

Want to build a boxeye?

*If you've ever wondered how your eye sees things
then here's a model to help you find out.*



*The following pages show you how to make a model of your eye
which you can actually see working.*

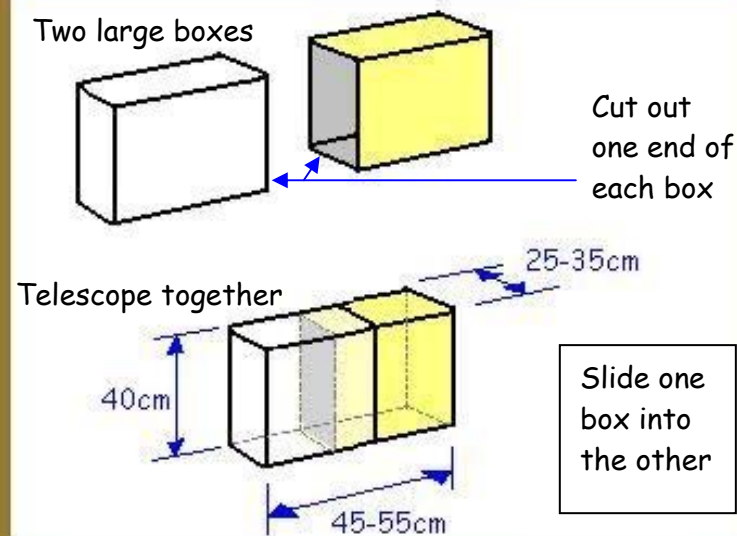
You will need

- Two large boxes of the same shape with all six sides (about 40 x30 x25 cm)
(The two boxes are joined together to form a space large enough to fit over your head with space above and in front of your face.)
- A large piece of white paper
- Scissors or a sharp knife
- Sticky tap and glue
- A special lens which you can get from your local NZAO member optometrist - Use the voucher on the last page to order your lens

Note to teachers: Please ask your optometrist for the lens about ten days before you start making the boxeye.



Construct a *boxeye*



Once you have joined the two boxes to form one big box, hold off adjusting the final length of the big box, until you have followed all steps shown on the next page.

When you have the lens fixed in place, you can focus the light by telescoping the box in or out to adjust its length until you see images clearly projected through the lens onto the opposite end inside the box.

so here's
how you
do it...

how to build your own **boxeye**



Glue the eye picture
to the front of the box,
right up high on one end.



Glue a sheet of
white paper
inside the box.

Ask a teacher or
parent to cut a hole in
the bottom of the box
to stick your head in.

Get a teacher or parent to use a
sharp knife to cut a hole through the
box where the pupil of the eye is.

Then glue your special lens
over the dotted line on the
eye picture.



Then what do you do?

Put the box on your head!

Look at the white piece of paper inside, and see
if you can see the world shining through!

It often works best if you have your back to a window.

Do you notice how everything looks upside down?

This is how your eye sees things, but
your brain is smart enough to turn
everything back up the right way!

Have fun !

