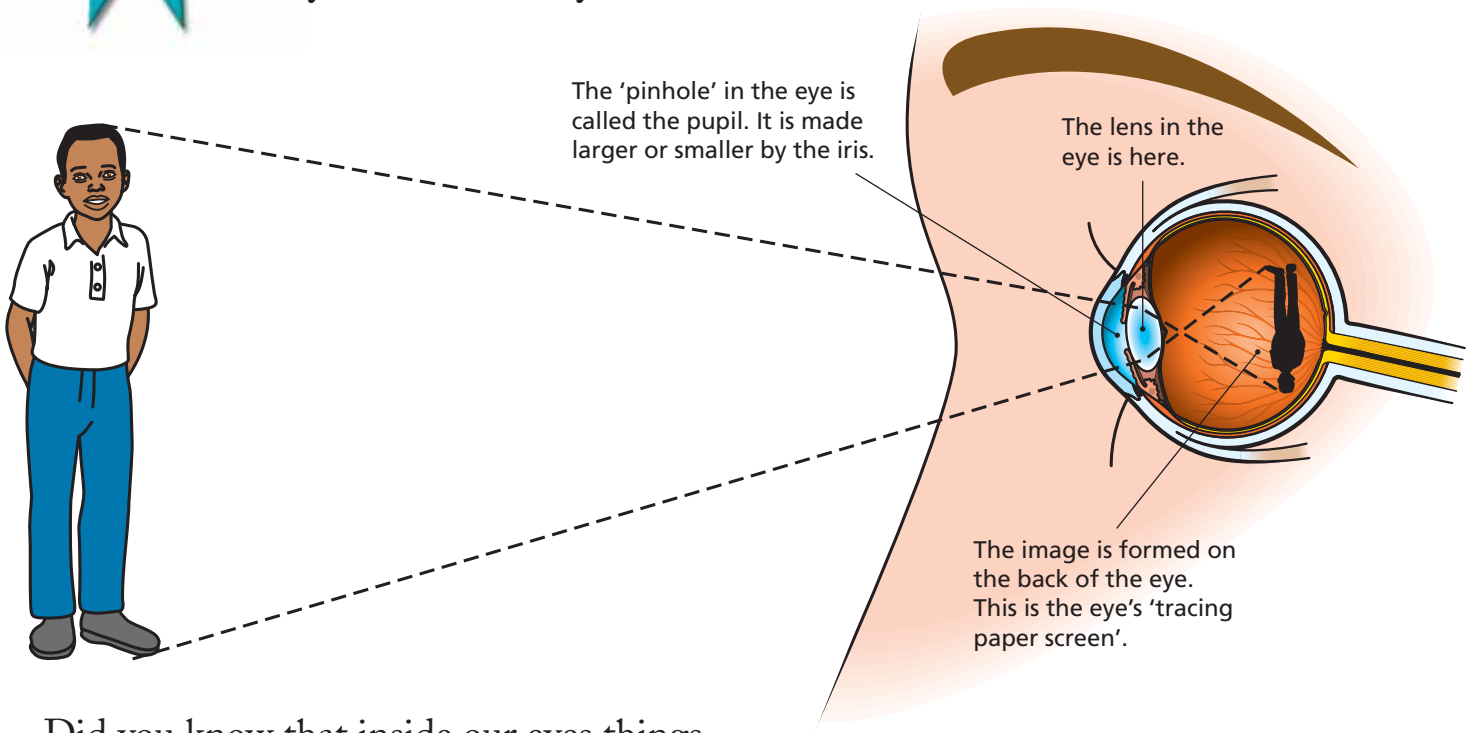
# 6 We see like a camera

**A simple pinhole camera will take pictures and also show you how the eye works.**




▲ **(Picture 1) There is a lens inside the eye that turns images upside down and back to front.**

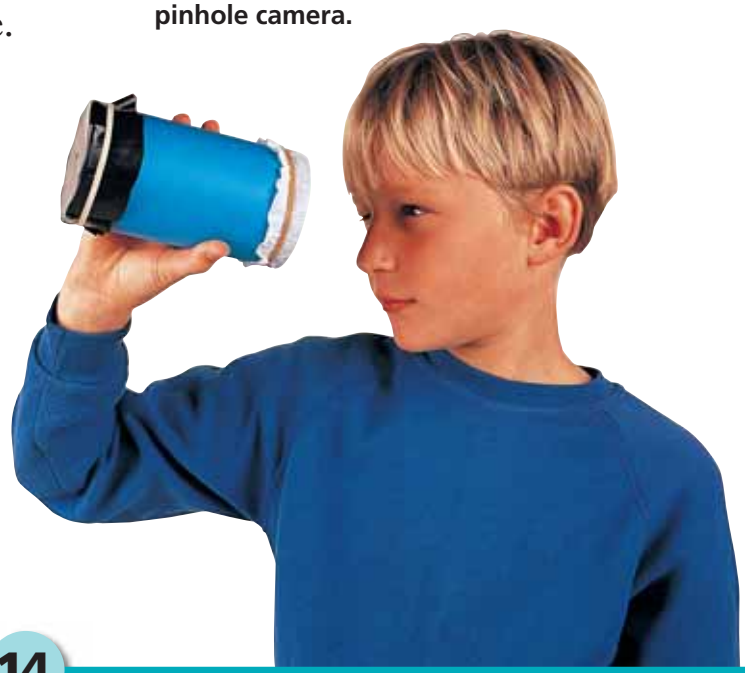
Did you know that inside our eyes things appear upside down and back to front? It is only our brains that make sense of this and turn things the right way up (Picture 1).

