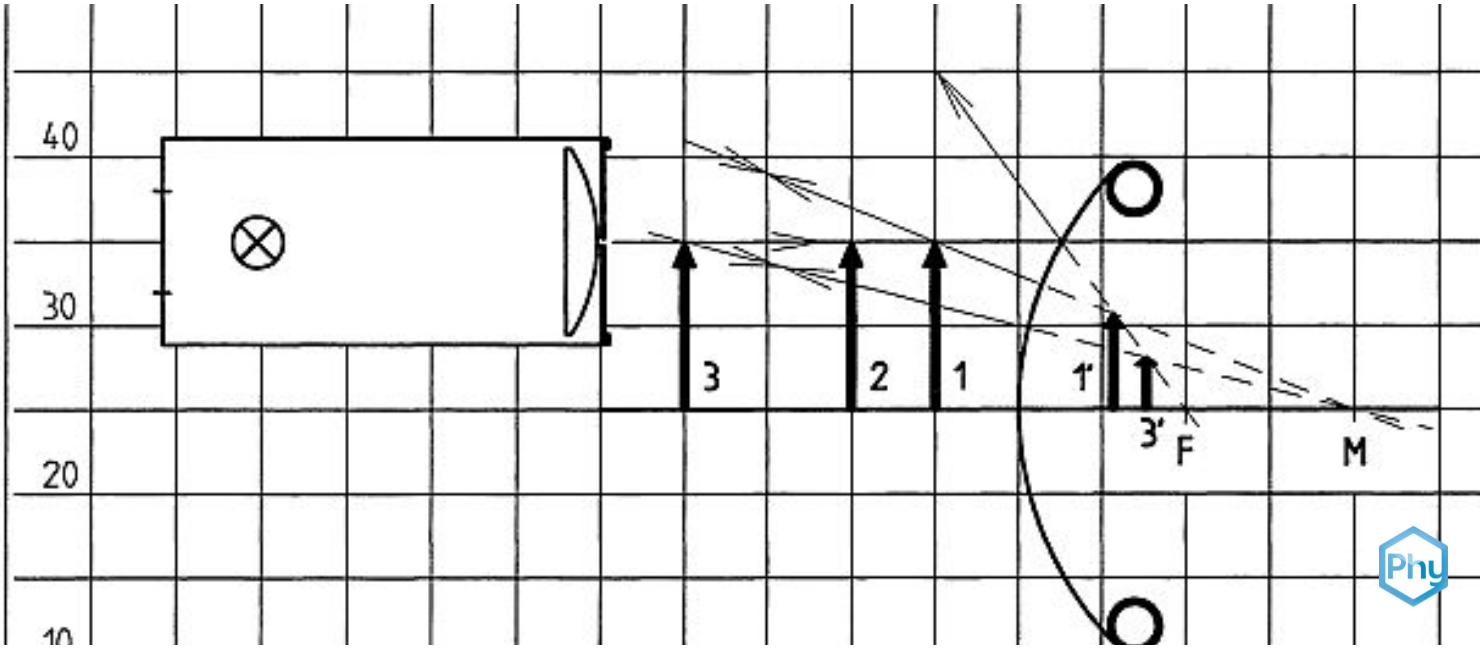
Image formation by a convex mirror



Physics > Light & Optics > Reflection & refraction of light

Difficulty level	Group size	Preparation time	Execution time
easy	-	10 minutes	10 minutes

This content can also be found online at:

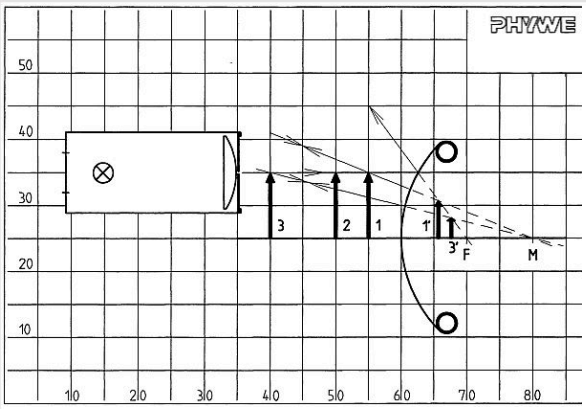
http://localhost:1337/c/642869c05e30a7000275ead8

PHYWE

Teacher information

Application

PHYWE



Experimental set-up:

Domed mirror with object arrows

In a convex mirror, the surface of the mirror is curved. A curved mirror behaves like many small plane mirrors.

A convex mirror reflects more distant objects much smaller than close objects.

PHYWE

Robert-Bosch-Breite 10
37079 Göttingen

Tel.: 0551 604 - 0
Fax: 0551 604 - 107

info@phywe.de
www.phywe.de

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

With the help of parallel rays and centre rays, the formation of images on the convex mirror is to be demonstrated; at the same time, the properties of the images are to be shown.

