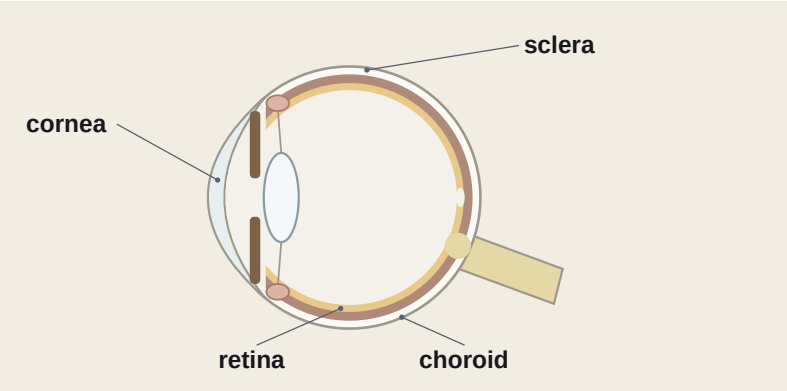
A8 · The eye and how we see · Completed notes

Goals: Name the three layers of the eye and the parts at the front, and give the job of each. Trace light from the cornea to the brain. Compare rods and cones. Explain the fovea centralis and the blind spot. Explain how the lens focuses on near and far objects. Name three vision defects, their causes and how they are corrected.

These are the completed notes. The blanks are filled in and each question is worked.

Slide 1 of 7 · The three layers of the eye

In lesson A7, a photoreceptor was a receptor that detects light. Photoreceptors are found in the eye. Today you learn how the eye works.



Key ideas

The outer layer of the eye is the **sclera**. Its clear front is the **cornea**.

The middle layer is the **choroid**. Its blood vessels feed the retina.

The inner layer is the **retina**. It holds the photoreceptors.

Example

Name the three layers of the eye, from the outside in.

1. The sclera is the outer layer.
2. The choroid is the middle layer.
3. The retina is the inner layer.

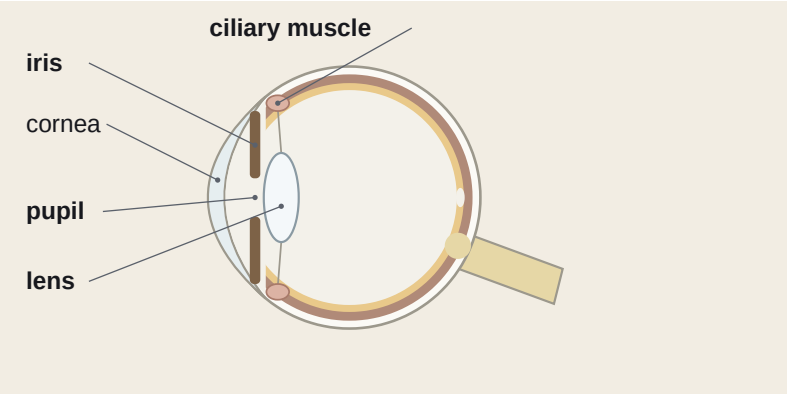
Try it

State the job of the cornea.

1. It is the clear front of the sclera.
2. It lets light in and bends it.

Slide 2 of 7 · Letting light in: the iris, the pupil and the lens

On the last slide, light entered the eye through the clear cornea. Three more parts sit just behind the cornea.



Key ideas

The **iris** is a ring of muscle. It is the coloured part of the eye.

The hole in the middle of the iris is the **pupil**.

The **lens** focuses light on the retina.

The **ciliary muscle** changes the shape of the lens.

Example

Predict what happens to the pupil in a dark room. Name the part that causes the change.

