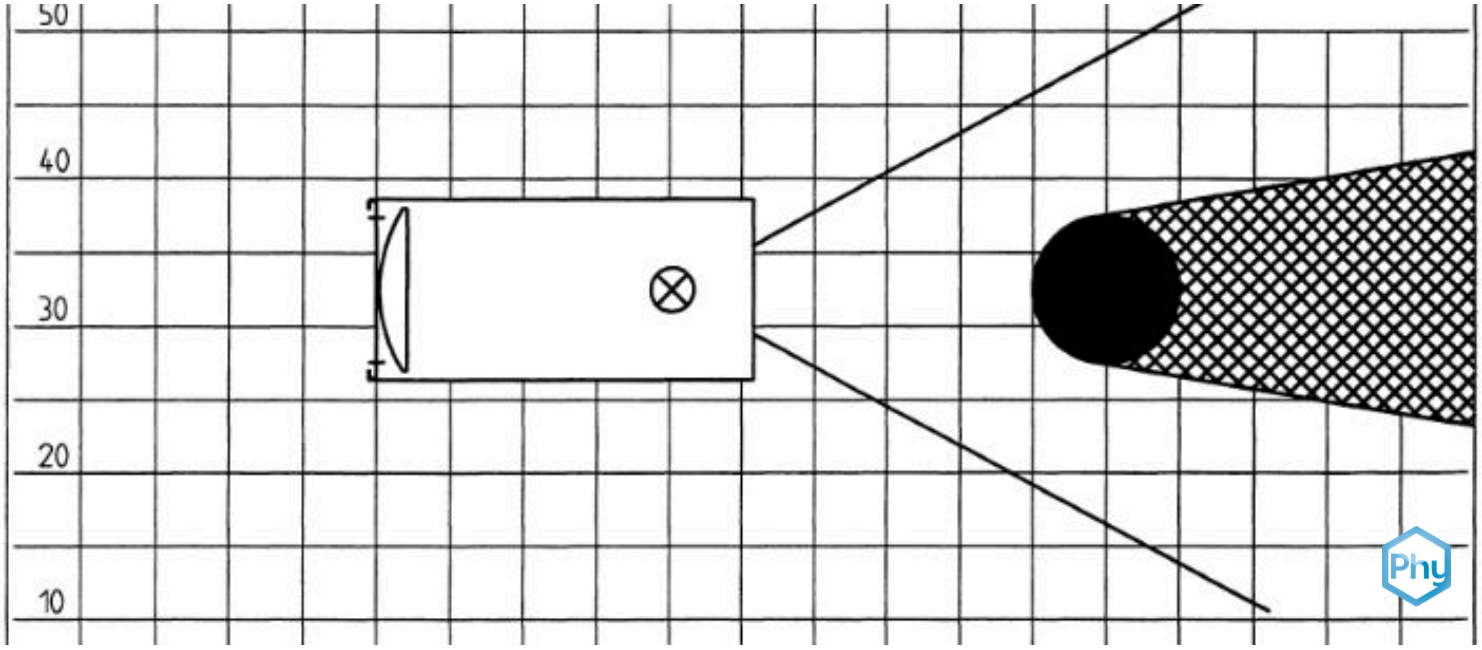
Shadow formation by a point light source



Physics > Light & Optics > Dispersion 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/642814775e30a7000275e9ee

PHYWE

Teacher information

Application

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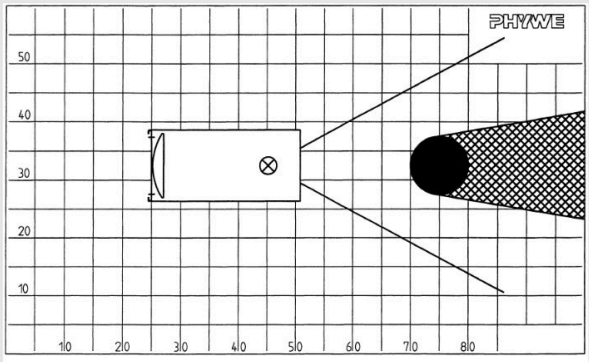

Experimental set-up:

Adhesive luminaire with point-shaped light source, divergent light beam and shadow body

Light spreads out in a straight line. If a ray of light hits an opaque object, a shadow is created.

