Eye model

For this eye model, clear vision distance is 1m.

Normal eye

Place a Plexiglas plate with the letter approximately 1 meter in front of the eye model (see Fig. 3). Place the lamp just next to the letter. Set the knob in the central position of the slider (at the top of the eye). Change the shape of the lens by using the syringe, so that the picture of the letter appears on the retina as sharp as possible.
Attention! During the near-sightedness and long-sightedness demonstrations we will not change the lens shape. We will do it during a presbyopia demonstration.

Demonstration of nearsightedness

1. Place the eye model (normal length of the eye) and the plate with the letter as shown in the Fig. 1.
2. Make the eye longer by using the knob on the slider. The eye has become nearsighted and the picture has become unclear. There are two ways in order to acquire sharper image:

a. the letter is moved closer to the eye, or
b. correction with lens, in this case a lens with the strength -0.5 D should be applied. Put this lens in the holder and picture becomes sharper.

Demonstration of long-sightedness

1. Place the letter 1 m from the eye (see Fig. 2).
2. Make the eye shorter. The eye has become long-sighted and the picture has become unclear. The picture will be sharper if you correct the visual defect with lens, a converging lens (+1.0 D).

Demonstration of presbyopia

The elasticity of the eye lens decreases when we become older. Therefore, we need glasses to see well at close range.

1. Repeat the first point of near-sightedness demonstration. Suppose that the letter is in the near point of the eye and that the lens cannot accommodate more. The lens cannot produce a sharp picture of the objects at closer range.

2. Move the letter closer to the eye (0.5 m distance). The letter will then be closer than near point of the eye and the picture of the letter becomes unclear.

   The visual defect can be corrected with a converging lens (+1.0 D), which produces a sharp picture at this range.

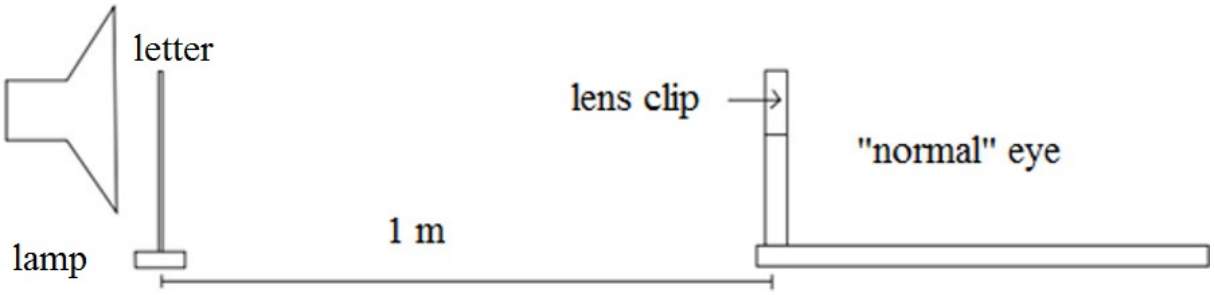

Fig. 1

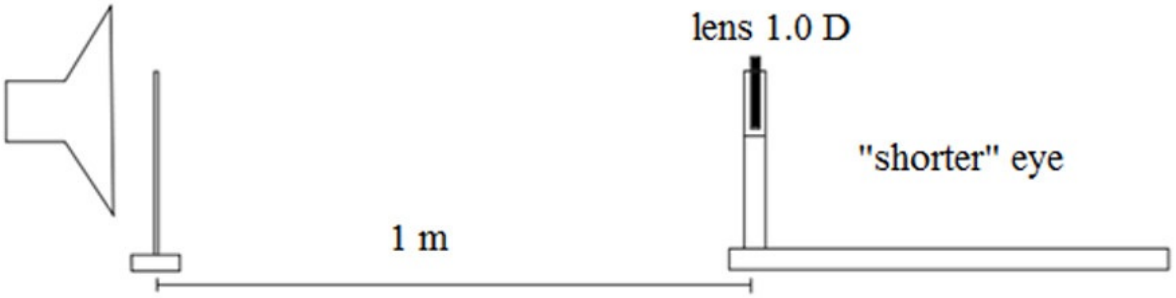

Fig. 2

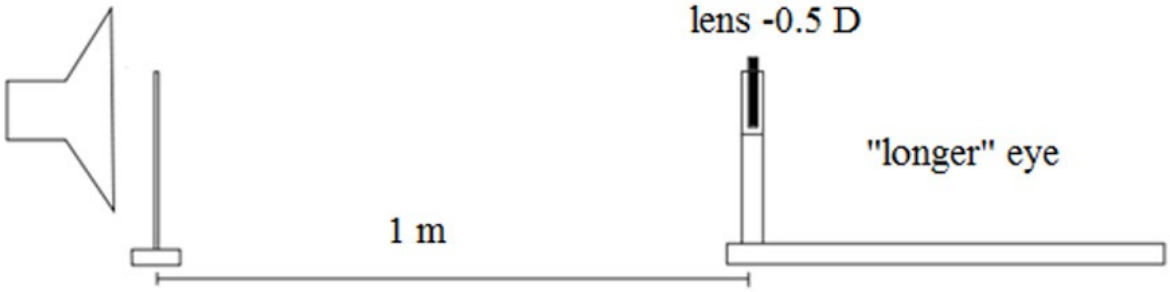

Fig. 3

Issues

Anatomy and eye function:

- Eye construction and its function
- Physical processes occurring in the eye (especially in cornea, lens and retina)
- Vision defects and its corrections

Davidovits P., Physics in Biology and Medicine

Rodney, Cotterill, Biophysics: An Introduction