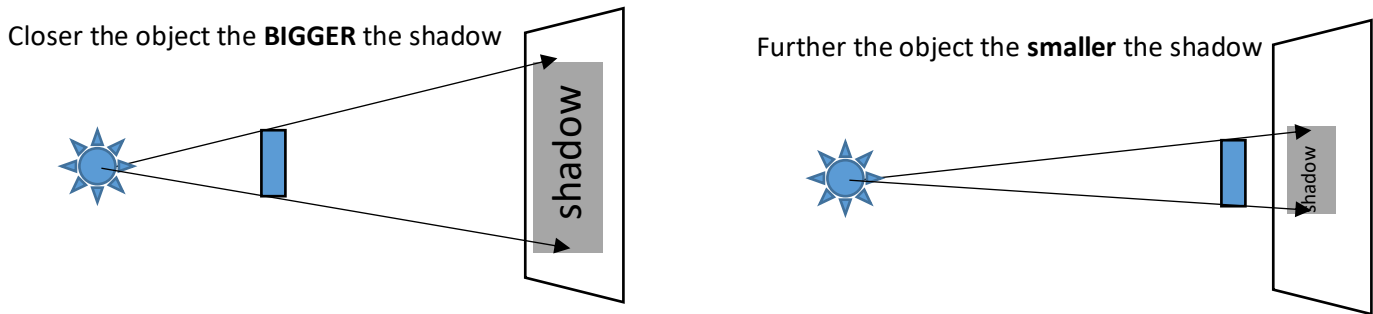


Answers to Lesson 17 Notes for notebook

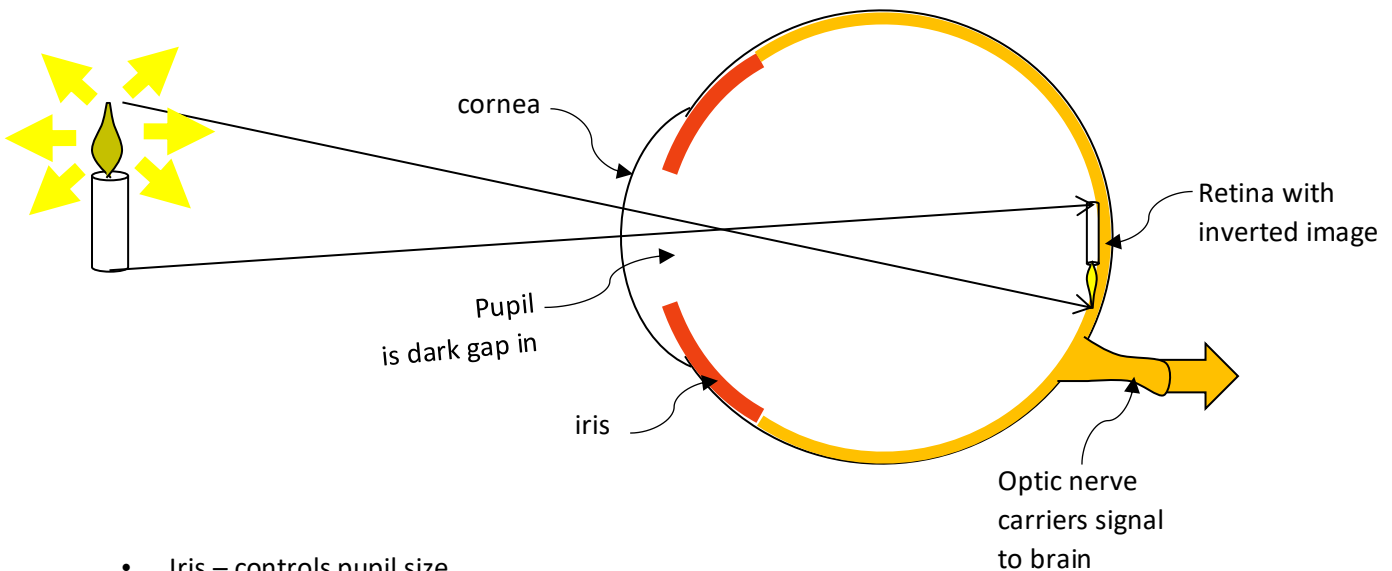
Shadows Activity 6 p169

Investigative Question: How does the distance of an object from a light source affect the size of its shadow? or something like that where the answer is not just yes or no.