The straight-line spread of light, from a point light source, creates a sharp shadow that reproduces the contour of the shadow-casting object on a scale.

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

Students need prior theoretical knowledge about the straight-line, ray-shaped propagation of light.

Principle

It is to be shown that a shadow is created behind an opaque body, the area of which depends on the distance of the body from the light source.

Other teacher information (2/2)

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Learning objective

Students should gain knowledge about the principles of shadowing.

Furthermore, they should recognise that the sharp formation of shadows is the result of the straight-line propagation of light from a point-shaped light source.

Tasks

The students should collect observations and insights into the effect of sharp shadows.

PHYWE

Robert-Bosch-Breite 10
37079 Göttingen

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

info@phywe.de
www.phywe.de

Safety instructions

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

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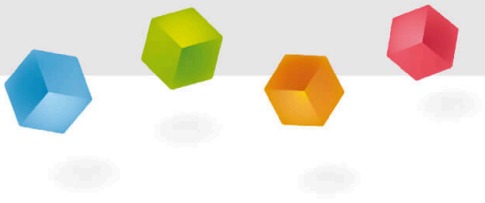

Student information

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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Shadow play of a group of people

When the sun shines, our bodies and objects in our surroundings cast a shadow.

But how is such a shadow created, and how is the sharp outline formed?

This is the question this experiment aims to clarify.

Equipment

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Robert-Bosch-Breite 10
37079 Göttingen

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

info@phywe.de
www.phywe.de

Set-up and Procedure

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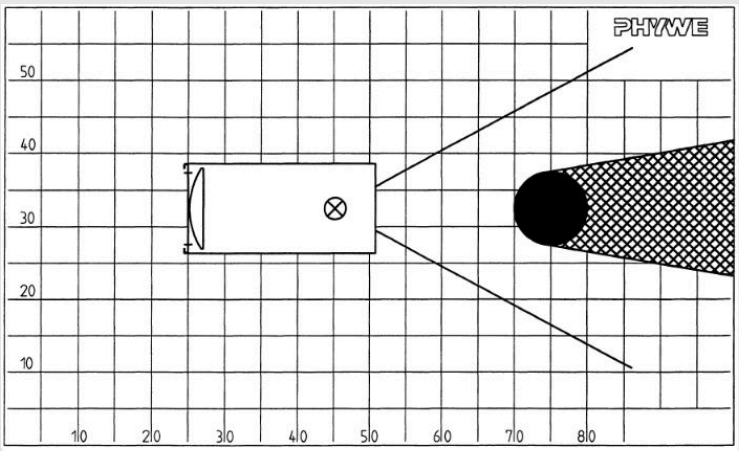

Adhesive luminaire with point-shaped light source, divergent light beam and shadow body

- Place the adhesive luminaire on the adhesive panel, push up the trim of the rear wall of the luminaire and create a divergent light beam with the point-shaped light source
- Bring shadow body earth into the light beam so that it still partially passes the shadow body on both sides; observe shadow
- Place the shadow body towards and away from the light source while keeping an eye on the shadow

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Report

PHYWE

Robert-Bosch-Breite 10
37079 Göttingen

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

info@phywe.de
www.phywe.de

Task 1

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Fill in the blanks

Behind the _____ body, an area remains unlit; a _____ is created. The shadow area is the larger, the _____ the distance between the body and the light source. The shadow is _____ limited.

sharp
smaller
light-impermeable
shadow

Check

Task 2

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Answer the questions below to check that you have understood the experiment correctly.

Tip: Although our sun is very far away, our shadow is often almost as big as we are.

Behind an opaque body, an area remains unlit!

○ True ○ False

Check

The smaller the distance between the body and the light source, the smaller the shadow area!

○ True ○ False

Check

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

Slide	Score / Total
Slide 11: Shadow area	0/4
Slide 12: Multiple tasks	0/2

Total 0 / 6

Solutions Repeat

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