## Pinhole camera

To know why we see things upside down, we can make a very simple model of an eye. It is made of a tube with a small pinhole at one end and a sheet of tracing (or greaseproof) paper over the other (Picture 2). This is called a pinhole camera. A pinhole camera is not just a model of the eye, it is also a model of how all cameras work. The first camera ever made was a pinhole camera.

Not much light passes through a pinhole, so the object you look at has to be very bright.

▼ **(Picture 2) A pinhole camera works on exactly the same principle as your eye, so you see things in just the same way as a pinhole camera.**





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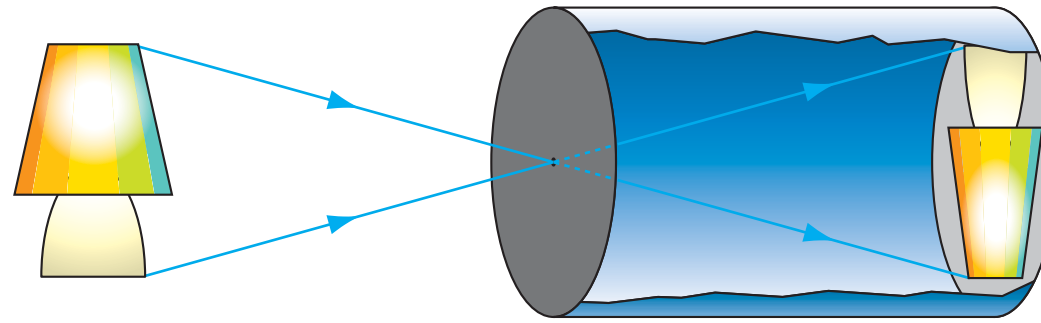
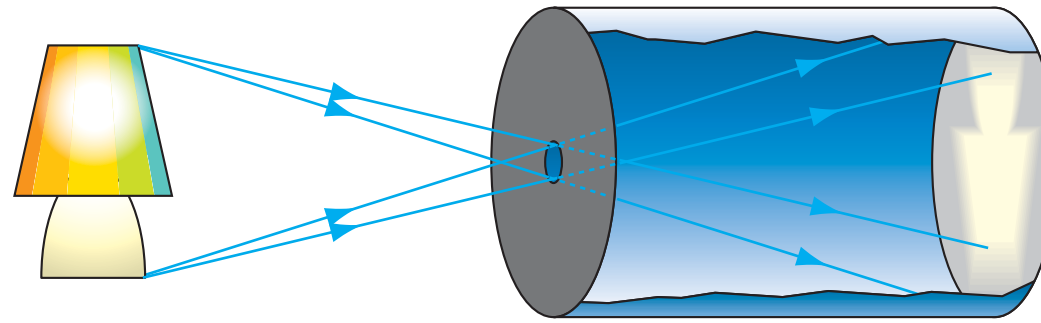
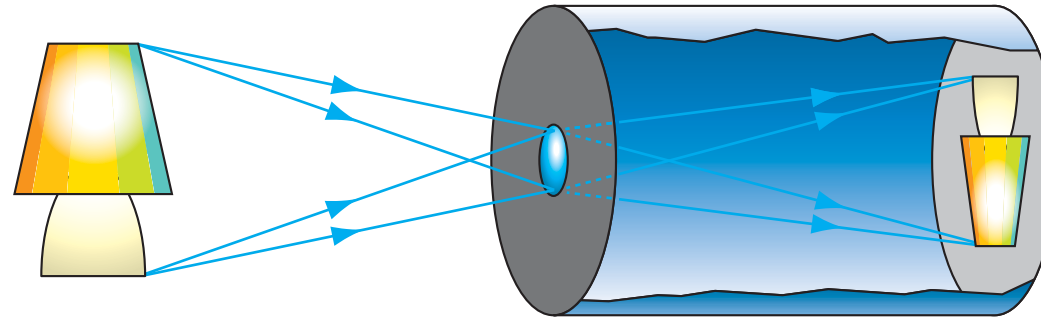


▶ **(Picture 3) Light travels only in straight lines, so light from the top of the lamp goes through the pinhole and hits the bottom of the screen. Similarly, light from the bottom of the lamp goes through the pinhole and hits the top of the screen. That is why the lamp appears upside down on the screen.**



▶ **(Picture 4) If you make the hole larger, light spreads out as it passes through the hole and this gives a fuzzy image.**



▶ **(Picture 5) To get a bright image that is also in focus, you need to use a lens instead of a pinhole.**

If you hold the pinhole camera to a lamp, for example, you will see an image of the lamp on the tracing paper screen. But the really strange thing is that the image of the lamp will be upside down and back to front (Picture 3).

## Getting more light

Pinhole cameras give a really sharp image. But only when they use pin-sized holes. If you make the hole bigger to allow more light in, the image becomes fuzzy (Picture 4). To get a bright image that is also sharp – called in **FOCUS** – you need a specially curved piece of glass or plastic called a **LENS** (Picture 5). This is why both eyes and cameras have lenses, not just pinholes.

### Summary

- **Our eyes are like pinhole cameras.**
- **Our eyes see upside down and back to front.**
- **Our eyes have a lens so that lots of light can be let in, and still give a sharp image.**