



Q29)

(a) (i) Photoreceptor cells are located in the retina of the eye.

(ii) *A - conjunctiva - protects and covers cornea.

*B - iris - regulates how much light enters the eye.

B i by watching their lifestyle patterns and determining which area of the body or region of the body was causing or may cause the sound. For example, watching 10 grasshoppers and noticing that when they rub the inner part of hind legs produces a sound in all of them.

ii remove the organ from a sound - producing ~~specimen~~ specimen and see if the organism still made the noise.

c) Technology has made many advances to treat cataracts. The clouding of the ~~eye~~^{lens} can have adverse effects of the sufferer, in some cases rendering them unable to see at all and perhaps unable to have independence and care for themselves. In places such as Africa where the incidence of cataracts is quite high, if it results in blindness it will usually mean the sufferer is outcaste from the tribe. Cataracts if untreated in many African countries result in death within 4 years in most cases.

Recent cataract technology involves replacement of the affected clouded lens with a plastic lens. This surgery is quite relatively inexpensive and restores vision adequately for the patient with minimal recovery time. But with this replacement of the lens with a plastic lens, the plastic lens is ~~not~~ not flexible and so unable to change shape. The ability of the lens to focus ~~per~~ on near objects is impaired but may easily be fixed with the use of bifocal lenses.

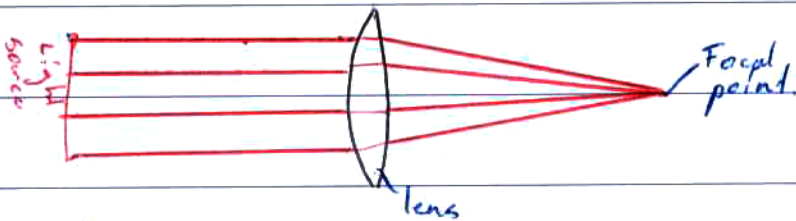
New research into cataracts has uncovered a possible link

between the production of a certain protein and cataracts. Further research may lead to preventative measures rather than surgery when it occurs.

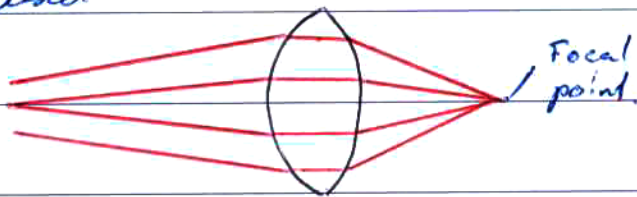
This new technology ^{of lens replacement} is mostly successful in restoring adequate vision but in some cases may require further surgery. The effects of cataracts are counteracted by lens replacement or the use of bifocals to restore sight with the patient being able to independently care for themselves. This 20 minute surgery is widely available and accessible so that the effects of cataracts can be minimised if not eradicate to all groups in society meaning a better quality of life.

d) Accommodation is the process of changing the shape of the lens to focus the light on the retina. The first-hand investigation we carried out involved a light box and different convex lenses. The light was set


on parallel and a thin lens was used.



With branching light rays a fatter lens was used.



The ~~point~~ procedure used showed that a fatter lens refracts the light a lot more than a thinner lens. This showed that an image further away needs less refraction to focus the light on the retina than an image close to the eye. The experiment also showed how the eye has the ability to change the shape of its lens for focus and clarity. The experiment was very suited to model the process of accommodation. A control of a flat lens was also done to compare results.

 The experiment was ~~rep~~ repeated to ensure accurate results.

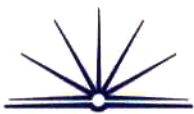
↑
No accommodation

e) The two devices designed to assist people with different types of hearing impairments are hearing aids and cochlear implants.

Hearing aids are used to amplify sounds. People whose outer ear doesn't function use hearing aids. The disadvantage of hearing aids is that in a loud room with several noises it's hard to distinguish between noises.

However hearing aids will not work when a person's whole ear won't work. For this cochlear implants are used.

Cochlear implants by-pass the ear completely and go straight to the ~~ear~~ auditory nerve. The cochlear implant changes the sounds heard into nerve impulses which is sent directly to the brain. The disadvantages of cochlear implants is that nerve damage can occur whilst putting them in and the whole side of the face will sag. Also if the auditory nerve is damaged then the implant can't work.



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