# Human Eye and the Colourful World

## Structure of Human Eye

- spherical in shape and has diameter of 2·3 cm.
- lens of eye forms an image on the light sensitive screen called retina.
- Light enters through thin membrane called cornea.
- Iris controls the size of pupil.
- Pupil controls and regulates the amount of light entering the eye.

## Power of accommodation

The ability of the eye lens to focus near and far objects clearly on the retina by adjusting its focal length.

## Defects of vision

① Myopia - This is also called short sightedness. A person with this eye defect can only see nearby objects clearly compared to distant objects. It is corrected by using concave lens.

② Hypermetropia - This is also called far sightedness. A person with this eye defect can only see distant objects clearly compared to nearby objects. It is corrected by using a convex lens.

③ Presbyopia - It is an age related condition caused due to the ~~loss of transparency~~ weakening of ciliary muscles and reduced lens flexibility.

④ Cataract - This is an age related condition caused due to the loss of transparency of the lens. It is usually results in blurry vision and cloudy lens. It is corrected by using a cataract surgery.

## Dispersion of White Light by a Glass Prism

- A prism splits the incident white light into a band of seven colours.
- The band of coloured components of a light beam is called its spectrum.
- Different colours of light bent through different angles. The red light bends the least while the violet bends the most.

## Atmospheric Refraction

- The refraction of light by the Earth's atmosphere is known as atmospheric refraction.
- It is caused by the bending of light rays when they pass through the layers of earth's atmosphere, which are of different optical densities.

## Twinkling of stars

- The twinkling effect of stars is due to the atmospheric refraction of star light.
- The starlight undergoes continuous refraction as it passes through the atmosphere before it reaches Earth.
- As the path of rays of light coming from the star goes on varying slightly, the apparent position of the star fluctuates, and the amount of starlight entering the eye flickers.

## Formation of Rainbow (Dispersion)

- natural spectrum appearing in a day after a rain shower.
- caused by dispersion of sunlight by tiny water droplets.
- refraction, dispersion and internal reflection of light.
- different colours reach the observer's eyes.

## Advanced Sunrise and Delayed Sunset

- The Sun is visible to us about 2 minutes before the actual sunrise, and about 2 minutes after the actual sunset because of atmospheric refraction. The time difference between actual actual sunset and the apparent sunset is about 2 minutes

