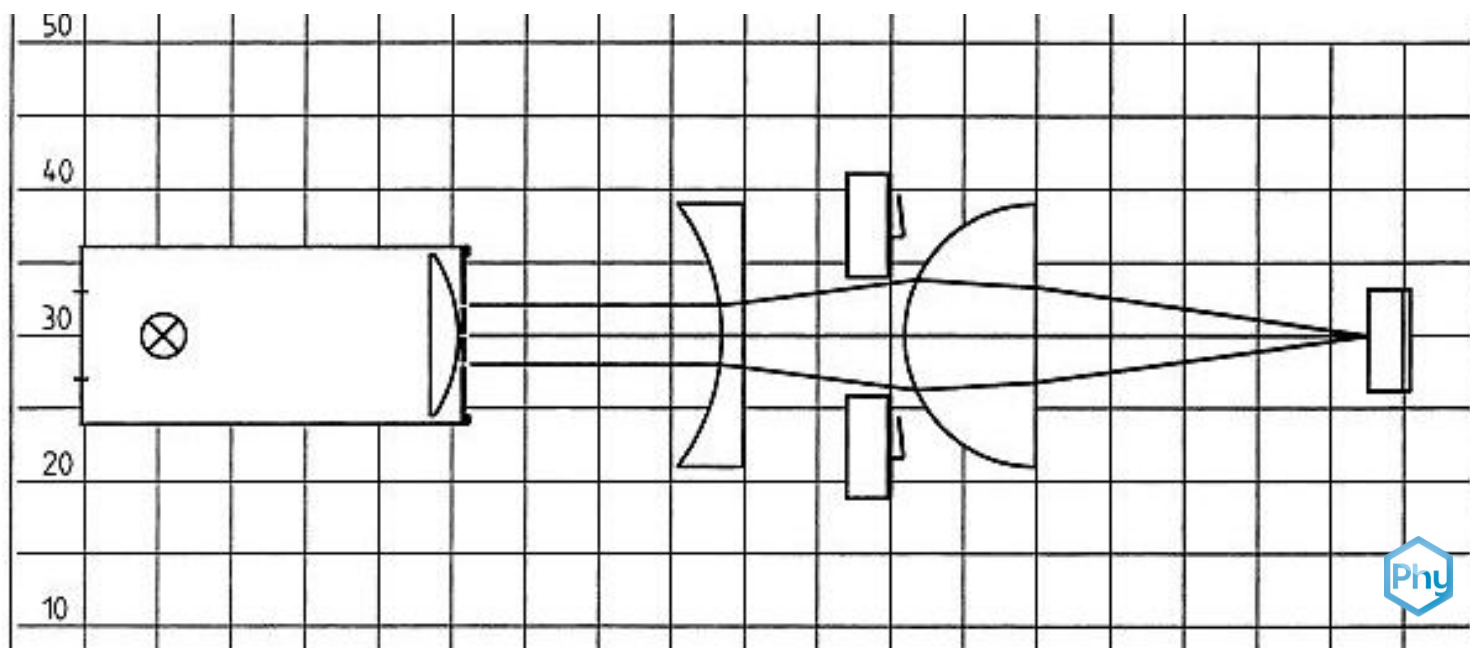


Myopia and its correction



Myopia and its correction

Physics

Light & Optics

Optical devices & lenses



Difficulty level

easy



Group size

1



Preparation time

10 minutes



Execution time

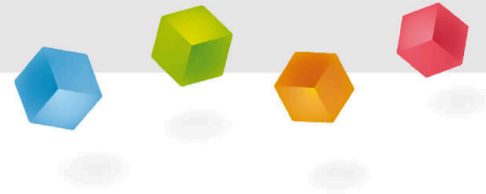
10 minutes

This content can also be found online at:



<http://localhost:1337/c/6257eb838f560900034090ca>

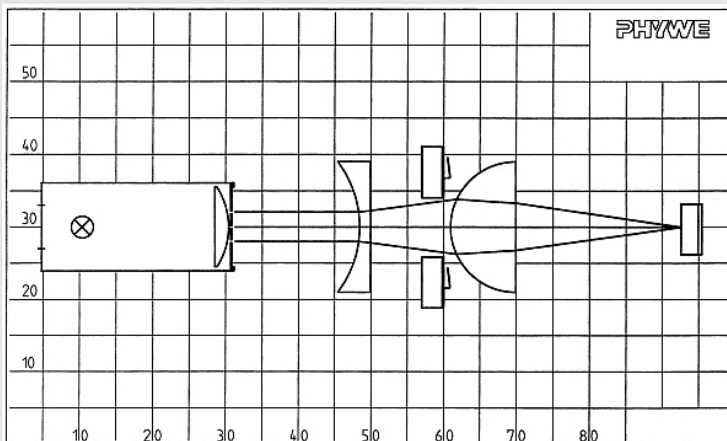
PHYWE



Teacher information

Application

PHYWE



Experimental setup:

3-slit aperture with diaphragm between scattering and converging lens

The experiment is intended to simulate and explain the correction of myopia with the help of glasses.

The eye is constructed in such a way that depending on the distance of an object to the eye, the "lens" of the eye curves more or less.

The correction of myopia is performed with the help of a diverging lens, which changes the focal length so that distant out-of-focus objects can be seen sharply again.

Other teacher information (1/2)

PHYWE

Prior



Students need prior knowledge of imaging optics, with collecting and diverging lenses, and the spectral colors of light. Furthermore, you should have gathered basic knowledge about the function of the human eye.

Principle



To demonstrate what myopia is and how it can be corrected with eyeglasses.

Other teacher information (2/2)

PHYWE

Learning



Students will recreate the natural functions of the human eye with the experimental setups.

