

Lesson Plan

NEUROHEADWAY

Neuroscience Into Education

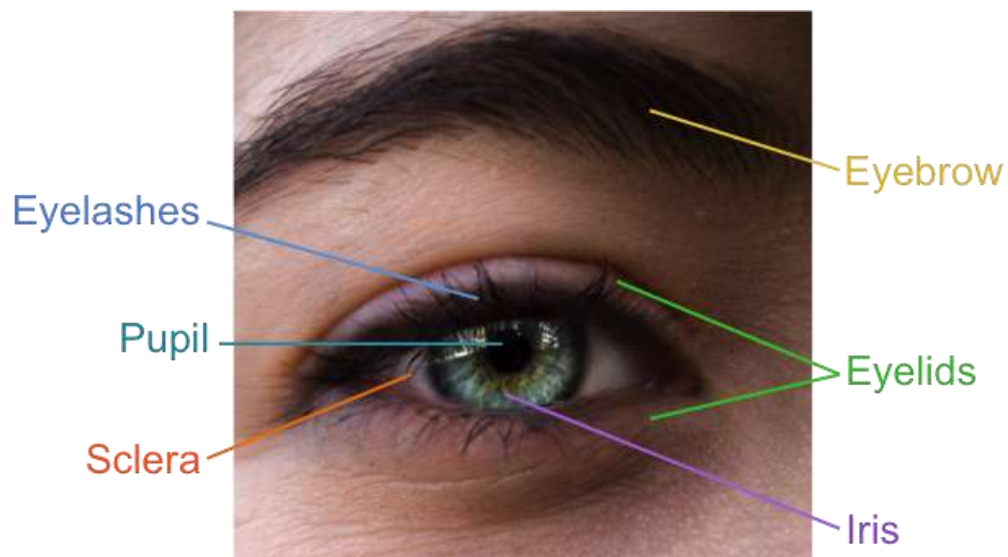
The Eye

How do we see?

The eye is the organ that allows us to see and is made up of lots of different parts.

What are the major structures in the eye?

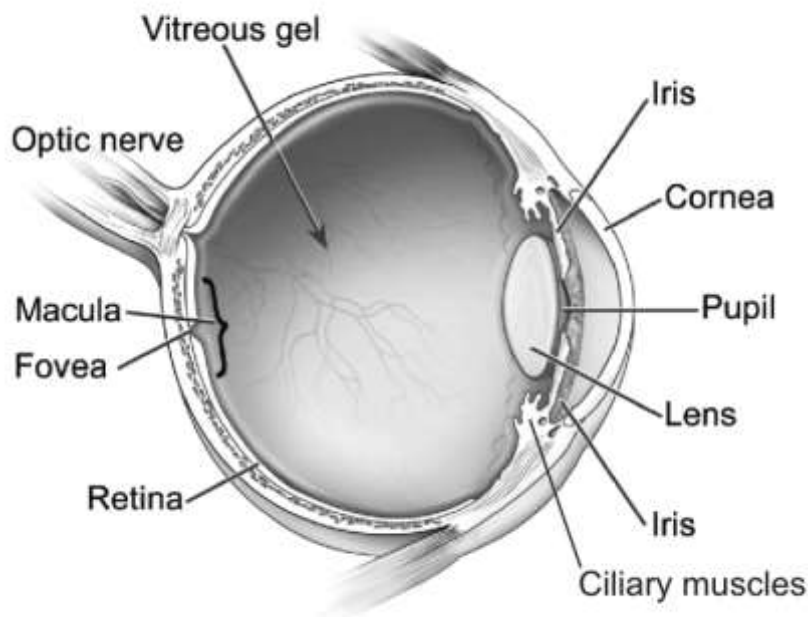
From the outside:



Activity: look at your own eyes in a mirror or look at your partners' eyes (but don't touch!) Can you identify all the structures seen in the diagram above?

See if you can work out what each of these structures are for.

What lies inside the eyes?



Cornea – clear layer that covers the eye, protects the bits inside and helps to focus light that enters the eye

Iris – this is the coloured part of your eye

Pupil – opening in the iris that allows light to enter the eye

Lens – crystalline structure that focuses light on the retina

Ciliary muscles – control the shape of the lens

Vitreous gel – the clear jelly that fills the eye and helps it keep its shape

Retina – the retina is made up of several layers and holds the photoreceptors that absorb light and convert this stimulus into a signal that travels to the brain

Macula – a central region of the retina containing a high concentration of photoreceptors; this region, along with the fovea, is responsible for sharp central vision

Fovea – a tiny pit in the centre of the macula, tightly packed with photoreceptors

Optic nerve – carries light signals from the eye to the brain

How do our eyes work?

We see something when light reflects off it and it is in our field of vision. Light enters the eye through the cornea and then the pupil, the black hole in the centre of the coloured part of your eye (the iris). The iris changes shape to adjust the size of the pupil and so changes the amount of light that enters your eye.

Activity: with a partner, look at how your pupils respond to different levels of light.

Close your eyes for 10 seconds and then

open them again. Do your pupils get bigger or smaller? If you shine a light into your partner's eye, will their pupil get bigger or smaller? Why?

Light beams that are shone on to your eyes pass through your cornea and lens, which lies directly behind your pupil. The lens is attached to the ciliary muscles, circular muscles that control the shape of your lens. We use the lens in our eyes to focus light that enters the eye onto the back of the retina.

When the ciliary muscle contracts (when you look at something closely) the tension on the lens capsule is relaxed and the lens becomes more spherical. Then the ciliary muscle relaxes (distant objects) the lens capsule is stretched and the lens becomes more flattened. A rounded lens has more focussing power and therefore you can see close objects more clearly when the ciliary muscle is contracted.

Activity: Draw a simple picture on a page. Use convex lenses of different strengths to show how your picture can be magnified to different extents.

Did you know... the eye works like a **pinhole camera**. When we look at something the image is flipped as it passes through our pupils and is detected upside down on our retina. When the signal for the image reaches your brain, it flips the image back the right way round so we can understand exactly what we are seeing.

This happens because light travels in a straight line so when it is directed through a small hole, such as the pupil in your eye, light from the top of the image will pass through the hole and end up at the bottom.