Conclusion: the closer the object to the light the bigger the shadow and/or the further the object from the shadow the smaller the shadow



Drawing for notebook Schematic Cross Section C/S of Human Eye



- Iris – controls pupil size
- Bright light \Rightarrow iris & pupil contracts \Rightarrow less light thro'
- Dim light \Rightarrow iris relaxes & pupil dilates \Rightarrow more light thro'

Lesson 20

Other properties of light: Reflection and Refraction

Reflection – light bouncing p173-176

Law of reflection: the angle of incidence = the angle of reflection i.e. $\hat{i} = \hat{r}$

1. Draw a labelled ray diagram of light reflection off a smooth surface with an angle of incidence of 50° like Fig.19 p174.
2. Do Activity 8 p175. Make the sketch also

Lateral inversion: A mirror image is laterally inverted.

- Your left and right hands are like mirror images.

Q: Why is the name of the ambulance written like that shown in the photo alongside?



Reflection off rough versus smooth surfaces

Compare Fig. 22 p175 with Fig. 23 on p176.

- **Rough** surfaces **scatter** light in different directions thus not forming an image. The smoother the surface the better or sharper the image

Activity:

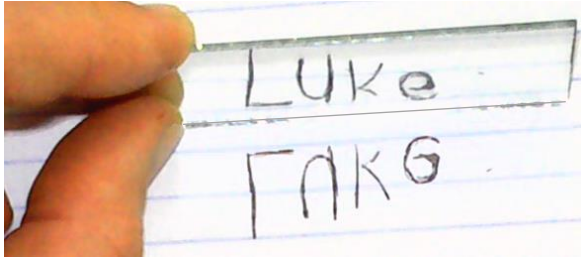
Try these on your own. You just need a mirror, your cell phone and some aluminium foil.

1. Compare the reflection of light, and the image formed, between the two sides of the foil
- Now crumple the foil and then flatten again. How does the reflection look now. SEE figure 23 p176 for a pictorial explanation.
2. i) Ask someone to take a close up photo of yourself winking or covering your one eye.
ii) Now take a selfie of yourself doing exactly the same thing.
iii) Now wink at yourself in the mirror doing exactly the same thing.
Question: Can you see a difference between the photo, selfie and the mirror image?

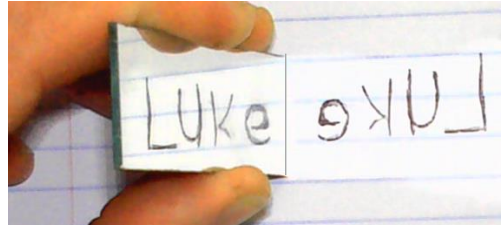
Note: some cell phones make the selfie like the photo. Other cell phones make the selfie like a mirror image.

Activity continued

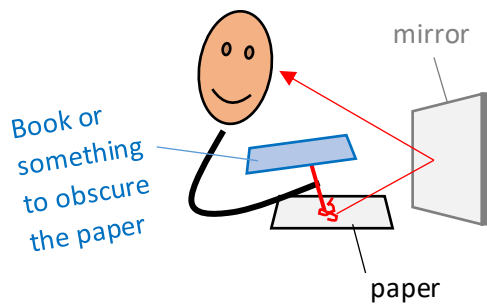
3.1 Write your name in such a way that the reflection reads correctly when viewed in the mirror. Draw the arrangement in your notebook.



And/Or



3.2



Obscure your view of the page you're writing on and use a mirror to write your name so that it reads correctly in the mirror. This is not easy

Lesson 21

Refraction – bending of light p181-186

*** Note Printing ERROR p181 and 182 should be swapped!! This is only in the older first edition textbook.

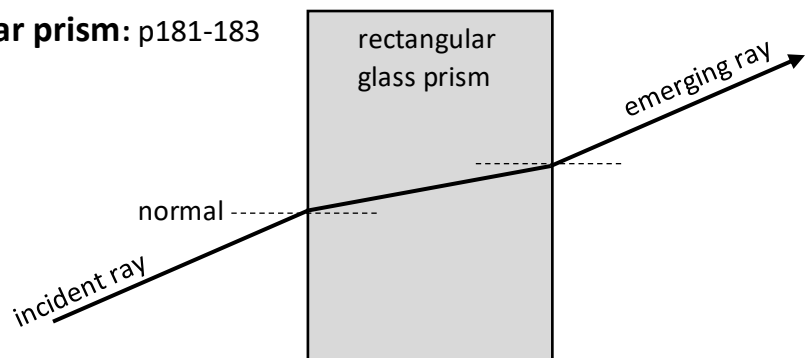
When light travels through a transparent substance like glass, perspex or water light **slows** down and **changes direction**.

