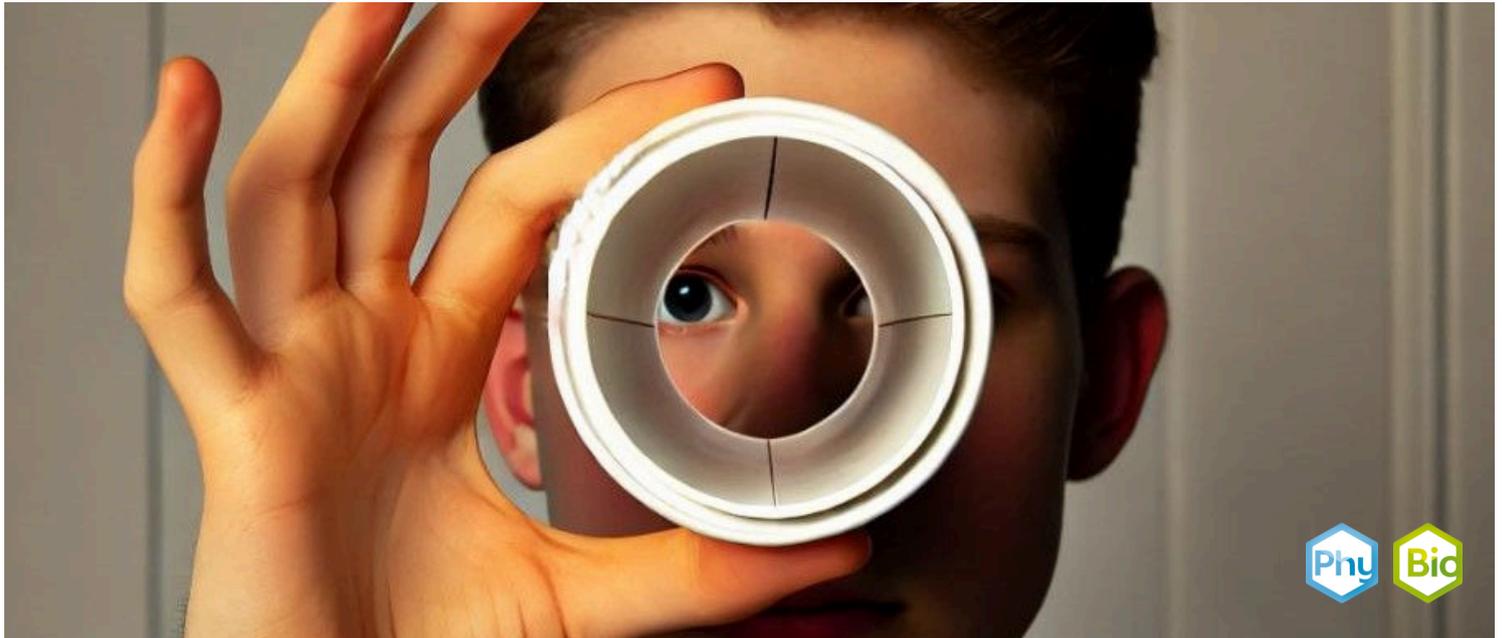


Look through your hand



The experiment is based on binocular fusion, in which the brain combines the images from both eyes to create a single perception. The right eye sees the image through the tube, while the left eye sees the hand and the surroundings next to it. Instead of a blocked field of vision through the hand, it gives the impression of being able to "see through the hand" because the brain combines the information from both eyes.

Physics

Light & Optics

Dispersion of light

Biology

Human Physiology

Hearing & Seeing



Difficulty level

-



Group size

-



Preparation time

-



Execution time

-

This content can also be found online at:



<https://www.curriculab.de/c/6717948c2787770002d59b7e>

PHYWE



Teacher information

Application

PHYWE



Look through your hand

Binocular fusion is the process by which the brain combines the slightly different images seen by each eye into a single, coherent image. This ability is crucial for depth perception and stereo vision, as it allows us to accurately judge spatial depth and distance. By combining the two images, the brain creates a consistent visual representation of the environment, which is important for making precise movements and improving spatial orientation. In addition, binocular fusion requires good eye coordination to avoid double vision or blurring.

