



LO: Describe the structure of the eye as seen in front view and in horizontal section



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- Each eyeball is attached to the skull by <u>rectus muscles</u>, which control <u>eye</u> <u>movement</u>.
- The eye consists of 3 layers, sclera, choroid and retina (innermost).
 - The sclera is covered by a thin layer of transparent mucus membrane called the <u>conjunctiva</u>, covering the sclera, keeping the <u>eyeball moist</u>.
 - Sclera protects the eye.
 - Choroid contains <u>numerous blood vessels</u> to transport <u>oxygen and</u> <u>nutrients</u> to the eye and <u>remove metabolic waste products</u>.
 - Retina has <u>photoreceptors called rods and cones</u> that <u>detects light</u> and <u>where images are formed</u>
 - Rods enables us to see in dim light, images in black and white
 - Cones enables us to see <u>colours</u> in <u>bright light</u>; available in red, blue and green.
 - Fovea (yellow spot) is the <u>site where images are focused. It contains the</u> <u>most number of photoreceptors.</u>



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- <u>Cornea</u> is transparent and dome-shaped to <u>refract light</u> into the eye to focus on the retina.
- <u>Iris</u> is a circular sheet of muscles, consisting of <u>circular muscles and radial</u> <u>muscles</u> which works <u>antagonistically</u> which <u>controls</u> the <u>size of the pupil</u> and the <u>amount of light entering the pupil</u>. It contains pigment, which gives the eye its colour.
- <u>Pupil</u> is a hole in the center of the iris which allows light to enter.
- Blind spot is the <u>site</u> at which the <u>optic nerve leaves the eye</u> and <u>no</u> <u>photoreceptors are present</u>. Optic nerve transmits <u>nerve impulses</u> via <u>sensory</u> <u>neurone</u> to the <u>brain</u>.
- Lens controls the <u>refraction of light</u> and <u>focuses</u> light rays to form a <u>clear and</u> <u>sharp</u> image on the retina at <u>varying distances</u>.
- Ciliary muscles found in the ciliary body <u>controls the thickness/curvature of the lens</u>.
- Suspensory ligaments <u>attaches the lens to the ciliary muscles/transmits the force</u> <u>from the ciliary muscles to the lens</u>.

LO: State the principal functions of component parts of the eye in producing a focused image of near and distant objects on the retina

Producing a focused image of near objects on the retina & interpretation of the image by the brain





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- <u>Ciliary muscles</u> in ciliary body <u>contract</u>, relaxing the pull on the suspensory ligaments.
- Suspensory ligaments slackens, relaxing their pull on the lens.
- Lens becomes thicker and more convex, decreasing its focal length.
- Light rays from near objects <u>bend more</u> and <u>focus to a point on the retina</u>, forming a <u>clear and sharp image</u>.
- <u>Photoreceptors</u> on the retina are stimulated, <u>generating nerve impulses</u> which are transmitted by <u>sensory neurone</u> in the <u>optic nerve</u> to the <u>brain</u> which interprets the nerve impulses and the person sees the near object.
- The point at which the image of a near object becomes blurred is called the <u>near</u> point of vision where the <u>lens reaches its maximum curvature</u>.

Producing a focused image of distant objects on the retina & interpretation of the image by the brain



- Ciliary muscles in the ciliary body <u>relax</u>, pulling on the suspensory ligaments.
- Suspensory ligaments becomes taut, pulling on the edge of the lens.
- Lens becomes thinner and less convex, increasing its focal length.
- Light rays from the distant object <u>bend less</u> and <u>focus to a point on the retina</u>, forming a <u>clear and sharp image</u>.

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• <u>Photoreceptors</u> on the retina are stimulated, <u>generating nerve impulses</u> which are transmitted by <u>sensory neurone</u> in the <u>optic nerve</u> to the <u>brain</u> which interprets the nerve impulses and the person sees the distant object.

LO: Describe the pupil reflex in response to bright and dim light

<u>Pupil reflex</u> is the <u>involuntary action</u> of the <u>muscles in the iris</u> in response to a <u>change in</u> <u>light intensity</u> by <u>changing the size of the pupil.</u>

This action is controlled by two sets of involuntary <u>muscles in the iris</u> called <u>circular</u> <u>muscles</u> and <u>radial muscles</u>.



Pupil Reflex Pathway

- Change in the light intensity stimulates photoreceptors on the retina.
- Nerve impulses are <u>generated</u> and transmitted along the <u>sensory neurone in the</u> optic nerve across a synapse to the <u>relay neurone</u> in the <u>brain</u> and <u>across</u> another synapse to the <u>motor neurone</u> and to the <u>effector</u> which are the <u>circular</u> and radial muscles of the iris.

In bright light

- Circular muscles of iris contract and radial muscles of iris relax
- Pupil <u>constricts</u> and <u>less light</u> enters the eye to prevent photoreceptors on the retina from being damaged

In dim light

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- <u>Circular muscles of iris relax</u> and <u>radial muscles of iris contract</u>
 Pupil <u>dilates</u> and <u>more light</u> enters the eye