1. The eye needs more light.
2. The pupil gets larger.
3. The iris causes the change.

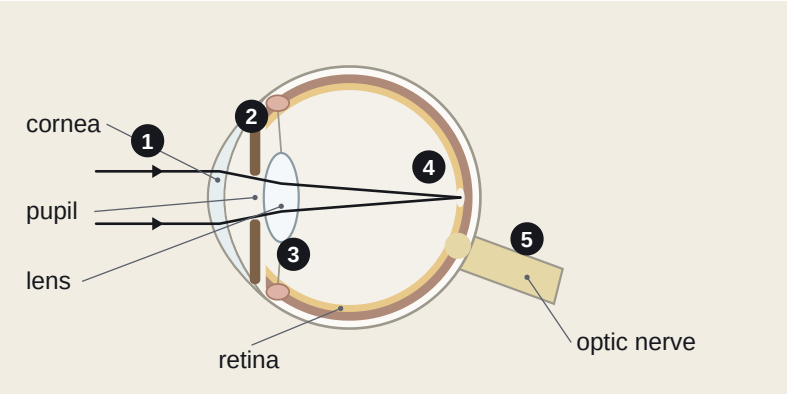
Try it

State the job of the lens.

1. It bends light.
2. It focuses the light on the retina.

Slide 3 of 7 · Method: trace light from the cornea to the brain

You have now met every part that light passes on its way into the eye. Here the path becomes five steps.



Key ideas

Light passes the **cornea**, then the **pupil**, then the lens.

It reaches the **retina**. Rods and cones start action potentials.

The **optic nerve** carries them to the occipital lobe.

Example

List, in order, the parts light passes from outside the eye to the retina.

1. Cornea.
2. Pupil.
3. Lens, then the retina.

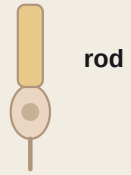
Try it

State what travels along the optic nerve: light or action potentials. Explain.

1. Light stops at the retina.
2. Rods and cones change it into action potentials.
3. The optic nerve carries action potentials.

Slide 4 of 7 · Rods and cones

On the method slide, light ended at the retina. There, rods and cones started action potentials. Rods and cones are the photoreceptors.





Cell	Works in	Detects	Where on the retina
rods	dim light	black and white	around the fovea centralis
cones	bright light	colour	packed in the fovea centralis

Key ideas

Rods work in dim light. They give vision in black and white.

Cones need bright light. They detect **colour**.

Rods contain a pigment called **rhodopsin**.

Example

At night you see shapes but not colours. Name the photoreceptors that are working.

1. The light is dim.
2. Rods work in dim light.
3. Cones need bright light.

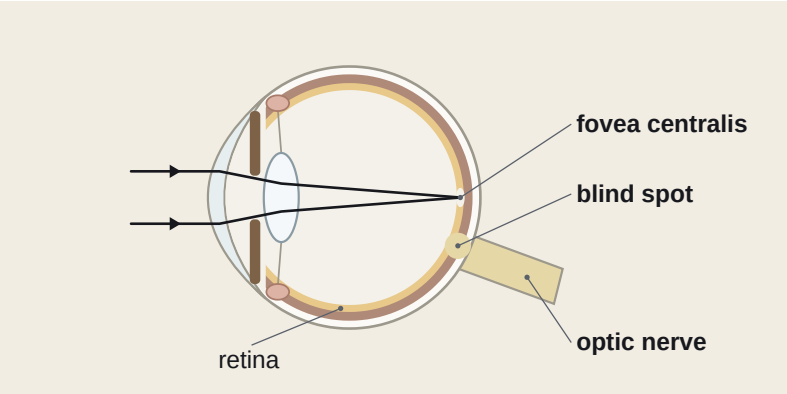
Try it

Compare rods and cones. Give what each one detects.

1. Rods detect light and dark.
2. Cones detect colour.

Slide 5 of 7 · The fovea centralis, the blind spot and the optic nerve

On the last slide, rods worked in dim light and cones detected colour. Rods and cones are not spread evenly over the retina.



Key ideas

The **fovea centralis** is packed with cones. Vision is sharpest there.

The **optic nerve** carries action potentials to the occipital lobe.

Where the optic nerve leaves the eye is the **blind spot**. It has no rods and no cones.

Example

Explain why the blind spot cannot detect light.

