

8 - The Eye

- Level 4 - Identify Materials as translucent, transparent or opaque
- Level 5 - State that objects that do not give out light are seen when light reflects off them and enters the eye;
- Level 5 - State that light may be absorbed, transmitted or reflected when it hits an object.
- Level 6 - Relate the way substances affect light to how they appear.

The Eye

Learn The Eye with all its labels:

- 1) The **pupil** is the **hole** in the middle of the iris, which **the light goes through**.
- 2) The **aqueous humour** is a **clear liquid** and the **vitreous humour** is a **clear jelly**.
- 3) The aqueous humour and vitreous humour **support** the spherical shape of the eye.
- 4) The **retina** is the **light sensitive** part. It has **light receptors** all over it, except at the **blind spot** where the **optic nerve** is.

The Eye

Iris
Pupil
Cornea
Lens
Vitreous Gel
Optic Nerve
Retina
Sclera
'Blind Spot'

LO: understand the structure of the eye

Optical Illusion

Draw two dots a small distance apart on your book. Place your book very close to your face and **focus on just one dot**. Slowly move the book away from your face...you should reach a point where the dot that you are not focusing on **completely disappears!**

Make sure you don't cheat! **Only focus on one dot!**

What is happening with this 'optical illusion'?

Adjusting for Light and Dark — the IRIS

Bright light

iris
circular muscle contracted
pupil

- 1) The **CIRCULAR MUSCLES** contract.
- 2) The **iris closes up**, the **pupil** gets **SMALLER**.
- 3) **LESS LIGHT** gets into the eye.

Dim light

radial muscle contracted

- 1) The **RADIAL MUSCLES** contract.
- 2) The **iris opens out**, the **pupil** gets **BIGGER**.
- 3) This lets **MORE LIGHT** into the eye.

Focusing on Near and Distant Objects

ciliary muscle
suspensory ligaments

TO LOOK AT DISTANT OBJECTS:

- 1) The **ciliary muscles RELAX**, which allows the **suspensory ligaments** to **PULL TIGHT**.
- 2) This makes the lens go **THIN**.

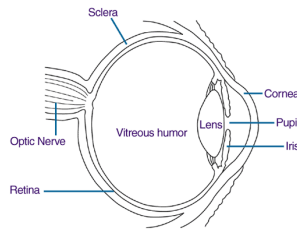
TO LOOK AT NEAR OBJECTS:

- 1) The **ciliary muscles CONTRACT** which **SLACKENS** the **suspensory ligaments**.
- 2) The lens becomes **THICK**.

LO: understand the structure of the eye

How the eye works

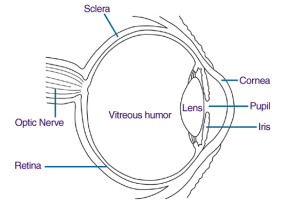
Regardless of if you are looking at an object very close to you or very far away, your eye is able to focus and you are able to see the object clearly. How is your eye able to refocus based on where the object is?



LO: understand the structure of the eye

How the eye works

1. When light enters the eye, the ciliary muscles change the thickness of the lens
2. The light is focused by your lens onto the retina
3. The light sensitive cells in the retina send electrical impulses through the optic nerve to your brain
4. Your brain processes these impulses and shows you what the object looks like

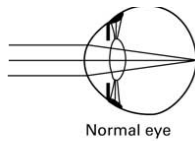


What happens if too much light suddenly enters the eye?

LO: understand the structure of the eye

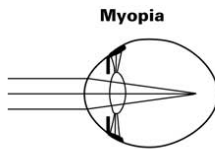
Short sight

In a normal eye, the lens focuses the image exactly on the retina.



Normal eye

However, in the eye of a person with Myopia (short sighted), the image is formed before the retina. This leads to a blurred image.



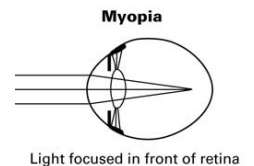
Myopia

Light focused in front of retina

LO: understand the structure of the eye

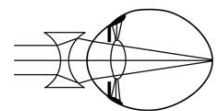
Correcting short sight

Short sight can be corrected by glasses that have a **concave (diverging) lens**. This causes the light rays to diffract outwards slightly as they pass the lens so that they are focused exactly on the retina by the lens in the eye.



Myopia

Light focused in front of retina

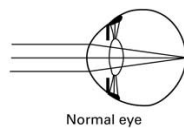


Corrected with concave lens

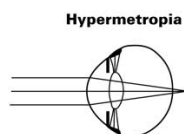
LO: understand the structure of the eye

Long sight

In a person with 'hyperopia' (long sight), the image is not correctly focused onto the retina by the eye lens. The image is focused behind the retina, leading to a blurry image.



Normal eye



Hypermetropia

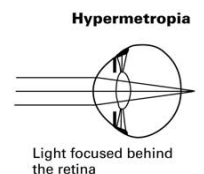
Light focused behind the retina

How can we correct this?

LO: understand the structure of the eye

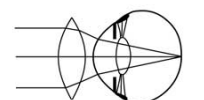
Correcting long sight

Long sight can be corrected by using a **convex (converging) lens**. This causes the light rays to converge slightly before they hit the lens so that they are refracted perfectly onto the retina.



Hypermetropia

Light focused behind the retina



Corrected with convex lens