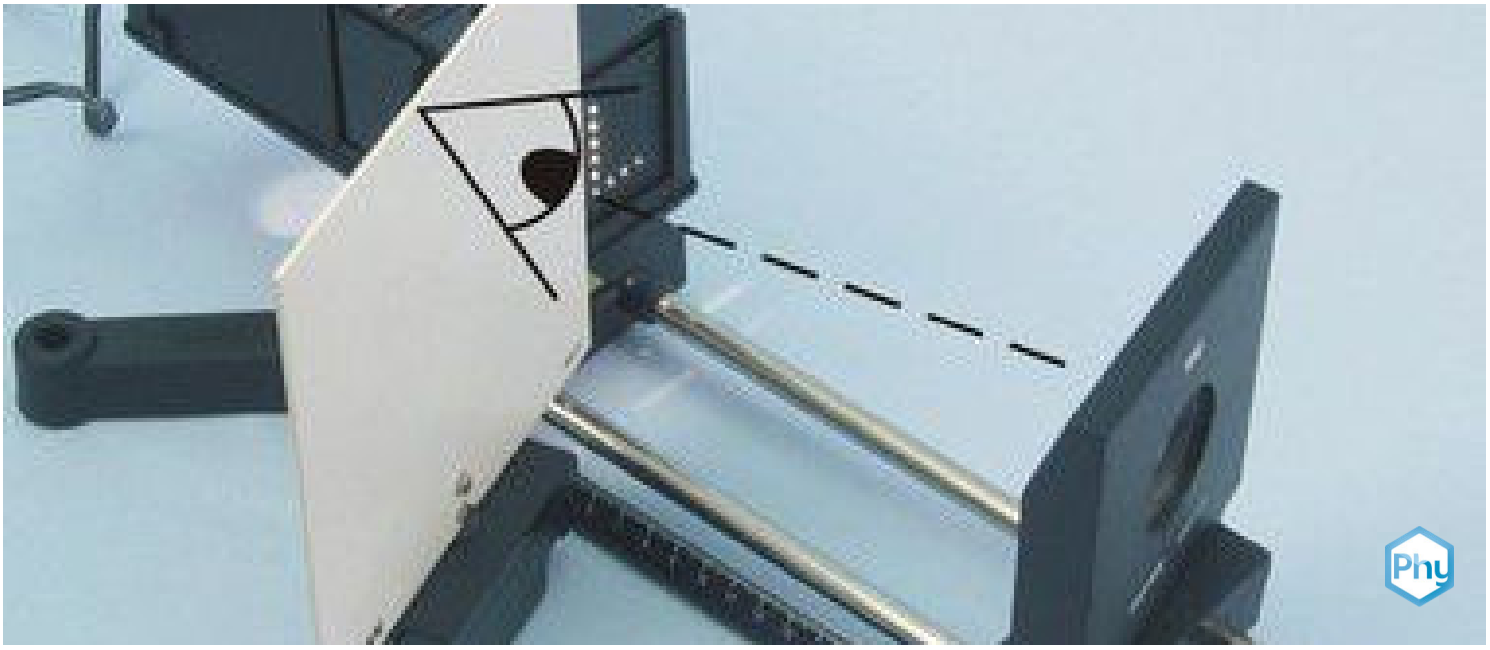
Images in a convex mirror



Physics > Light & Optics > Reflection & refraction of light

Difficulty level	Group size	Preparation time	Execution time
easy	1	10 minutes	10 minutes

This content can also be found online at:

http://localhost:1337/c/62dbbd08a52f910003dffb64

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

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Teacher information

Application

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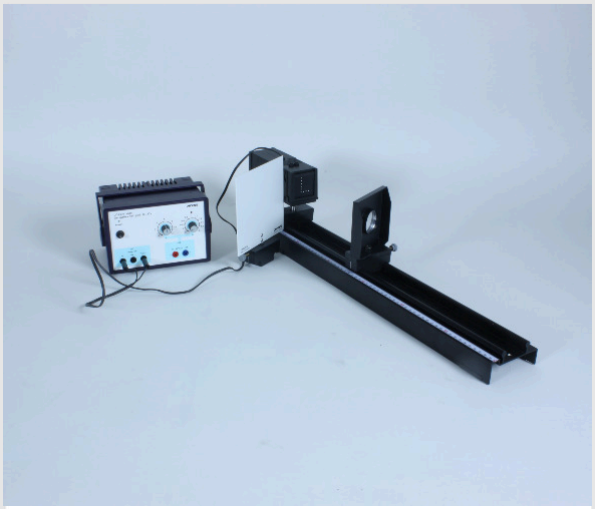

Experimental setup

Convex mirrors enlarge the angle of vision by reducing the image. This wide-angle effect is used in everyday life to see unclear areas better, e.g. with traffic mirrors at road junctions or with surveillance mirrors in supermarkets.