1. It is where the optic nerve leaves the eye.
2. It has no rods and no cones.

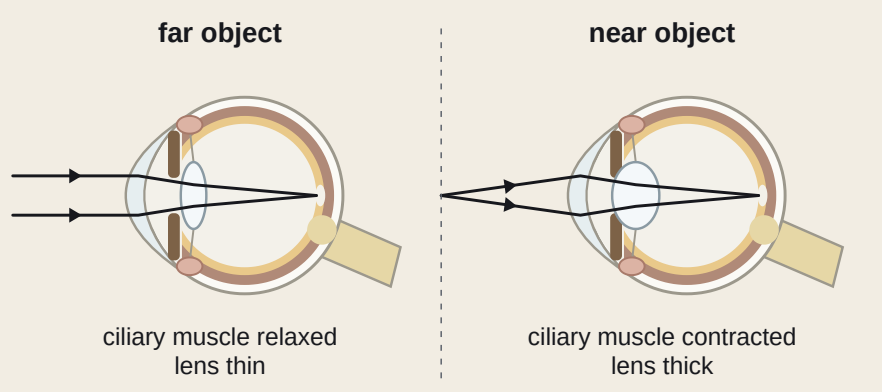
Try it

Explain why vision is sharpest at the fovea centralis.

1. It is packed with cones.
2. Light from an object you look straight at falls there.

Slide 6 of 7 · Focusing on near and far objects

On the last slide, light from an object met at the fovea centralis. The lens must change shape to make that happen for near and far objects.



Key ideas

For a far object, the ciliary muscle **relaxes**. The lens becomes thinner.

For a near object, the ciliary muscle **contracts**. The lens becomes **thicker**.

This adjusting of the lens is **accommodation**.

Example

You look from your phone to a far mountain. Describe what the ciliary muscle and the lens do.

1. The mountain is a far object.
2. The ciliary muscle relaxes.
3. The lens becomes thinner.

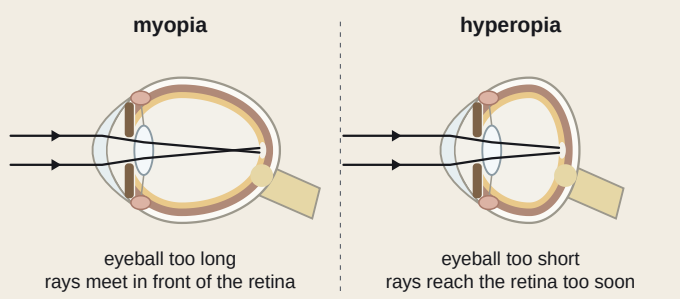
Try it

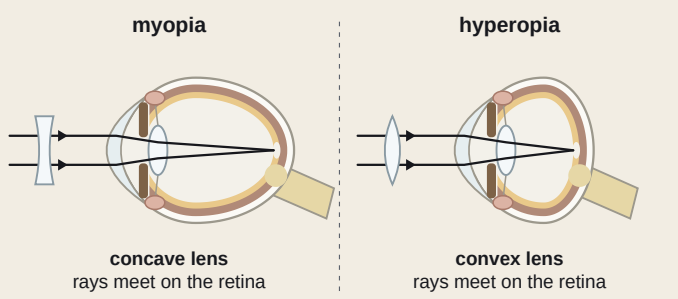
You look from a far clock to a book in your hand. Describe what the ciliary muscle and the lens do.

1. The book is a near object.
2. The ciliary muscle contracts.
3. The lens becomes thicker.

Slide 7 of 7 · Vision defects and how they are corrected

On the last slide, a healthy lens made light meet on the retina. In many eyes the light meets in the wrong place, and the picture is blurred.





Key ideas

In **myopia**, the eyeball is too long. A **concave lens** corrects it.

In **hyperopia**, the eyeball is too short. A **convex lens** corrects it.

In **astigmatism**, the cornea or the lens is unevenly curved.

Example

A person reads a book easily but cannot read a far road sign. Name the defect and the lens that corrects it.

1. The person sees near objects clearly.
2. This is myopia.
3. A concave lens corrects it.

Try it

A person sees far objects clearly but not near ones. Name the defect and the lens that corrects it.

1. This is hyperopia.
2. A convex lens corrects it.