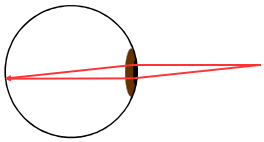
Eyes and Corrective Lenses

Lens causes light rays to converge on the back of the eye.



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Focal length of human eye is adjustable.

Muscles can pull lens, causing the lens to be thinner, less converging.

When muscles are relaxed, elasticity of lens restores lens to thicker shape, more converging.

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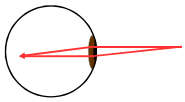
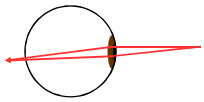
The human eye eventually loses elasticity and loses some range in convergence, resulting in inability to focus on near objects. Typically, there is significant loss between 40 and 50 years of age.

Eyes and Corrective Lenses

Some eyes have lenses that are too converging or not converging enough and need corrective lenses.



Too converging
"Nearsighted"



Not converging enough
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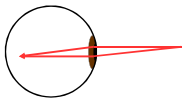
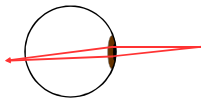


Too converging
"Nearsighted"

Corrected with
diverging lens.



Not converging enough
"Farsighted"

Corrected with
converging lens.

Example: A student's natural lenses focus light from a distant object 0.1 cm in front of the back of the eye.

a. What kind of corrective lenses should the student use?

b. What should be the focal length of the corrective lenses?

[The back of the human eye is ~2.4 cm from the natural lens. Estimate the location of corrective lenses.]

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[The object for the natural lens is the image for the corrective lens, BUT the two distances are different because they are measured from different lenses.]

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