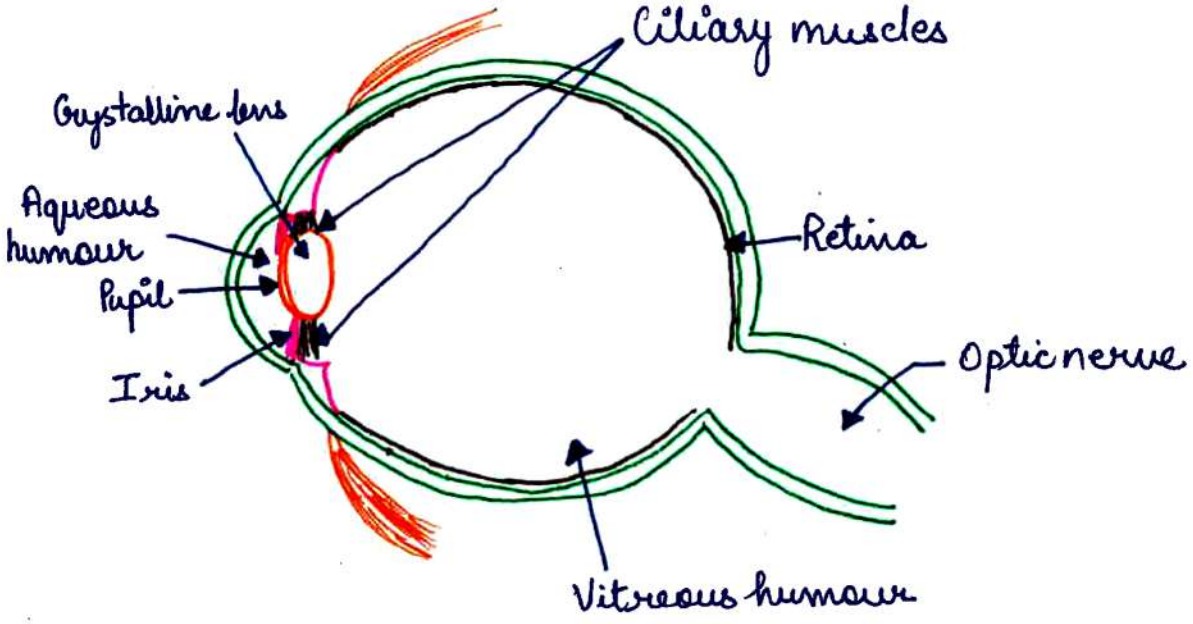
## Scattering of Light

- Tyndall effect :- The phenomena of scattering of light give rise to tyndall effect. The colour of scattered light depends upon the size of scattering particles.

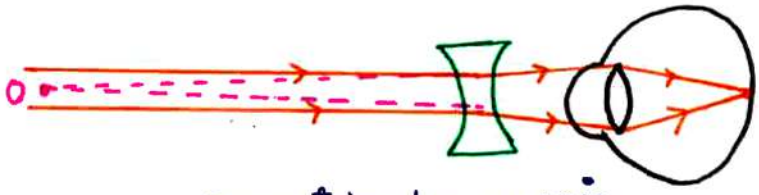
- Why is colour of the clear sky Blue?

- The molecules of air are more effective in scattering light of shorter wavelength at blue end than light of longer wavelength at red end.
- When sunlight passes through the atmosphere, the fine particles in air scatter the blue colour more than the red colour. The scattered blue light enters our eyes.

