Eye Diagram: GCSE Biology

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1. Introduction

- Our body has five basic sense organs, and the eye is one of them.
- It has a layer known as the **retina** that contains receptor cells.
- The receptor cells in the retina are of two types: **Cones** and **Rods.**
- It is with the help of the eye that we can see various objects, colors, and lights.

Real-life uses:

Differentiating colors

Seeing objects

Aiming

Reading

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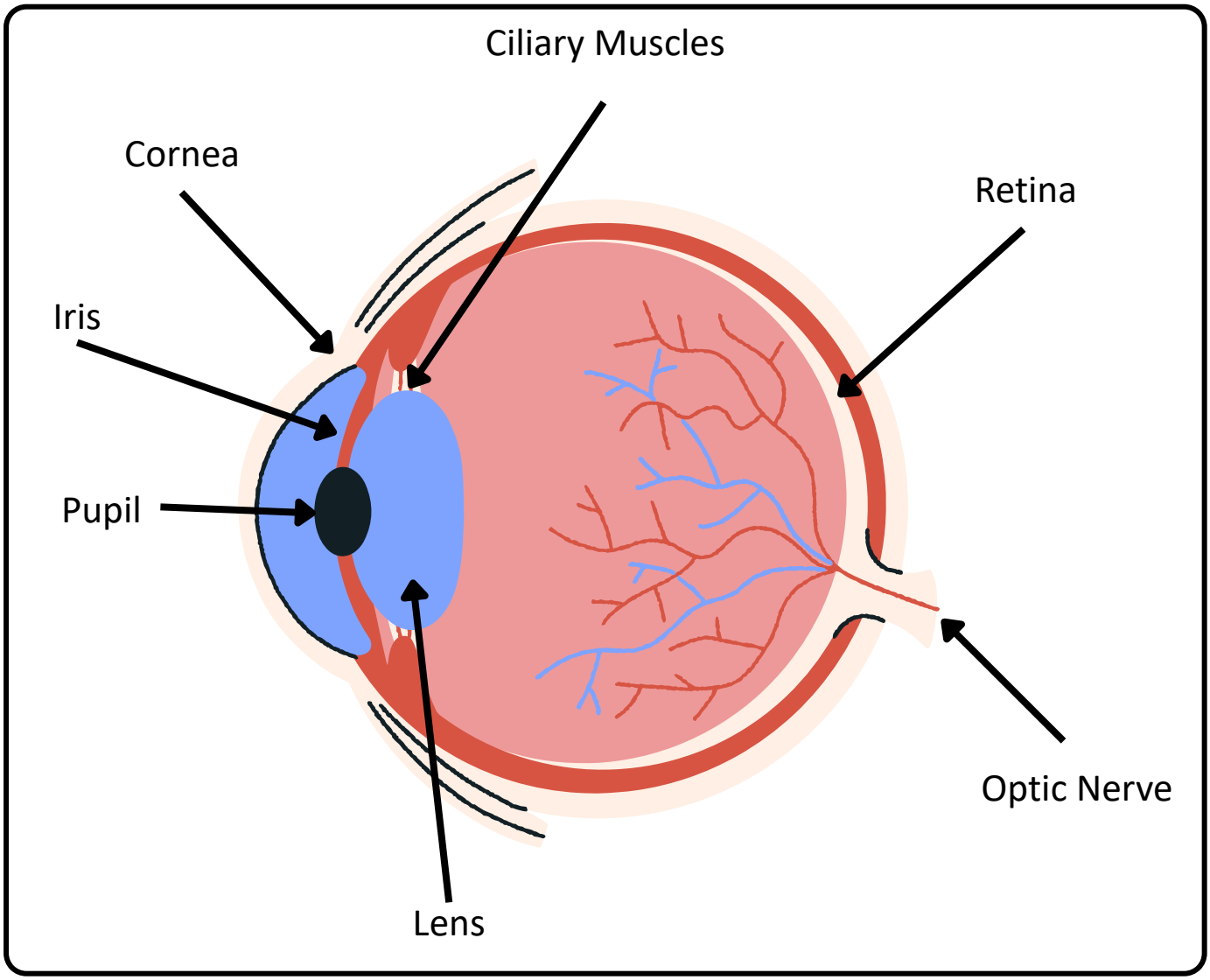
2. Diagram of the Eye



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3. Eye Parts and their Functions

