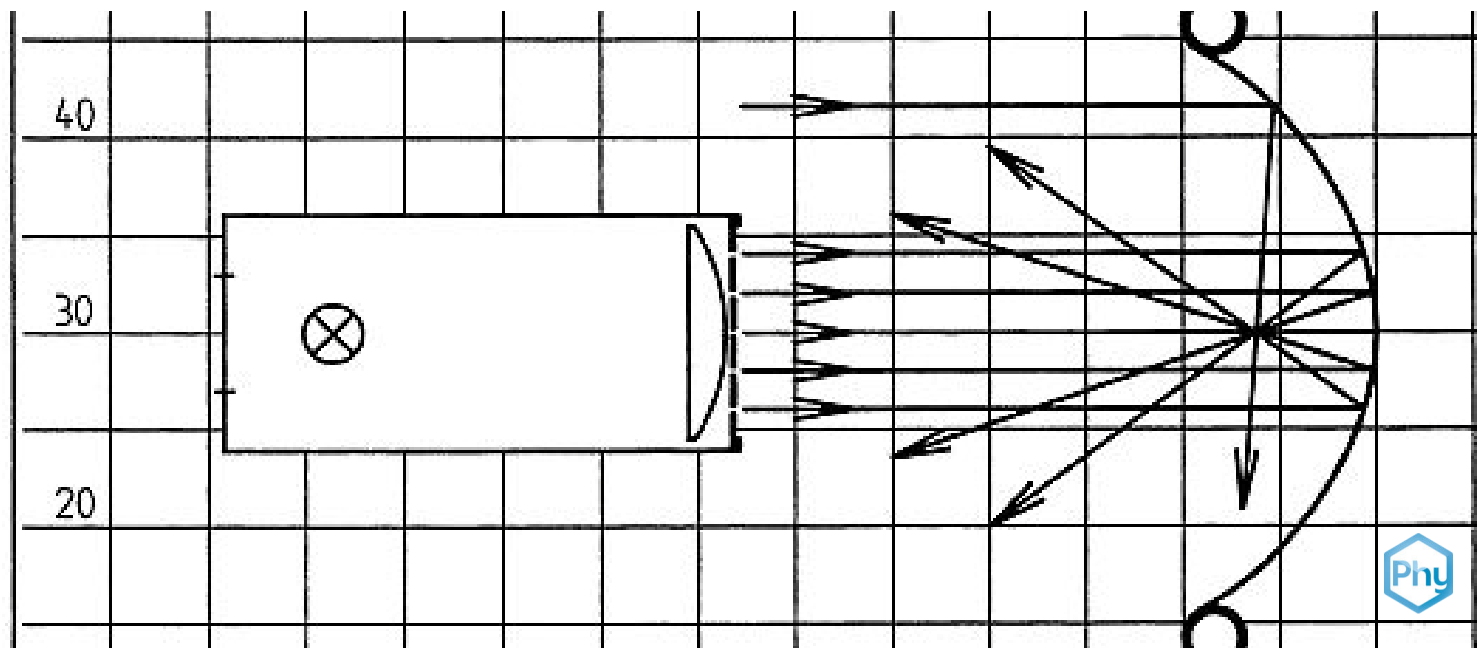


Reflection of light by a parabolic mirror



Physics

Light & Optics

Reflection & refraction of light



Difficulty level

easy



Group size

-



Preparation time

10 minutes



Execution time

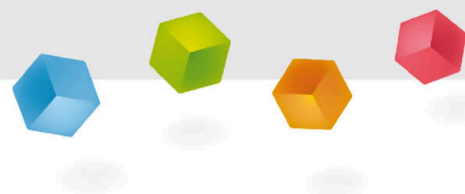
10 minutes

This content can also be found online at:

<http://localhost:1337/c/64286b945e30a7000275eae1>

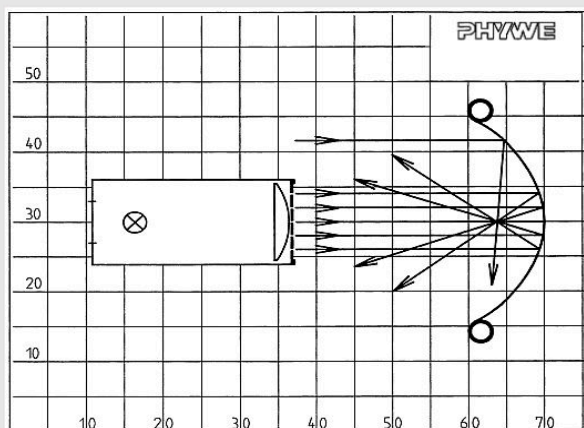
PHYWE

Teacher information



Application

PHYWE



Experimental set-up:

Parabolic mirror

A parabolic mirror is characterised by the fact that it does not have a constant radius, but is parabolic in shape.