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Robert-Bosch-Breite 10
37079 Göttingen

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

info@phywe.de
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Other teacher information (1/4)

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Principle

Light rays are scattered by a convex mirror. They therefore produce reduced images and increase the angle of view.

Learning objective

Students should observe the mirror effect of a convex mirror and investigate the relationship between object width and image size.

Other teacher information (2/4)

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Task

Students should investigate the properties of images produced by a convex mirror at different object widths.

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Robert-Bosch-Breite 10
37079 Göttingen

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

info@phywe.de
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Other teacher information (3/4)

The students' unsuccessful attempts to catch crescent mirror images with a screen make this experiment particularly interesting and motivating if the students have no or only uncertain knowledge about image formation at the convex mirror.

But it is also recommended as an experiment to confirm or check the students' theoretical knowledge. Even in this case, many students will try - against their better judgement - to catch the reflection.

Other teacher information (4/4)

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Notes on set-up and procedure

- The students will, according to the instructions for carrying out the experiment, determine certain object widths and look at the mirror images (statically) in each case.
- At the end of the experiment, it may be useful and methodologically interesting to ask the students to observe the changes in the mirror image when the convex mirror is moved uniformly to the right or left on the optical bench.

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Robert-Bosch-Breite 10
37079 Göttingen

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

info@phywe.de
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Safety instructions

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

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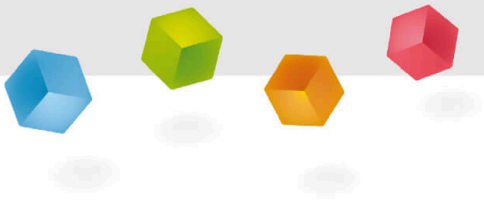

Student information

PHYWE

Robert-Bosch-Breite 10
37079 Göttingen

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

info@phywe.de
www.phywe.de

Motivation

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Car rear view mirror

Convex mirrors, enlarge the angle of vision. This wide-angle effect is used in everyday life to see unclear areas better, e.g. with traffic mirrors at road junctions or with surveillance mirrors in supermarkets. Convex mirrors are also used in the mirror cabinet, as they can make the reflection appear slimmer.

How do convex mirrors work?

Tasks

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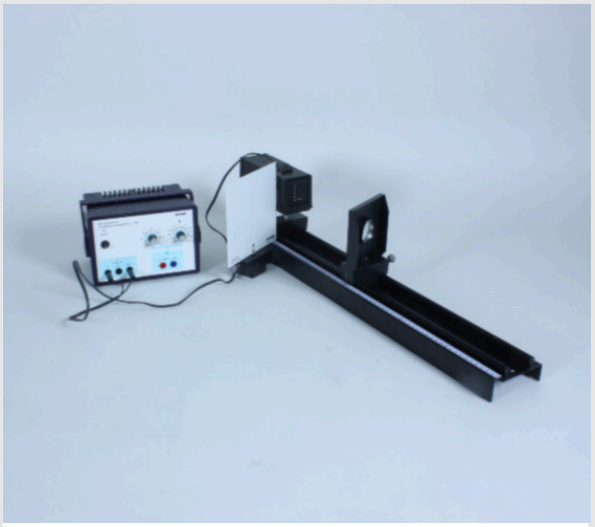

Experimental setup

Investigate the properties of images produced by a convex mirror at different object widths.

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Fax: 0551 604 - 107

info@phywe.de
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Equipment

Position	Material	Item No.	Quantity
1	Optical profile-bench for student experiments, l = 600 mm	08376-00	1
2	Light box, halogen 12V/20 W	09801-00	1
3	Bottom with stem for light box	09802-20	1
4	Concave/convex mirror with rod	09821-00	1
5	Slide mount for optical bench	09822-00	2
6	Screen, white, 150x150 mm	09826-00	1
7	Object -L-, glass bead	11609-00	1
8	PHYWE Power supply, 230 V, DC: 0...12 V, 2 A / AC: 6 V, 12 V, 5 A	13506-93	1

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Set-up (1/3)

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- Assemble the optical bench from the two tripod rods and the variable tripod foot and place the scale on the front tripod rod.
- Place the base with stem under the light box.