Eye Parts	Features	Their Functions
Cornea	Transparent covering	Focusing of light rays
Iris	Colored part of the eye	Constrict or dilate the pupil
Pupil	Dark area in the middle of the eye	Allows the entry of light
Lens	Transparent and flexible	Fine-tunes the focus of light rays
Ciliary Muscles	Smooth muscles	Adjusts the curvature of lens
Retina	A layer of rod and cone cells, lining the back of the eyeball	Cones for color, Rods for light
Optic Nerve	Has bundles of neurons	Takes impulses to the brain

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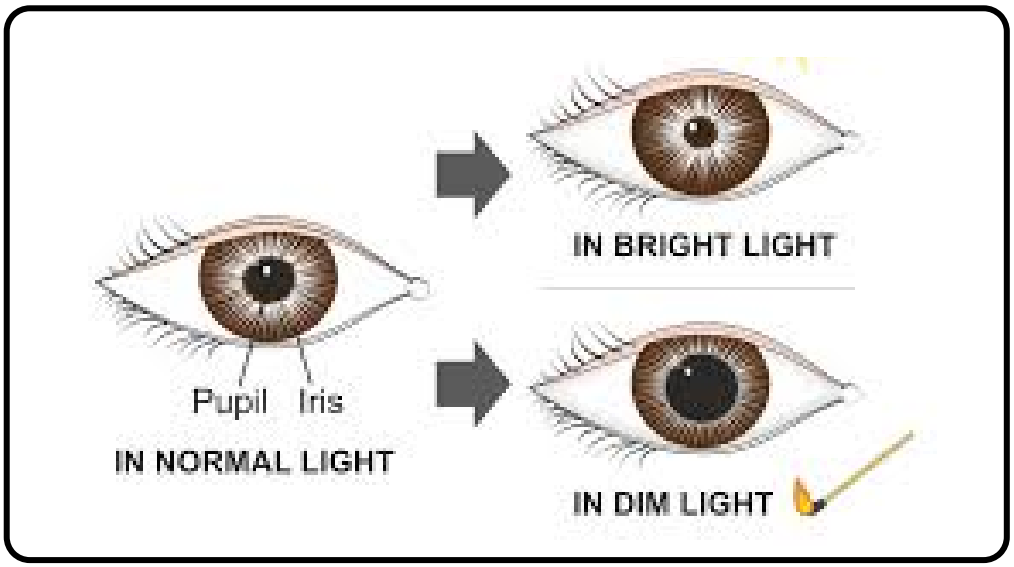
4. Adaptation in the Eye

- The process in which the **retina and pupil** adjust according to **varying light intensities** that fall on the eye is called **Adaptation.**
- In **Dim Light,** the **pupils dilate** to allow more light to enter, and the **rod cells** in the retina become **more active**.
- These adjustments enable correct vision in low light.
- In **Bright Light,** the retina interprets high-intensity light and sends signals to the brain. The brain, in response, **constricts the pupils**.
- With this, potential damage to the retina is prohibited.



Light intensity	Pupil Reaction	Effect
Dim	Dilates	Allows vision in low light
Bright	Constricts	Protects the retina from damage

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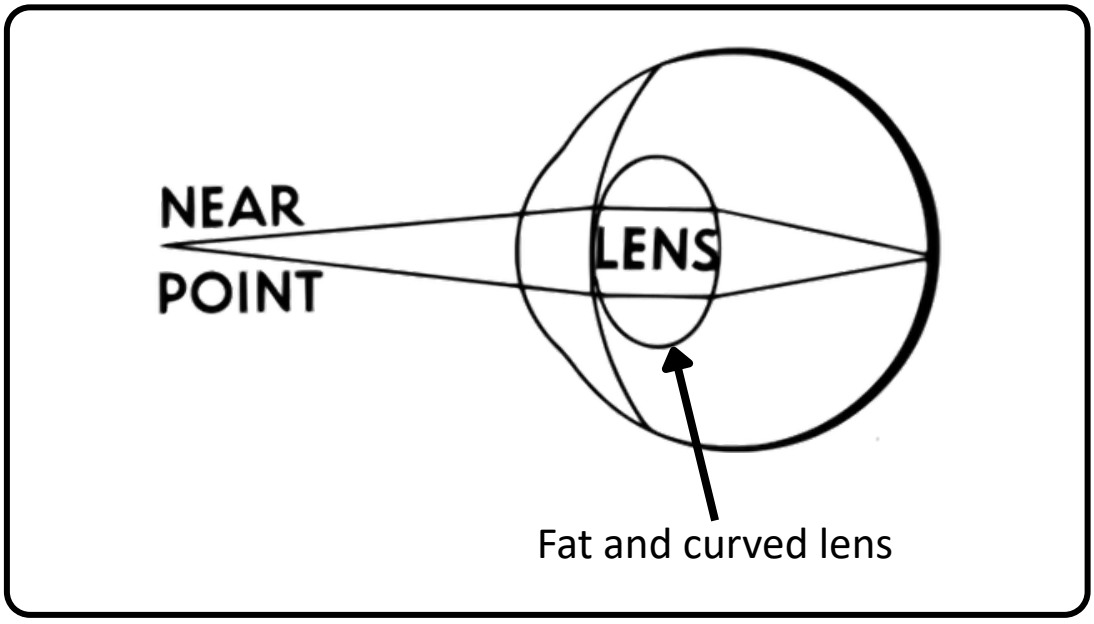
5. Accommodation in the Eye

