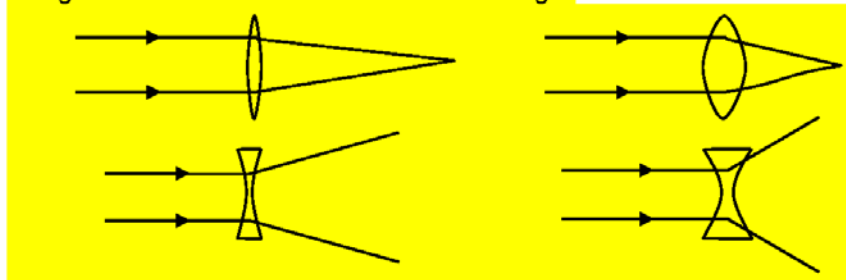


Lenses are transparent objects made normally from glass or plastic. As light travels through the lens, it bends or refracts. Different mediums refract light differently depending on their optical density. This is measured using a refractive index. The higher the RI the more the light bends as it passes into the medium.

For lenses, another factor that changes how much light bends, is the focal length of the lens.

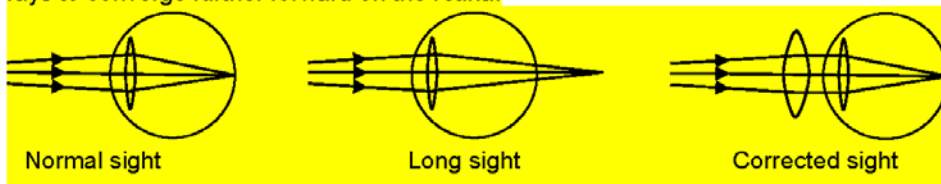
Focal length depends on how thick the lens is. For example the thicker a lens is, the more the light will bend and so the shorter the focal length.



①

We use lenses all the time in everyday life, in microscopes, telescopes, cameras but most importantly in glasses. Eye glasses are used to correct problems that we can get with our eyes. Long sightedness is when the eye cannot focus on objects close up, so the person can only see long distances. This can be caused by the eye ball being too small, so the image that the eye sees does not fall upon the back of the eye (on the retina) but behind it.

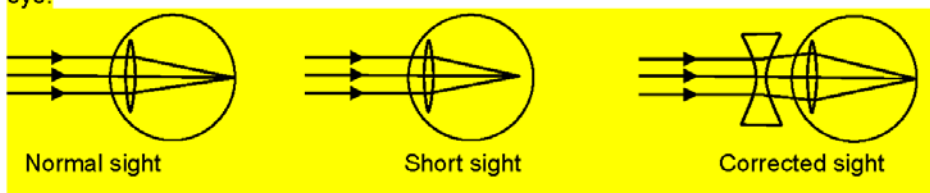
Long sightedness can be corrected by a convex lens, as the convex lens causes the light rays to converge further forward on the retina.



①

Short sightedness is when the eye cannot focus on objects far away so the person can only see short distances. This can be caused by the front of the eye being more curved than round or the eye ball being too long, so the image falls before the retina, rather than on it.

Short sightedness can be corrected by a concave lens, as the concave lens causes the light rays to diverge further before the lens in the eye converges the light rays on the back of the eye.



①

New fluid filled adjustable lenses are now available they are much like normal glasses only the glass lens is replaced with flexible plastic lens with a compartment of silicon oil, and there is an adjustable pump on the side of the glasses.

The pump can pump the silicon oil in and out of the compartment changing the shape of the lens to suit each person's individual eye needs. Silicon oil is used instead of water, as silicone oil has a refractive index (light bending value) of 1.406. This is higher than the light

bending value of some other liquid, such as water (RI of 1.33) Therefore, less silicone oil would be necessary to bend light compared to a larger amount of water.

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