Set-up (2/3)

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- Clamp the light box in the left part of the tripod base so that the lens side faces away from the optical bench.
- Slide an opaque shade in front of the lens and the Perl-L into the shaft at the other end of the luminaire.


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Robert-Bosch-Breite 10
37079 Göttingen

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

info@phywe.de
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Set-up (3/3)

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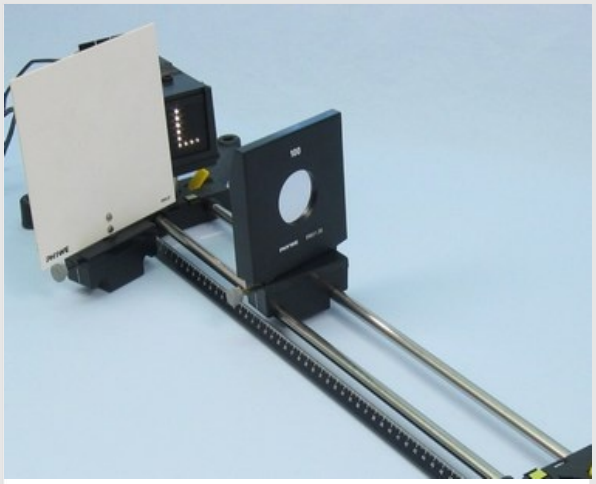

Experimental setup

- Place the camber mirror on the optical bench and set up the screen according to the illustration.
- Note: The camber mirror should be placed at a slight angle on the optical bench so that the light reflected from it can strike the screen, which must be placed next to the optical bench.

Procedure (1/2)

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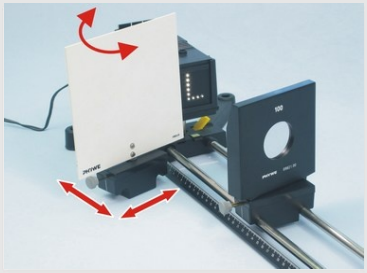

- Connect the lamp to the power supply unit (12 V~) and switch it on.
- Try to catch the image created by the convex mirror with the screen.
- What do you observe? Describe your observations in the report.

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37079 Göttingen

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

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Procedure (2/2)

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View of the camber mirror

- Now look at the mirror from the direction of the screen.
- Describe your observations in the report under "Observations 2".
- Repeat this for different object widths. Describe your observations.
- Switch off the power supply unit.

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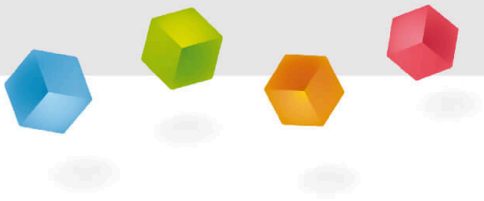

Report

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Robert-Bosch-Breite 10
37079 Göttingen

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Fax: 0551 604 - 107

info@phywe.de
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Observations

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Observation 1: Note down your observations as you try to catch the image with the screen.

Observation 2: Note down your observations while looking at the convex mirror.

Task 1

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What properties do convex mirror images have? They are...

- [ ] virtual
- [ ] reduced
- [ ] upright
- [ ] real
- [ ] enlarged

Check

Traffic mirrors

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Robert-Bosch-Breite 10
37079 Göttingen

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

info@phywe.de
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Task 2

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Where are the convex mirror images located?

- ○ Arch mirror images lie behind the mirror.
- ○ Arch mirror images lie in front of the mirror.
- ○ Arch mirror images lie next to the mirror.

Check

Task 3

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What are applications for convex mirrors?

- ☐ Car rear view mirror
- ☐ Cosmetic mirror
- ☐ Focal mirror
- ☐ "spies" on windows
- ☐ Traffic mirrors at road junctions

Check

Consider what is meant by enlarging the field of vision.

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Robert-Bosch-Breite 10
37079 Göttingen

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

info@phywe.de
www.phywe.de

Slide	Score / Total
Slide 19: Properties of convex mirrors	0/3
Slide 20: Position of the image	0/1
Slide 21: Applications of convex mirrors	0/3

Total 0 / 7

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