boxeye

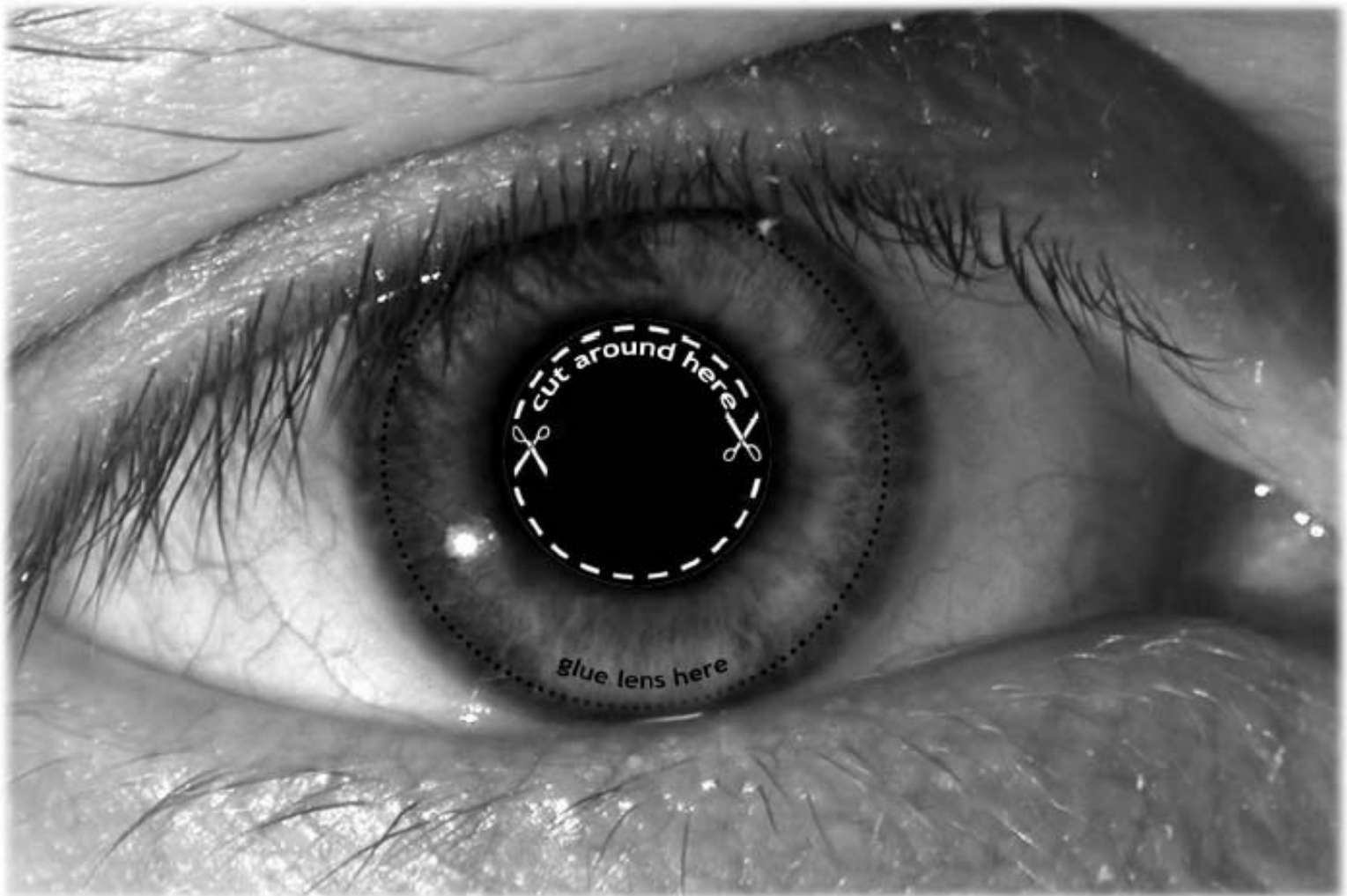
Lens Voucher

Please supply a lens suitable for the boxeye project

(There may be a small charge for the cost of a lens)



Dear Optometrist, please provide a lens for the boxeye project. You may need to calculate that the lens focal point suits the box being used. Usually an uncut lens within +2 to 2.5 OD is suitable. Any questions about the boxeye project can be sent to the NZAO info@nzao.co.nz or 0800 439 322



How the eye works :

Sight is an amazing process made possible by many parts of the eye working together.

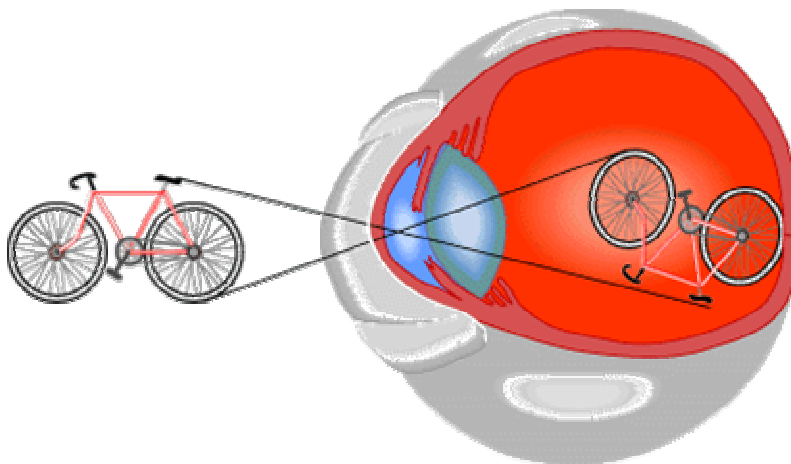
If you look at the diagram of the eye over the page you will see the major parts of the eye illustrated.

