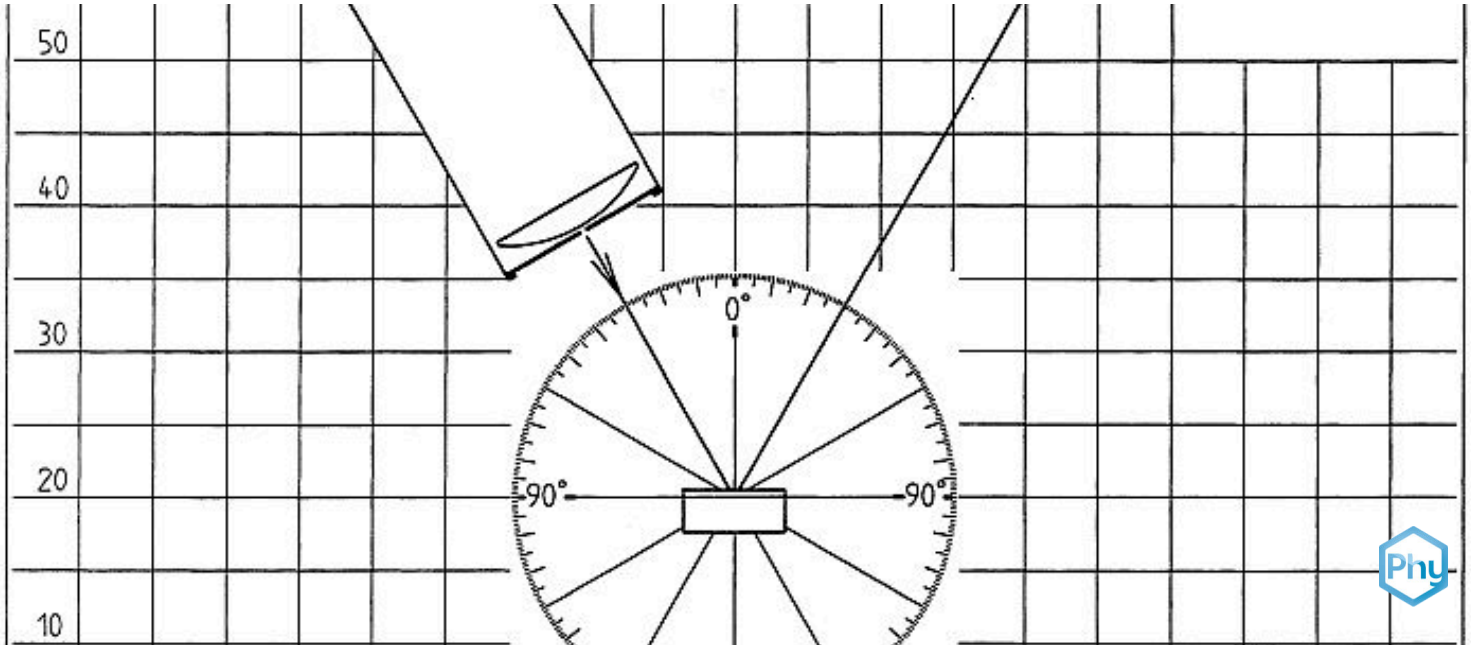
The law of reflection



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/6428229c5e30a7000275ea06

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Teacher information

Application

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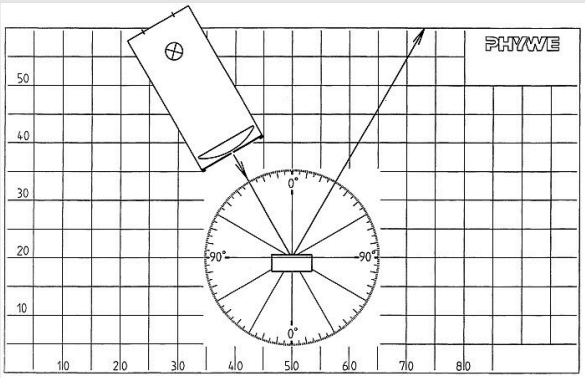

Experimental set-up:

Adhesive luminaire with optical disc and plane mirror

Light propagates in a straight line. If a light beam hits a reflecting object, the light beam also spreads out in a straight line from there.

The angle of incidence of a light beam to a reflecting object (mirror) always corresponds to the angle of reflection of the light beam.

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)

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Prior knowledge

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

Principle

The law of reflection is to be worked out and the reversibility of the light path during reflection is to be demonstrated.

Other teacher information (2/2)

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Learning objective

The students should gain knowledge about the principles of light reflection. The focus should be on the knowledge of angle of incidence = angle of reflection.

Tasks

The students should understand that straight rays of light are always reflected exactly as they hit the object.