Other teacher information (1/2)

PHYWE

Prior knowledge



The structure of a human eye should be discussed in class beforehand.

Principle



The experiment is based on binocular fusion, in which the brain combines the images from both eyes to create a single perception. The right eye sees the image through the tube, while the left eye sees the hand and the surroundings next to it. The brain merges these different images into a coherent scene. Instead of a blocked field of vision through the hand, the impression is created as if you could "see through the hand" because the brain integrates the information from both eyes in such a way that the hand becomes virtually "invisible" to minimise the disturbance in vision.

Other teacher information (2/2)

PHYWE

Learning objective



Students understand how binocular fusion works by experiencing how the brain combines images from both eyes to create a three-dimensional perception. In this experiment, the illusion of looking through one's own hand is created.

Tasks



Through the experiment, the students learn how binocular fusion works and how this creates the optical illusion of being able to see through one's own hand.

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



Motivation

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Binoculars

Imagine you have two eyes that work like two cameras. Each eye sees a little differently because they are slightly apart. When you look at something, both eyes send an image to your brain. Binocular fusion is the process by which your brain takes these two images and merges them into a single, clear image. This helps you to see things better and also to recognise how far away something is from you. 3D films work on the same principle. Two projectors project the films onto the screen at the same time. Special glasses, which you wear while watching, ensure that each eye sees one of the two films. The brain puts the films back together so that you see everything spatially!

Tasks

PHYWE



Look through your hand

- Find out how binocular fusion works and observe the resulting optical illusion.
- Learn how your brain combines the images from your two eyes.

Material

Position	Equipment	Item no.	Quantity
1	Plastic pipe L=20cm, d=35mm	64953-00	1

Set-up and procedure

PHYWE



- Hold your left hand flat and open in front of your face, about 20 cm from your eyes.
- Hold the tube with your right hand directly in front of your right eye, as if you were looking through a telescope.
- Look through the tube and focus your gaze on a distant object.
- Look at your hand with your left eye at the same time. Make sure that the tube and your hand are in the same field of vision.
- You should be able to see through the tube and at the same time see part of your hand next to the tube.

PHYWE



Report

Task 1

PHYWE

Drag the correct words into the gaps.

In this experiment, you will use a plastic tube to create an optical . First, hold your in front of your face. With your right hand, hold the tube in front of your right . If you look through the tube and look at your hand at the same time, it looks as if there is a in your hand. This illusion is created because your the different images it receives from both eyes. The experiment shows how our brain processes visual information and sometimes creates surprising effects.

 Check

Task 2

PHYWE

Where in everyday life does a visual illusion similar to the one in this experiment occur, in which the brain combines two different images?

- When listening to music through headphones.
- Reading a book in dim light.
- Watching television on a black and white screen.
- Watching a 3D film in the cinema with special glasses.

 Check

Task 2

PHYWE

Where in everyday life does a visual illusion similar to the one in this experiment occur, in which the brain combines two different images?

- When listening to music through headphones.
- Reading a book in dim light.
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- Watching a 3D film in the cinema with special glasses.

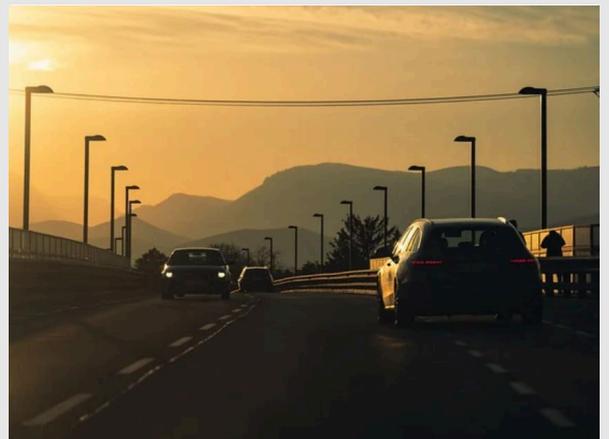
[✓ Check](#)

Task 3

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In which everyday scenario can the brain's ability to combine images be useful?

- When sleeping, to be able to dream better.
- When driving a car, to be able to judge distances better.
- When speaking, to improve pronunciation.

[✓ Check](#)

Looking into the distance