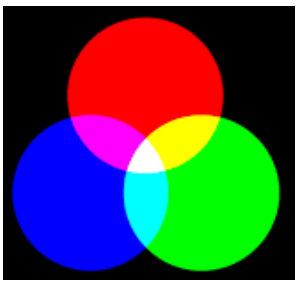
23. **Concave** lenses are thinner in the middle and scatter the light (there is no focal point).



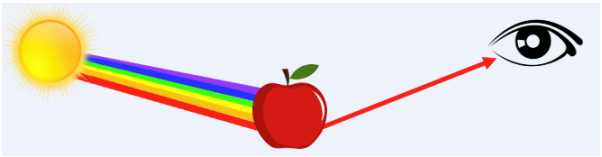
24. In the eye, the cornea and lens are both convex lenses and help to focus light onto the retina.

Colour

25. Prisms cause light to be dispersed.
26. **Dispersion** causes the white light to split into seven **component** colours called a **spectrum.**
27. **Spectrum:** A band of colours produced by separation of the components of light because they are each refracted differently.
28. The order of the colours is always the same ROYGBIV: red, orange, yellow, green, blue, indigo, violet.
29. **Red** light is **refracted** the least and **violet** is refracted the most.
30. Red, green and blue are called the **primary colours** of light.
31. Yellow, magenta and cyan are the **secondary colours** of light, made from combinations of the primary colours.
32. **White light** is produced from the **combination** of **all the colours**.



33. Objects appear the colour that they reflect, e.g. a red apple appears red because it reflects red light and absorbs all other colours



34. White objects appear white because they reflect all colours
35. Black objects appear black because they absorb all colours