This shape allows all parallel incident rays to be reflected by the focal point.

A similar technique is used to receive satellite signals with a SAT antenna (dish).

Other teacher information (1/2)

PHYWE

Prior knowledge



The students need theoretical knowledge about the straight-line, ray-shaped propagation of light and that objects reflect light rays.

Principle



It is to be shown that a parabolic mirror reflects all light rays incident parallel to the optical axis through the focal point.

Other teacher information (2/2)

PHYWE

Learning objective



The students should gain knowledge about the principles of light reflection. This experiment is about the reflection behaviour of a parabolic mirror.

Tasks



The students should observe how a parabolic mirror reflects all parallel rays through the focal point.

Additional teacher information

PHYWE

Note



To make the parabola template, the pattern can be copied, glued onto a thin cardboard and cut to size.

This parabola has the equation $y^2 = 25x$ (Unit: 1 cm).

Your focal point is 62.5 mm away from the vertex.

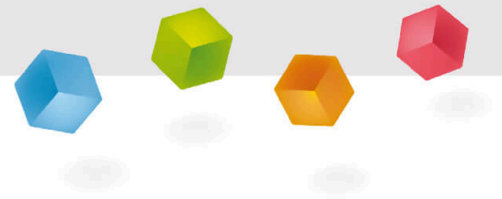
Safety instructions

PHYWE



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

PHYWE



Student information

Motivation

PHYWE



Parabolic antennas in the desert

On the left side you can see a satellite receiver, the special thing about these systems is their shape.

Even though they appear to be simply round at first glance, they are actually parabolic, i.e. the radius changes continuously from the centre to the upper edge.

Today's experiment deals with a mirror that is shaped like this, the parabolic mirror.

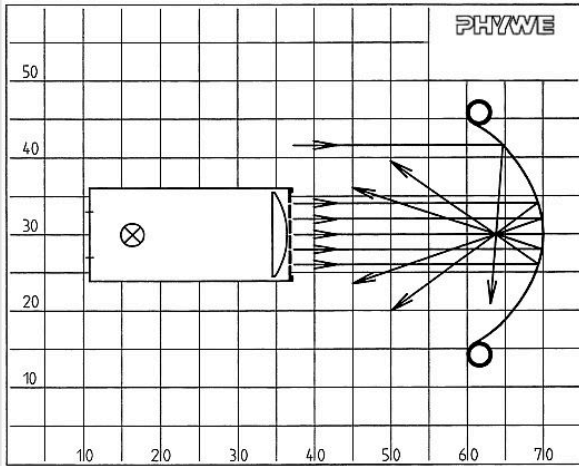
You can find out about the special features of this mirror on the following pages.

Equipment

Position	Material	Item No.	Quantity
1	PHYWE Demo Physics board with stand	02150-00	1
2	Halogen lamp for experiments, 12V/50W, with magnetic base	08270-20	1
3	Concave/convex mirror,magnet held	08270-12	1
4	PHYWE Multitap transformer DC: 2/4/6/8/10/12 V, 5 A / AC: 2/4/6/8/10/12/14 V, 5 A	13533-93	1
5	G-clamp	02014-00	2

Set-up and Procedure

PHYWE

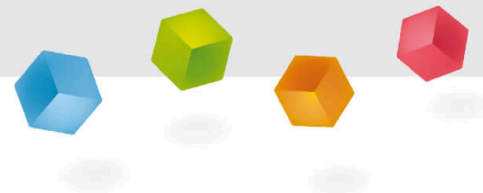


Parabolic mirror with 5-slit aperture

- Draw optical axis on adhesive board
- Putting the mirror on the template
- Position the luminaire with the 5-slit aperture so that the centre beam runs along the optical axis.
- Move the luminaire up and down in parallel so that the course of parallel beams far away from the axis can also be observed.

PHYWE

Report



Task 1

PHYWE



Write down your observations on the reflection behaviour of the parabolic mirror.

Task 2

PHYWE



Fill in the blanks!

Through a all are reflected in such a way that the reflected intersect at a point on the axis.

Slide

Score / Total

Slide 13: Parabolic mirror

0/4

Total



0/4



Solutions



Repeat



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