

Introduction to Physical Science

Vision
Presented by Robert Wagner

The Eye

- The cornea and lens act as a thin lens to project an image on the retina
- The pupil allows for various opening sizes allowing us to see in a wide range of light levels.

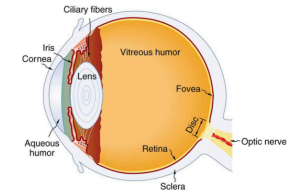


Image Credit: OpenStax College Physics - Figure 26.2 CC BY 4.0

Image Formation

- Image on the retina is inverted - our brain inverts the image giving us the sense of an upright object
- Lens adapts for us to see at a distance and close up
 - Relaxed - viewing distant objects
 - Accommodates - viewing nearby objects

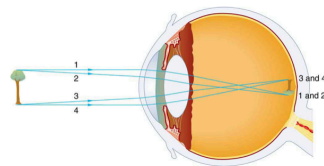


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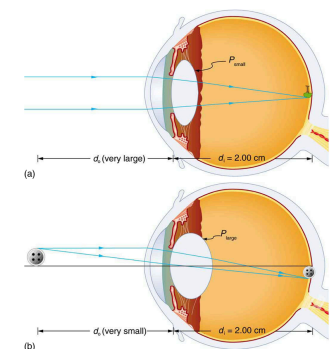


Image Credit: OpenStax College Physics - Figure 26.4 CC BY 4.0

Vision Correction

- Common vision defects
- Nearsightedness - myopia
 - Inability to see distant objects clearly
- Farsightedness - hyperopia
 - Inability to see nearby objects clearly

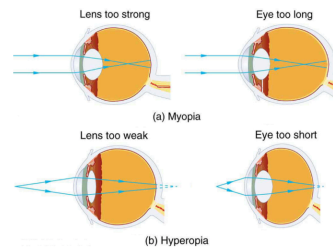


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Vision Correction (2)

- Correcting for nearsightedness - myopia
 - Diverging lens to compensate for over convergence of eye
- Correcting for farsightedness - hyperopia
 - Converging lens to compensate for under convergence of eye

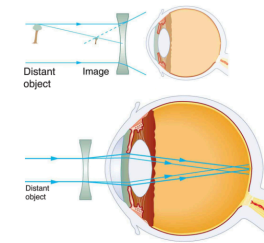


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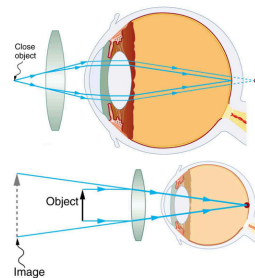


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Astigmatism

- Definition - an unevenness or asymmetry in the focus of the eye
- Often caused by irregularities in the shape of the cornea
- Corrected with glasses with the opposite irregularity

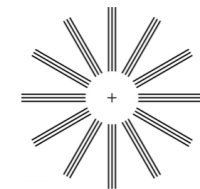


Figure 26.8 This chart can detect astigmatism.

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Summary

- The cornea and lens of the eye combine to become effectively a thin lens
- Common defects in vision include nearsightedness (myopia) and farsightedness (hyperopia)
- Astigmatism is due to irregularities in the eye and can be corrected for as well