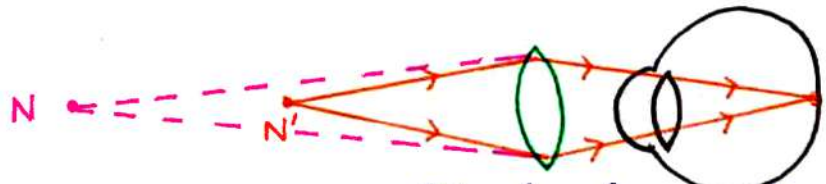
# Human eye




# Defects of vision

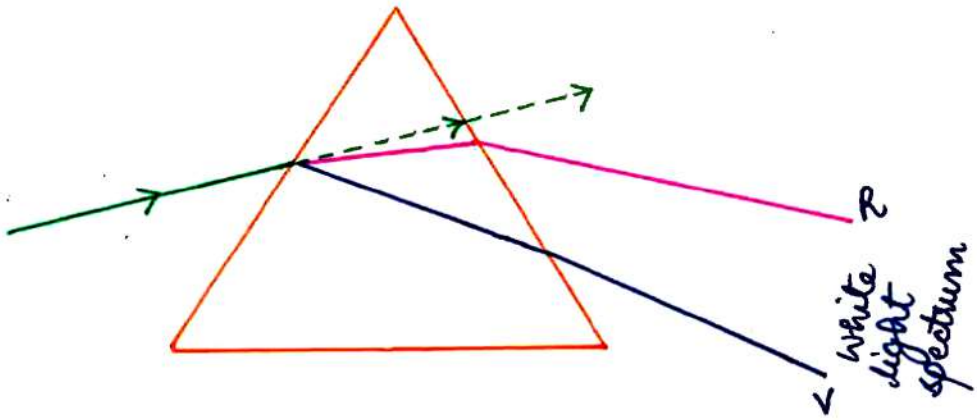



Correction for myopia

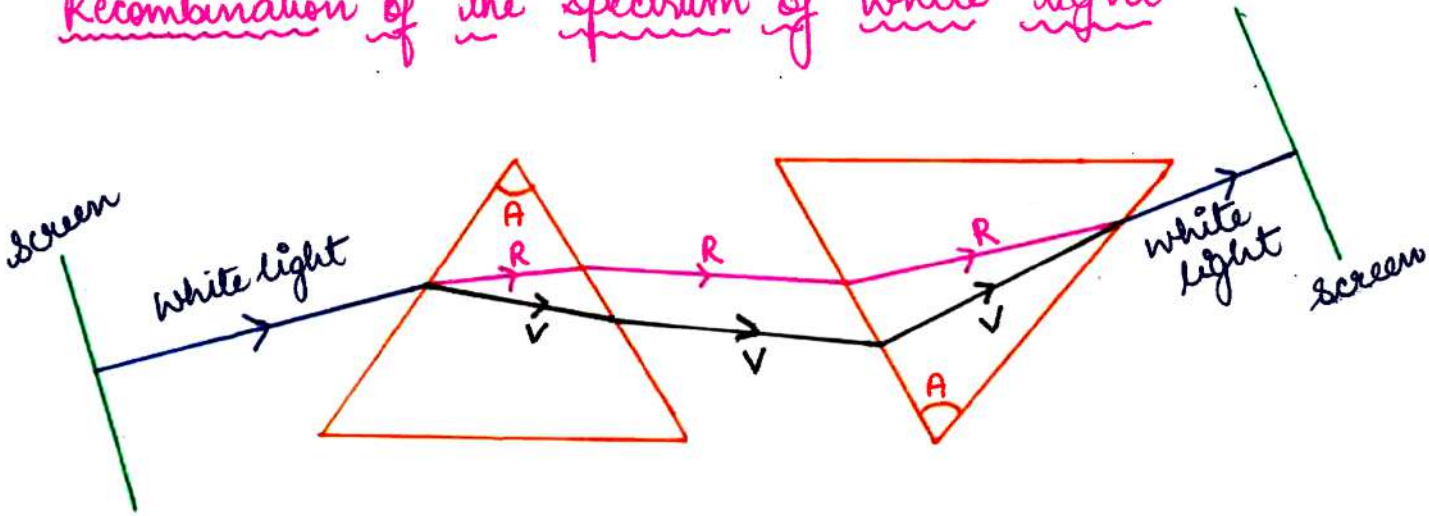



Correction for hypermetropia

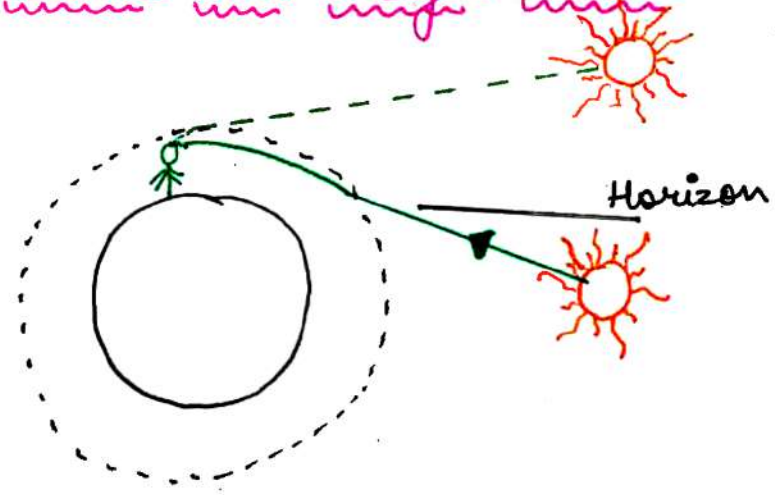
# Dispersion of white light by the Glass Prism




# Recombination of the spectrum of white light




# Advance sunrise and delayed sunset



# Formation of Rainbow