- The natural ability of the eye to **change** its **lens's shape** to adjust its **focus** so that objects at different distances can be seen clearly is called **Accommodation.**

How does the eye focus on a near object?

- To see a near-placed object clearly, the eye must **increase** its **focusing power.**
- For this, the **ciliary muscles contract, loosening up the suspensory ligaments.**
- This makes the **lens fat** and **more curved**.
- Therefore, light rays **refract more** and **focus on the retina**.



How does the eye focus on a distant object?

- To see a distant object clearly, the eye must **reduce** its **focusing power**.
- For this, the **ciliary muscles relax, tightening the suspensory ligaments.**
- This makes the **lens thinner** and **less curved.**
- Thus, light rays **refract less** and **focus on the retina**.

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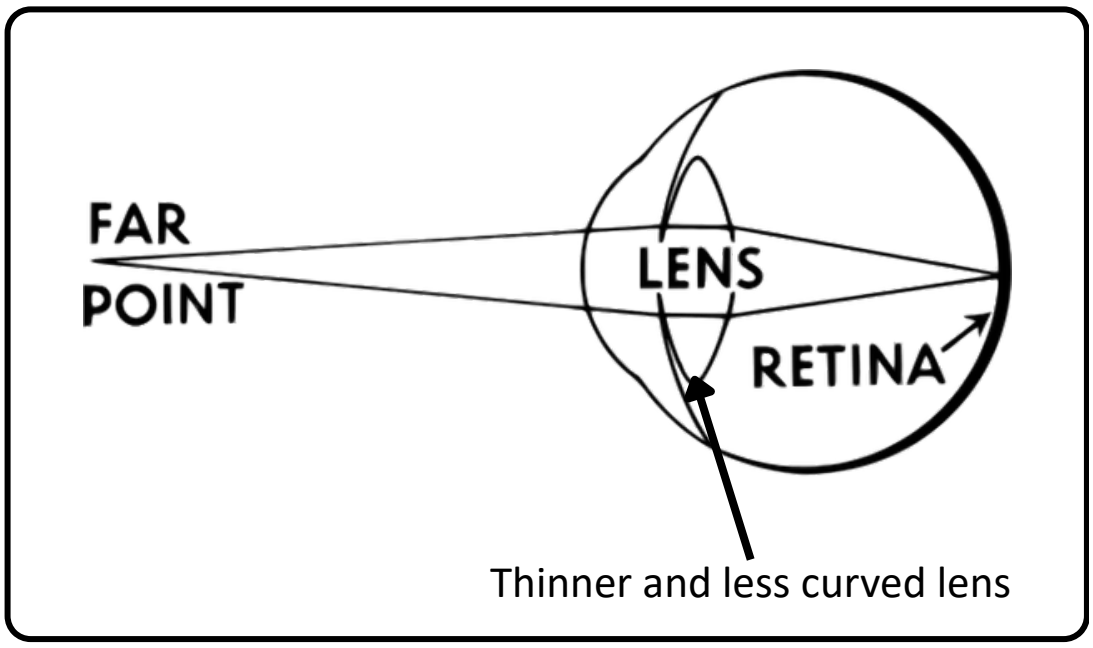