Tasks



Students should make observations and gather knowledge about the experimental setup.

Safety instructions

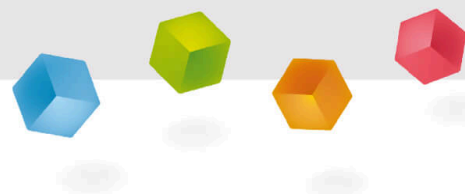
PHYWE



- The general instructions for safe experimentation in science education apply to this experiment.

PHYWE

Student Information



Motivation

PHYWE



Glass of orange juice with blurred background

The image on the left is commonplace for myopic people.

You can see close objects sharply, but as soon as they move away they become blurred and can sometimes only be recognized with great effort.

Remedy for this health problem are glasses for myopic people.

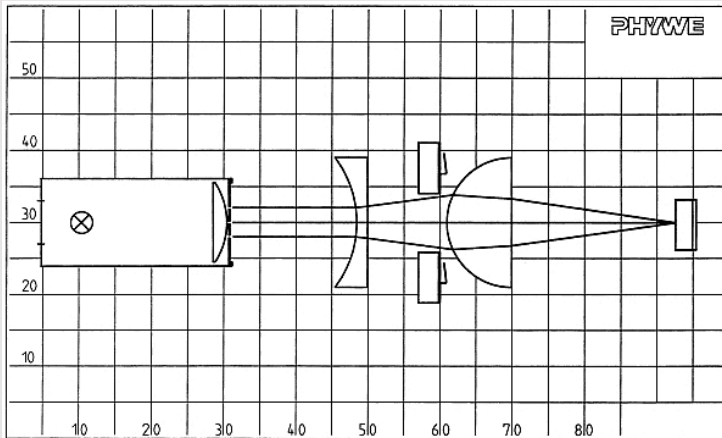
This experiment will explain how these glasses help the eye.

Equipment

Position	Equipment	Item no.	Quantity
1	PHYWE Sticky board with rack, demo physics	02150-00	1
2	Adhesive lamp, halogen 12 V/50 W	08270-20	1
3	Model body, semicircle, holding magnet	08270-01	1
4	Model body, plano concave, holding magnet	08270-03	1
5	Cover with holder, magnetic	08270-10	2
6	Plane mirror, magnetic	08270-13	1
7	PHYWE step transformer with rectifier DC: 2/4/6/8/10/12 V, 5 A / AC: 2/4/6/8/10/12/14 V, 5 A	13533-93	1

Structure and implementation (1/2)

PHYWE

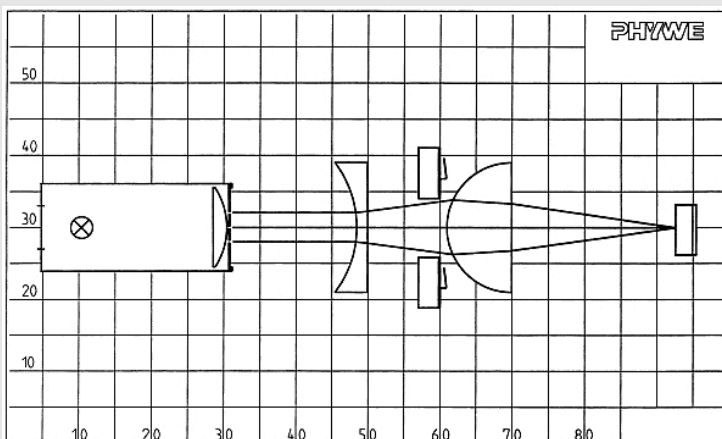


3 slit aperture with concave lens and converging lens as eye

- Set optical axis
- Position the holding lamp with 3-slit bezel so that the center beam runs along the optical axis.
- Place and adjust the semicircle model body; attach the diaphragms (as models for the eye lens and the iris diaphragm); select the positions of the parts as shown in the illustration.
- Become aware of the intersection point of the rays (image of a very distant object point) with the optical axis.

Structure and implementation (2/2)

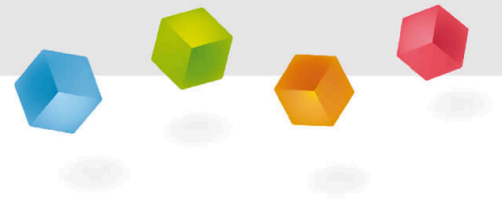
PHYWE



3 slit aperture with concave lens and converging lens as eye

- Place the plane mirror, the rear side of which is to represent the retina, in such a way that the sharp image (focal point) is located on the "retina"
- Model a myopic eye from this normal-sighted, relaxed eye by moving the "retina" to the right until it has a distance of approx. 225 mm from the "eye lens".
- Correct myopia by attaching the plano-concave model body ("glasses").

PHYWE



Report

Task 1

PHYWE

Drag the correct words into the gaps!

When the is too long, the of objects appear in front of the .

A can correct this eye defect.

This increases the .

retina

images

eyeball

diffusing lens

focal length

☒ Check

Task 2

PHYWE

The nearsighted eye is longer, or deeper, than the normal-sighted eye.

☐ True☐ False☒ Check

Nearsightedness is usually treated with a monacle.

☐ True☐ False☒ Check

Task 3

PHYWE



The images of objects to which the eye is directed,

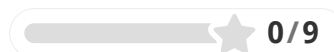
appear in front of the retina.

appear behind the retina.

appear on the cornea.

Slide	Score / Total
Slide 12: Focal length of the eyes	0/5
Slide 13: Multiple tasks	0/2
Slide 14: Retina of the eyes	0/2

Total



Solutions



Repeat