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 and image formation of a convex mirror.

Tasks

The students should observe how a convex mirror reproduces objects of different distances and sizes.

PHYWE

Robert-Bosch-Breite 10
37079 Göttingen

Tel.: 0551 604 - 0
Fax: 0551 604 - 107

info@phywe.de
www.phywe.de

Additional teacher information

PHYWE

Note

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

Safety instructions

PHYWE

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

PHYWE

Robert-Bosch-Breite 10
37079 Göttingen

Tel.: 0551 604 - 0
Fax: 0551 604 - 107

info@phywe.de
www.phywe.de

PHYWE

Student information

Motivation

PHYWE

Traffic mirrors

On the left you can see a picture of a traffic mirror. Even if you still have to wait a few years for your driving licence, these mirrors are also helpful on foot or on your bike to keep an eye on sharp bends or junctions that are difficult to see.

This experiment is intended to show how the mirror image is created in such a convex mirror and why it looks so distorted.

PHYWE

Robert-Bosch-Breite 10
37079 Göttingen

Tel.: 0551 604 - 0
Fax: 0551 604 - 107

info@phywe.de
www.phywe.de

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

PHYWE
Robert-Bosch-Breite 10
37079 Göttingen
Tel.: 0551 604 - 0
Fax: 0551 604 - 107
info@phywe.de
www.phywe.de

Set-up and Procedure (1/2)

PHYWE

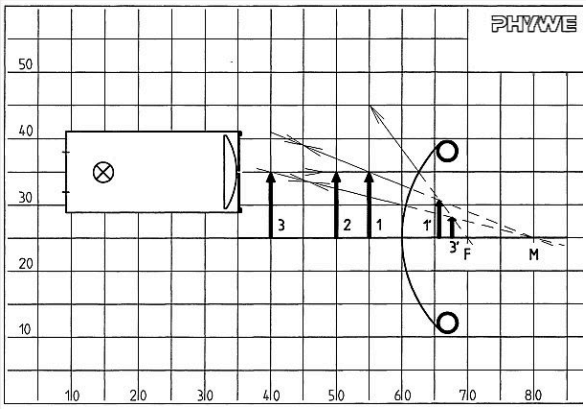


Fig.1:

Domed mirror with object arrows

- Draw optical axis
- Draw an arc of a circle with radius r = 200 mm on the board using a template or compass.
- Set mirror on circular arc
- Mark centre of curvature and focal point (r = 200 mm, f = 100 mm)
- Draw equal-sized object arrows e.g. at a distance of 50 mm, 100 mm, 200 mm from the apex of the mirror.

Set-up and Procedure (2/2)

PHYWE

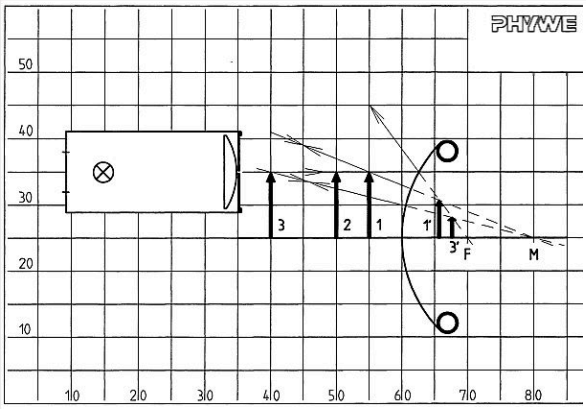


Fig.1:

Domed mirror with object arrows

- Position luminaire with 1-slit aperture so that it produces a parallel beam through all arrowheads
- Trace all light rays during the experiment as far as possible
- Position the luminaire one after the other so that it produces a centre beam through one of the arrowheads.
- Remove luminaire and convex mirror, draw the ray paths in front of the mirror as well as the backward extensions of the reflected rays up to their intersections (Fig. 1 shows two examples); enter image arrows

PHYWE

Robert-Bosch-Breite 10
37079 Göttingen

Tel.: 0551 604 - 0
Fax: 0551 604 - 107

info@phywe.de
www.phywe.de

PHYWE

Report

Task 1

PHYWE

Write down your observations of the different experimental set-ups.

PHYWE

Robert-Bosch-Breite 10
37079 Göttingen

Tel.: 0551 604 - 0
Fax: 0551 604 - 107

info@phywe.de
www.phywe.de

Task 2

PHYWE

Fill in the blanks!

The convex mirror only produces upright, _____, virtual images. The images are smaller the _____ the object is from the _____.

farther | diminished | mirror

Check

Slide	Score / Total
Slide 14: Domed mirror	0/3

Total 0 / 3

Solutions | Repeat | Export text

PHYWE

Robert-Bosch-Breite 10
37079 Göttingen

Tel.: 0551 604 - 0
Fax: 0551 604 - 107

info@phywe.de
www.phywe.de