Light enters the eye and is bent by the **cornea** (the window of the eye) to pass through the **pupil**.

The light then passes through the **lens** (behind the pupil) which enables the image to be focused onto the **retina**.

The retina changes the light image (energy) into electric impulses that are carried through the **optic nerve** to the vision centre of the brain where the image is interpreted.

The picture below shows how the view of the bicycle is focussed onto the retina



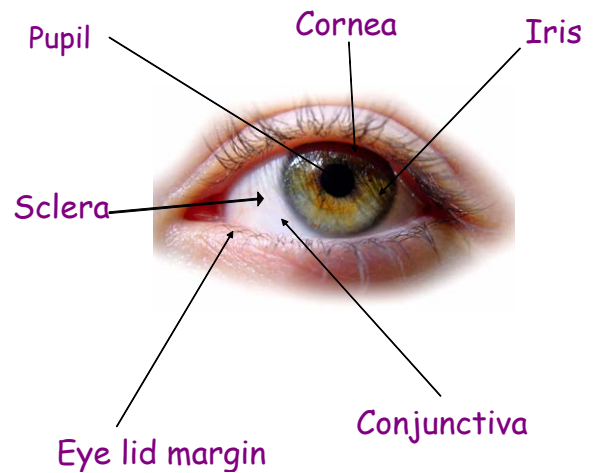
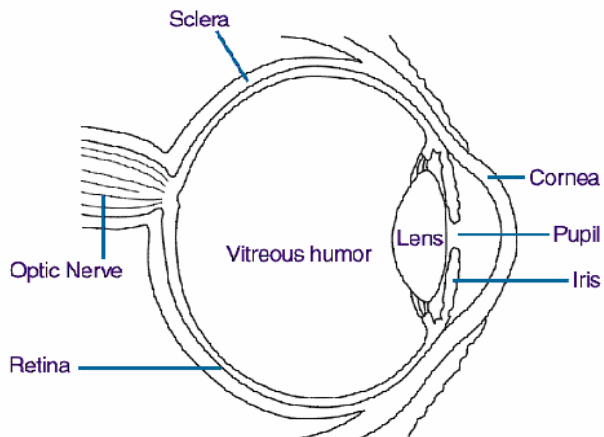
By a strange trick of nature and physics the image on the retina is an upside down version of what you actually see. The brain processes the image so we can see things the right way up.

For people with normal vision the image hits bang smack on the retina and this is represented in the Normal Focus picture over the page. The light coming into the eye is bent to come together right on the back of the eye.

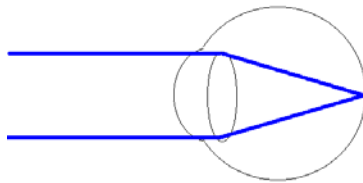
For short-sighted people the light bends more sharply in their eye and comes together short of the retina making the image blurry. Things far off are hard to see clearly.

For long-sighted people the light does not bend sharply enough to make a clear image on the retina and they will have trouble seeing close up things clearly.

Diagram of the Eye



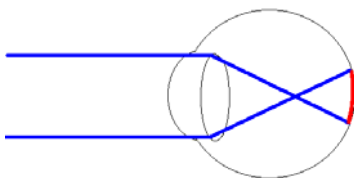
Normal Focus



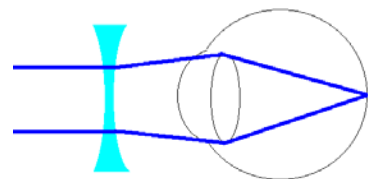
Short Sightedness (Myopia)

Distance vision blurry, near usually OK.

Short-sighted focus



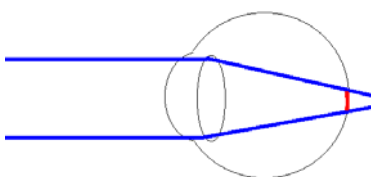
Short-sighted correction



Long-sightedness (Hyperopia)

Difficulty seeing clearly and comfortably up close.

Long-sighted focus



Long-sighted correction