Object placement	Ciliary Muscles	Suspensory Ligaments	Lens
Near objects	Contract	Loose	Fat and more curved
Distant objects	Relax	Tight	Thinner and less curved

6. Defects of the Eye

- **Myopia (Short-sightedness)** is the condition in which objects placed at a distance appear faded.
- This happens because the rays of light **focus before the retina**.
- **Causes:** Lengthy eyeball or Extra-curved cornea.
- The patients suffering from this condition are **short-sighted** or **myopic.**

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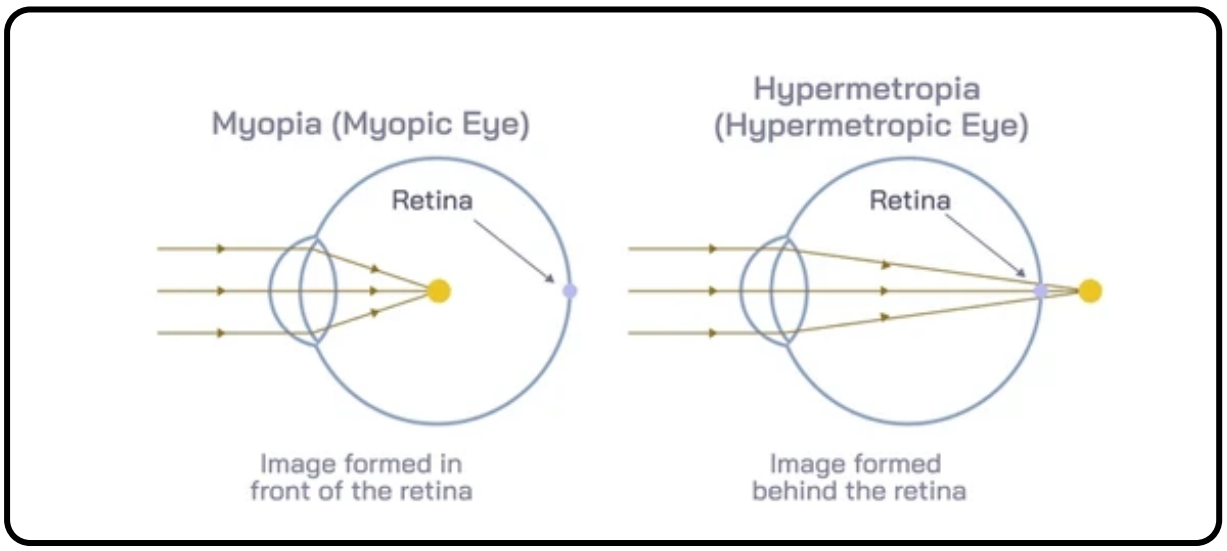
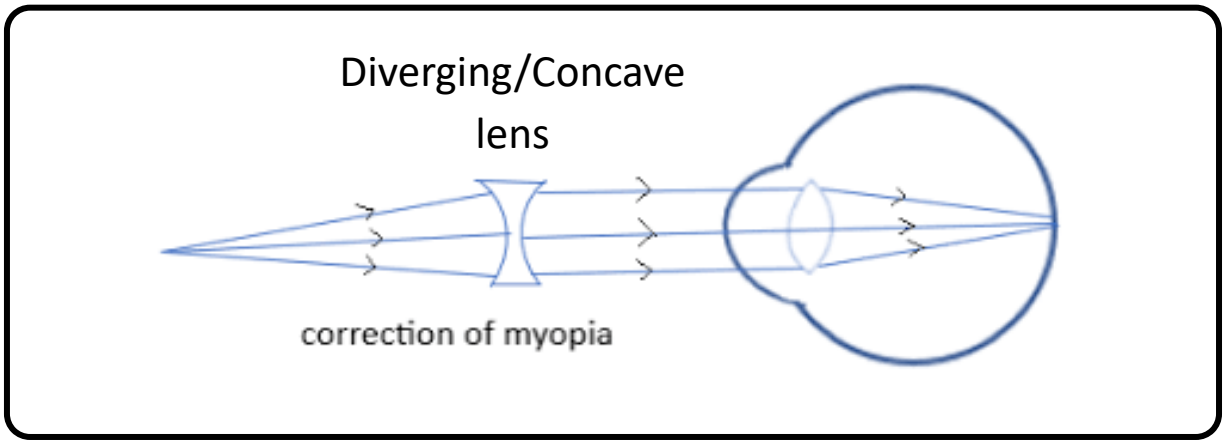
- **Hyperopia/Hypermetropia (Long-sightedness)** is the condition in which objects placed nearby appear blurred.
- This happens when the rays of light **focus behind the retina**.
- **Causes:** Small eyeball or less curved cornea.
- The patients suffering from this condition are **long-sighted** or **hyperopic** or **hypermetropic.**



7. Treating Eye Defects

- **Correction of Myopia** is done with a **diverging lens**.
- The rays of light are diverged so that after refraction from the eye lens, they focus on the retina, not in front of it.