This is how spectacles work. Light bends when passing through the lenses to help the person see clearer.

Previously this was the SBA practical. The school has ray box equipment to investigate reflection and refraction. Your teacher will demonstrate how to do these

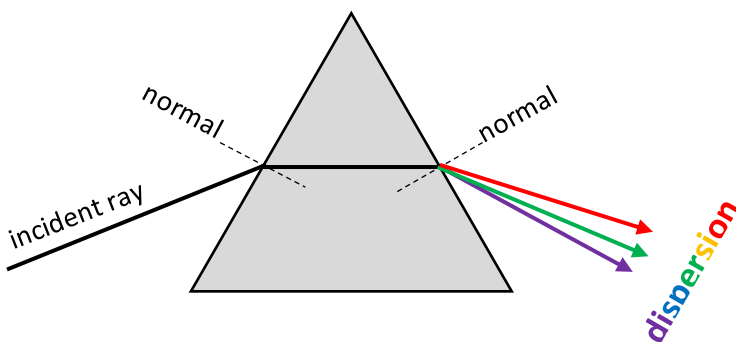
Refraction through a rectangular prism: p181-183

- Upon entering the prism the light bends **towards** the normal
- Upon exiting the prism the light bends **away** from the normal



Notebook: Draw both these diagrams in your notebook. Complete the labels for the rectangular prism. Take at least half page per drawing

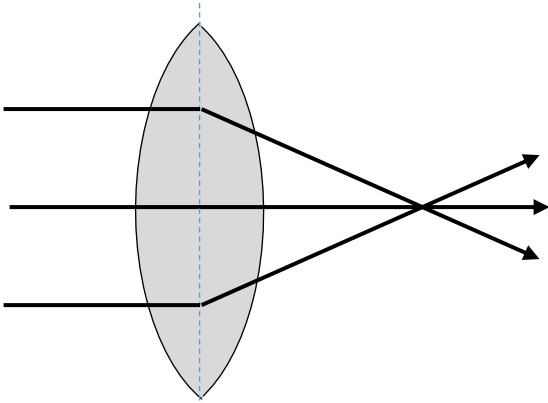
Refraction through a triangular prism & Dispersion P184



Since the sides of the prism aren't parallel the colours of white light **disperse** into the spectrum

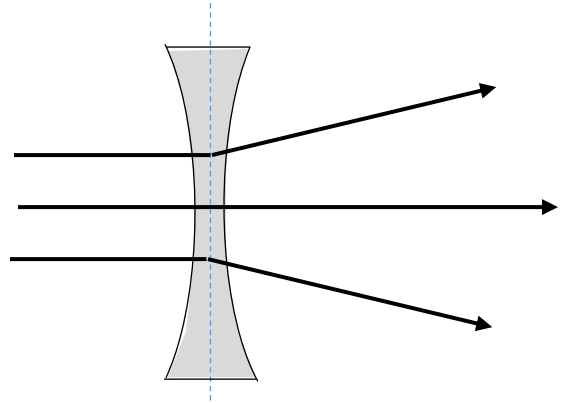
Lenses: NOT EXAMINABLE

Convex lenses converge light



Used as reading glasses and magnifiers

Concave lenses diverge light



Used if short sighted

Activity PHET SIMULATION

Try this very good simulation of refraction and reflection of light

<https://phet.colorado.edu/en/simulation/bending-light>

The image displays two screenshots of the PhET 'Bending Light' simulation. The top-left screenshot shows the simulation's main interface with a light ray passing through a boundary between two media. The top-right screenshot shows the 'Intro' screen of the simulation, featuring a navigation menu with 'Intro', 'Prisms', and 'More Tools'. The bottom-left screenshot shows a detailed view of the simulation with a light ray passing through a prism, and the bottom-right screenshot shows the 'Reversometer' tool used to measure the angle of refraction.

Lesson 22

1. *Read page187 about careers in Optics*
2. *Do Revision Questions p188*
3. *Do Practice Test P189-190*