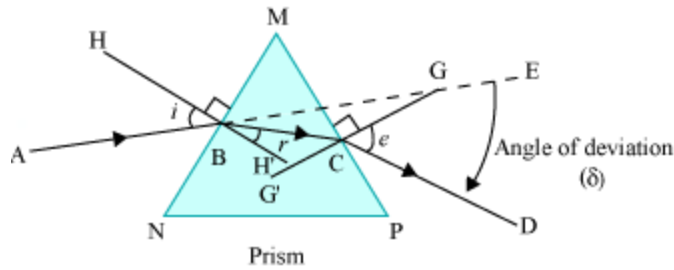


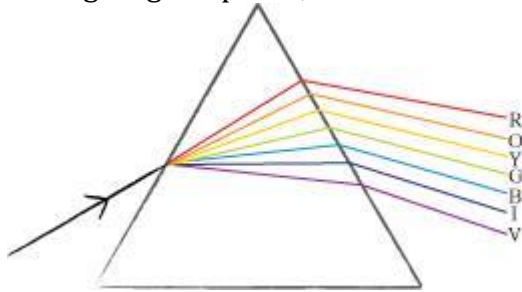
# The Human Eye And The Colourful World

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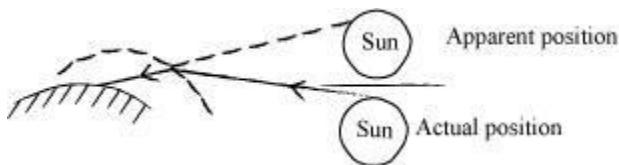
- Vitamin A (raw carrots, broccoli, green vegetables, cod-liver oil, etc.) is necessary for good vision.
- **To protect your eyes, the following points should be remembered:**
  - Avoid reading in dim light.
  - Wash your eyes at least four times a day with clean and cold water.
  - Wash your eyes quickly if dust particles or small insects enter your eye.
  - Visit an eye specialist regularly. Improper vision can cause stress, eyestrain, and even headaches.
  - While reading, maintain a distance of atleast 25 cm between your eyes and the book.
  - Do not rub your eyes. If redness in the eye persists, then consult an eye specialist immediately.
  - Avoid direct exposure to sunlight. Exposure to a large amount of light can harm your retina.
- **Power of accommodation**
  - Ability of the lens to adjust its focal length
  - Thickness of the lens is controlled by ciliary muscles
  - Nearest focal distance of lens = 25 cm
- **Defects**
  - **Myopia/near-sightedness**
    - **Problem:** Distant objects cannot be seen clearly
    - Image is formed in front of the retina
    - **Correction** –concave lens
  - **Hypermetropia/far-sightedness**
    - **Problem:** Near objects are not seen clearly
    - Image formed beyond the retina
    - **Correction** – convex lens
  - **Presbyopia** – Near-focus distance increases with age
    - Power of accommodation decreases
    - **Correction**– Bi-focal lens and concave lens
- **Refraction through a prism**
  - Light bends because of refraction that takes place at points **B** and **C** .
  - The extent of deviation of the light ray from its path BE to path CD is known as the angle of deviation ( $\delta$ )



- The splitting of a beam of white light into its seven constituent colours, when it passes through a glass prism, is called the **dispersion of light**



- Red → Disperses least
- Violet → Disperses most
- Yellow → Average of all lights
- Formation of rainbow is a natural phenomenon in which white sunlight splits into beautiful colours by water droplets.
- **Flickering of objects** - this is because the air above the fire is relatively hotter than the air further up in the atmosphere.
- **Twinkling of stars** – caused by changing air density in the atmosphere
- **Early sunrise and delayed sunset** – caused by refraction of light through the atmosphere



- The sun and the planets do not twinkle because they are not seen as point sources like stars, but are considered as extended sources.
- Scattering is the phenomenon of absorption and re-emission of light.
- The phenomenon of scattering of light by the colloidal particle gives rise to **Tyndall effect**.
- Atmospheric particles, smoke, tiny water droplets, suspended particles of dust, and air molecules scatter sunlight. Therefore, the path of light becomes visible.
- **Sky is blue**- because light near blue wavelength scatters most.
- Danger signs are red in colour- because red light scatters least.