A useful trick

Physics > Light & Optics > Dispersion of light

Biology > Human Physiology > Hearing & Seeing

Nature & technology > From senses to measuring

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

This content can also be found online at:

https://www.curriculab.de/c/6717a0502787770002d59c18

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Teacher information

Application

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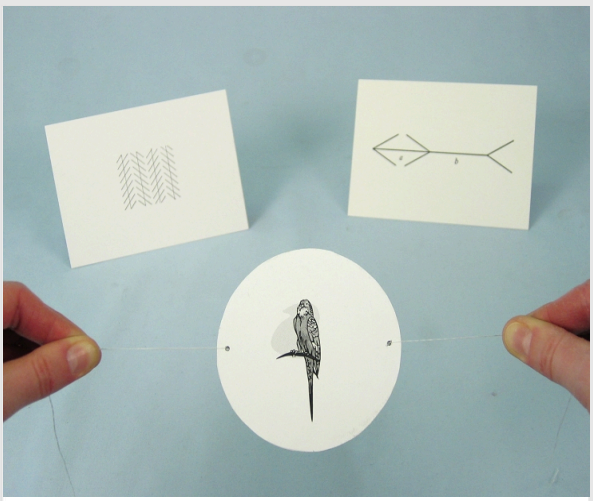

Carrying out the experiment

You have the impression of a sequence of movements, but in reality you see many individual images that differ in that the moving object is always moved a little further. Because the images follow each other so quickly, it appears as if the object is actually moving. In the cinema, 32 - 36 images are shown per second, while the television transmits 50 images per second.

But how does it all work?

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Other teacher information (1/2)

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Prior knowledge

Students should know how moving images are recorded and processed and why individual images are perceived as a film.

Principle

Many individual images running in quick succession are displayed as a moving film.

Other teacher information (2/2)

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Learning objective

Pupils should recognise that there are different ways to "outwit" the eye. They should realise that it is sometimes better to check what they see.

Tasks

The pupils check whether their perception always corresponds to reality.

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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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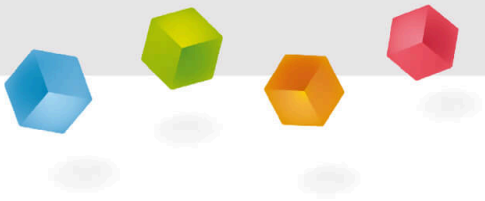

Student information

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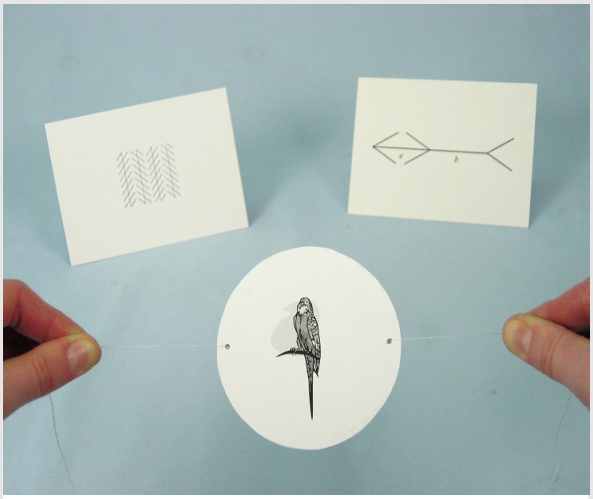
Motivation



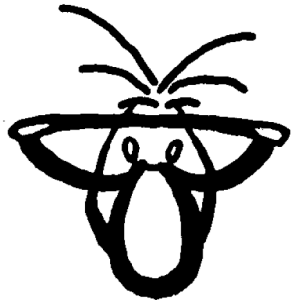
Experimental setup

You have the impression of a sequence of movements, but in reality you see many individual images that differ in that the moving object is always moved a little further. Because the images follow each other so quickly, it appears as if the object is actually moving. In the cinema, 32 - 36 images are shown per second, while the television transmits 50 images per second.

But how does it all work?

Tasks

- How can you trick the eye?
- Check whether your perception always corresponds to reality.



A film is actually just a rapid sequence of individual images that our brain reproduces as a film.

right

false

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Material

Position	Equipment	Item no.	Quantity
1	Set for 15 experiments, TESS beginner nature and technology NT-SIN	15241-88	1

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Additional material

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Position	Equipment	Quantity
1	White cardboard	1

Set-up and procedure (1/2)

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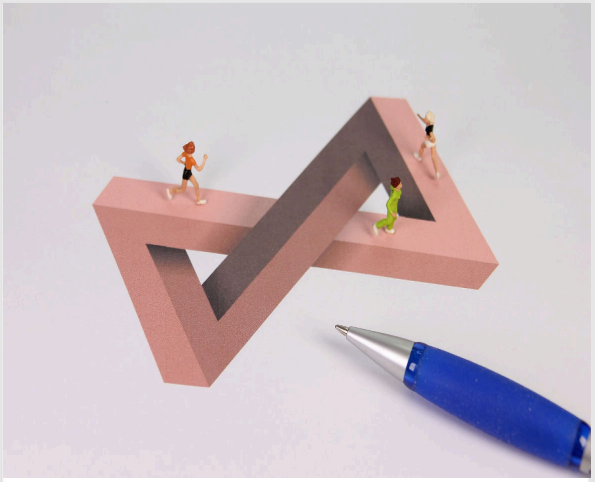

Optical illusion or not?

- Look at the map showing the line labelled "a" and "b".
- Estimate which route is longer: the one labelled "a" or the one labelled "b".
- Measure the distances with the ruler.
- Now look at the map with the four lines drawn next to each other, which are hatched diagonally.
- Which of the four lines lean to the right, which to the left?

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Set-up and procedure (2/2)

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- Check your guess by measuring the distances between the lines at the top and bottom with a ruler.
- Cut out a round disc from white cardboard. Measure the distances with the ruler.
- Use the knitting needle to make holes in the disc on the right and left and attach a string to them.
- Draw a cage on the front and a bird on the back (a man with an umbrella on the front, raindrops or similar on the back). The picture on the back must be upside down.
- Hold the disc by the ribbons with both hands and twirl it around so that the thread twists.
- Now pull the threads so that the disc rotates very quickly.

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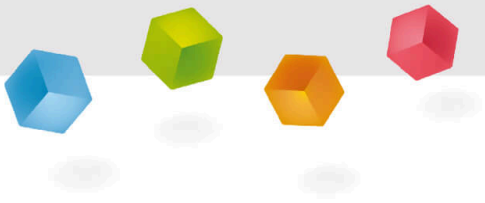

Report

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Task 1

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Which route looks longer? Distance "a" or "b"? What do you determine with the ruler? Which of the lines look inclined to the right, which to the left, and what do you find when you measure them?

Take notes of your observations.

Task 2

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How do you explain your estimates of the lengths "a" and "b"? How does the impression of sloping lines come about?

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Task 3

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Write down at least one technique using the illusion of the eye and explain how the illusion is used when turning the disc.

Task 4

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What do you observe when the painted disc rotates?

- A moving film instead of two individual images.
- The disc turns black and white one after the other.
- Nothing. I can no longer recognise anything.
- The colours blur and I recognise a rainbow.

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Slide	Score / Total
Slide 8: Tricked	0/2
Slide 17: Painted disc	0/1

Total amount 0 / 3

Solutions Repeat Export text

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