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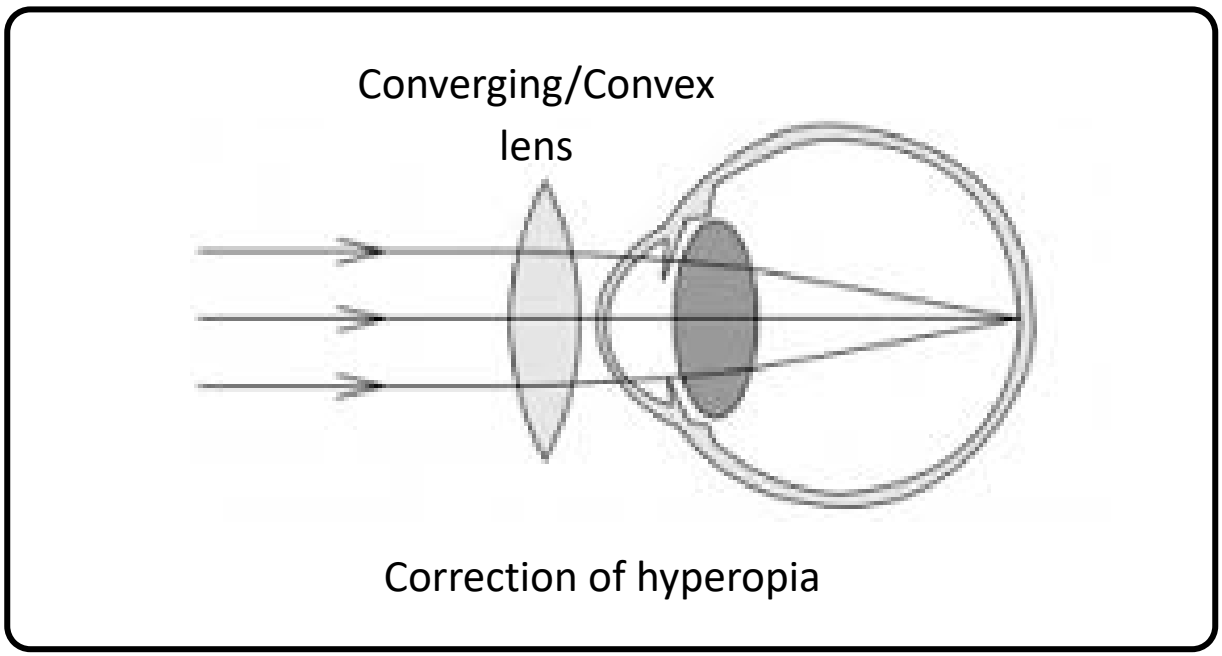
- **Correction of Hyperopia** is done with a **converging lens**.
- The rays of light are converged so that after refraction from the eye lens, they focus on the retina, not behind it.



Correction of hyperopia

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8. FAQs

1. **What are the main parts of the eye?**
The main parts include: cornea, iris, pupil, lens, ciliary muscles, retina, and optic nerve.

2. **What is the adaptation in the eye?**
Adaptation is the adjustment in the eye as per varying light intensities.

3. **What happens to the eye in dim light?**
In dim light, the pupil widens so that more light can enter the eye.

4. **What is accommodation in the eye?**
Accommodation is the process of changing the shape of the lens to focus on near or distant objects.

5. **What is myopia, and how is it caused?**
Myopia is when distant objects appear blurry. It happens when the eyeball is too long or the lens is too curved.

6. **What is hyperopia, and how is it caused?**
Hyperopia is when nearby objects appear faded. It happens when eyeball is too short or the lens is too flat.

7. **How does the size of the pupil change?**
Muscles in the iris control and change the size of the pupil. It can make it smaller or bigger.