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Robert-Bosch-Breite 10
37079 Göttingen

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

info@phywe.de
www.phywe.de

Additional teacher information

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Note

If necessary, the plane of the reflected light can also be demonstrated with simple paper. However, it is recommended to use white paper (e.g. 06306-00).

Safety instructions

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

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37079 Göttingen

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info@phywe.de
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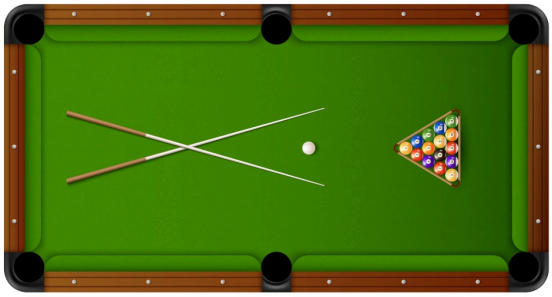
Student information

Motivation



3D animation:

Billiard table

A pool table in physics class?!

The underlying experiment deals with the reflective properties of light.

If you look at a simple game of billiards, you quickly find similarities with the reflection behaviour of light.

Just like the light on a mirror, the balls bounce off the boards, depending on the direction they come from, they take a new direction after impact.

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Robert-Bosch-Breite 10
37079 Göttingen

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info@phywe.de
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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	Optical disk, magnet held	08270-09	1
4	Plane mirror, magnet held	08270-13	1
5	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
6	G-clamp	02014-00	2

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Robert-Bosch-Breite 10
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Tel.: 0551 604 - 0
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info@phywe.de
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Set-up and Procedure (1/2)

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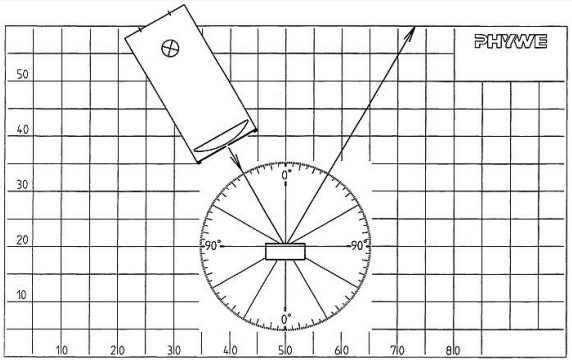

Adhesive luminaire with parallel light beam and various reflectors

- Place optical disc in the centre of the lower half of the panel
- Position the luminaire with 1-slit aperture so that the light beam falls obliquely from above along one diameter.
- Place the plane mirror so that the reflecting surface contains the horizontal diameter of the full circle.

  (The plane mirror is not surface-mirrored. Therefore, the underside of the mirror glass plate must be in the same plane as the horizontal diameter).

Set-up and Procedure (2/2)

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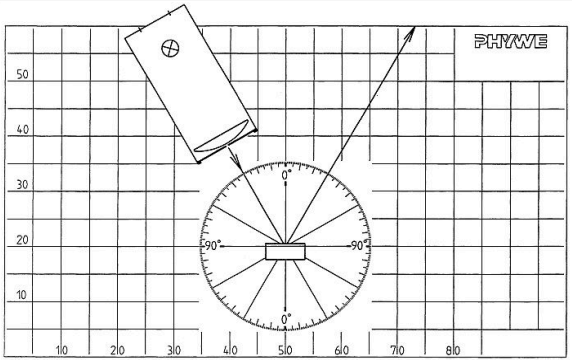

Adhesive luminaire with parallel light beam and various reflectors

- Vary the angles of incidence and read off and tabulate the respective angles of incidence and reflection.
- Hold a light sheet of paper, thick as cardboard, at the edge of the board in the plane of the board so that the reflected beam falls in a grazing manner; then tilt the sheet backwards and forwards out of the plane of the board.
- Place the luminaire in such a way that the light beam runs against the direction that one of the reflected light beams had during the measurements.

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Robert-Bosch-Breite 10
37079 Göttingen

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info@phywe.de
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Report

Task 1

Enter your observations for the angle of reflection in the table opposite!

α	α'
0°	
20°	
40°	
60°	
80°	

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Robert-Bosch-Breite 10
37079 Göttingen
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info@phywe.de
www.phywe.de

Task 2

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The law of reflection applies to the reflection of light: If, in particular, a ray of light strikes vertically, it is reflected into itself. The light path during reflection is reversible.

Angle of incidence and angle of reflection are equal, α=α'.

○ True ○ False

Check

Incident beam, reflected beam and incident slot are in different planes.

○ True ○ False

Check

Slide	Score / Total
Slide 14: Multiple tasks	0/2

Total 0 / 2

Solutions Repeat Export text

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