8 Glasses

Most people will need the help of eyeglasses during their lives. This is what glasses do.

Our eyes have natural lenses in them. These lenses can change shape, as we saw on page 16. This allows us to focus on things that are close at hand and far away (Picture 1).

Sometimes our eyes are not able to give us a very clear picture. This is because the natural lenses in our eyes cannot change to the shape we need. When this happens, we help the eye by adding an extra lens in front. These lenses include glasses and hand lenses (Picture 2).

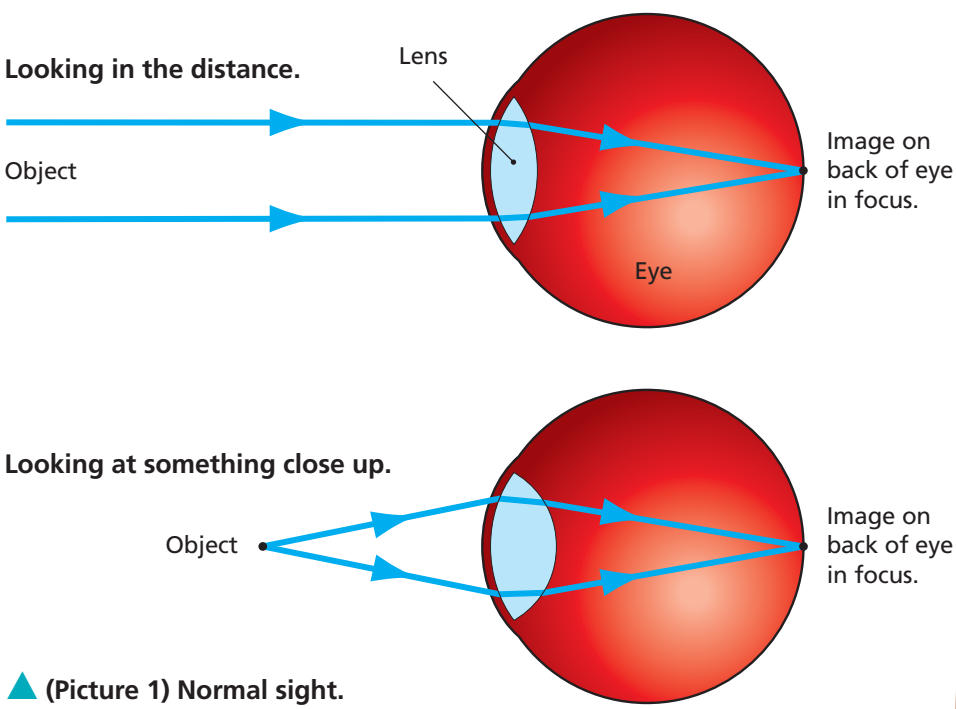
There are two kinds of lenses, those that are slightly bulging (called convex lenses) and those that are slightly dished (called concave lenses).

How glasses are made

Lenses begin as a sheet of glass or plastic and are then shaped using fine abrasive powder and specially shaped tools. Contact lenses are small lenses held on the surface of the eye.

Since plastic is less dense than glass, plastic glasses are not as heavy. Plastic scratches more easily than glass, but it is less brittle and less likely to shatter.

Sunglasses often contain no lenses at all and are simply sheets of glass or plastic coated with material that soaks up some of the light passing through them. Tinted coating can also be applied to lenses.



▲ **(Picture 1) Normal sight. If you have normal sight, you can see things in focus whether they are near or far.**

▼ **(Picture 2) If you put a hand lens in front of your eye, you will be able to see things clearly if they are close up, but they will be extremely blurred if they are far away.**

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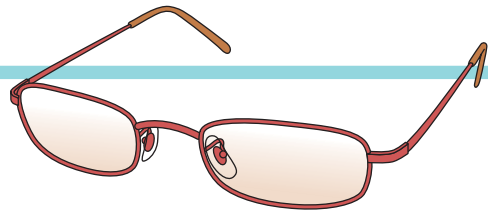
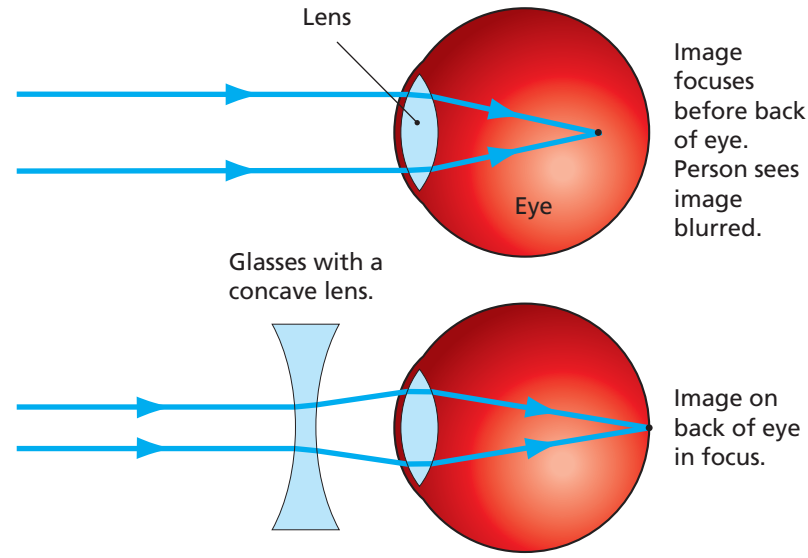


How glasses work for short-sighted people

Some people can see near things clearly, but distant things look blurred (Picture 3). In this case, the lens of the eye brings light into focus before it reaches the back of the eye. To correct this problem, a dished lens is used to change the direction of the light before it reaches the eye. This focuses light correctly on the back of the eye.

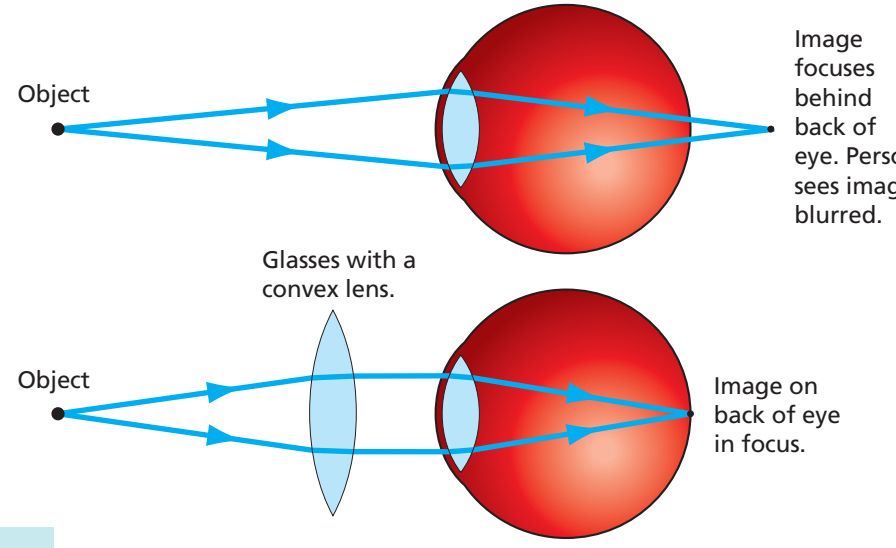


▲ **(Picture 3) Short-sightedness.**
The upper diagram shows a side view of the eye of someone with short-sightedness and without glasses. Light from objects a long way away focuses before it reaches the back of the eye.

The bottom diagram shows how a concave lens stops the light from focusing too quickly, so that it focuses exactly on the back of the eye.

How glasses work for long-sighted people

Many people can see distant things clearly, but close-up things look blurred (Picture 4). This is the more usual eye problem. In this case, the lens of the eye brings light to a focus behind the back of the eye. To correct this problem, a slightly bulging lens is needed to bring objects to a focus exactly at the back of the eye.



▲ **(Picture 4) Long-sightedness.**
The upper diagram shows a side view of the eye of someone with long-sightedness and without glasses.

The bottom diagram shows how a bulging (convex) lens focuses the light more quickly, so that it focuses exactly on the back of the eye.

Summary

- **Glasses are a way to help improve sight.**
- **Slightly dished lenses help correct short-sightedness.**
- **Slightly bulging lenses help correct long-sightedness.**