Colored afterimages

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/6717943817f7cb00029d434f

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Teacher information

Application

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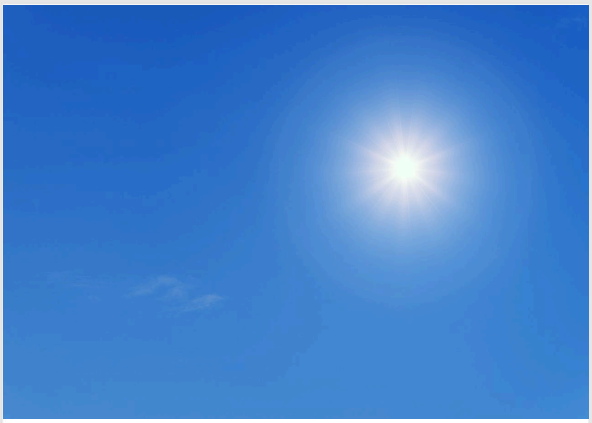

Sun creates afterimage

A coloured afterimage is created when the special cells in our eyes, called cones, become accustomed to a particular colour and then take a break, creating an image in the complementary colour. For example, if you look at something red for a long time and then look away, a green afterimage appears because the red-sensitive cones recover while the other cones remain active.

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Other teacher information (1/2)

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Prior knowledge

The function of the human eye should be discussed in class beforehand.

Principle

Coloured afterimages occur when the colour receptors in the eye, known as "cones", take a break after looking at a certain colour for a long time. During this pause, other cones that react to the complementary colour become more dominant. So if you look at something red for a long time and then look away, you will see a green afterimage, as the green-sensitive cones continue to work while the red-sensitive cones take a break.

Other teacher information (2/2)

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Learning objective

The aim of this experiment is to teach pupils about their visual perception of the world. This involves complicated processes. Seeing coloured afterimages illustrates how our eyes and brain work together to process colours.

Tasks

The students learn about the phenomenon of the afterimage and gain an insight into why it exists.

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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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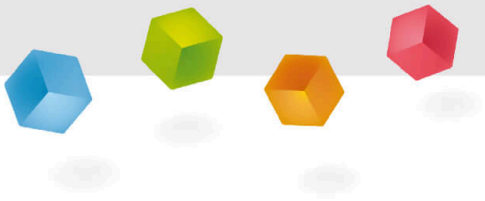

Student information

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Motivation

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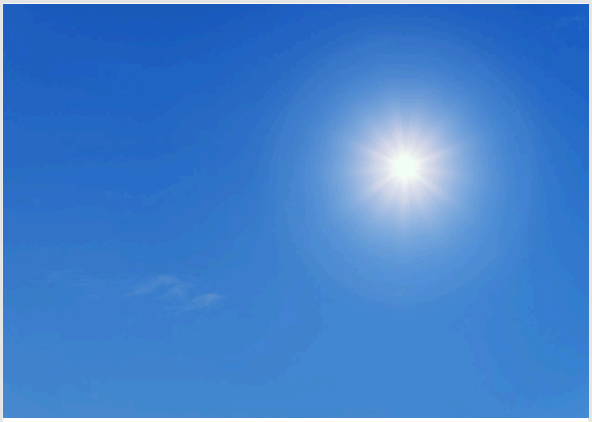

Sky with sun

Have you ever looked at a bright object such as the sun and then closed your eyes? Then you probably saw a bright spot for a short time, which was still visible even though the light source was gone. This phenomenon is called an afterimage. This phenomenon can be used to learn something about how our eyes and brain work together.

Tasks

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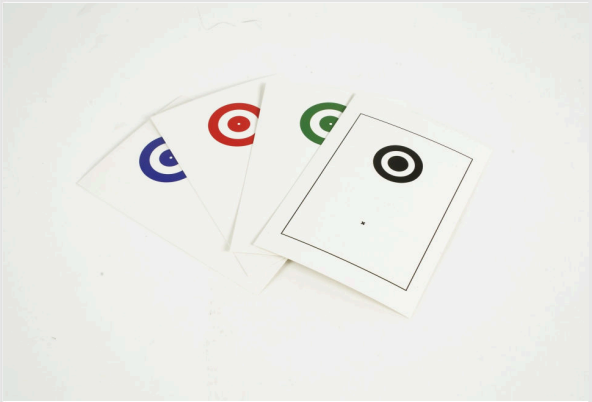

Cards for colour afterimages

- Create coloured afterimages and recognise the complementary colours.

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Material

Position	Equipment	Item no.	Quantity
1	Figures on the subject of physiological vision	64949-00	1

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Set-up and procedure

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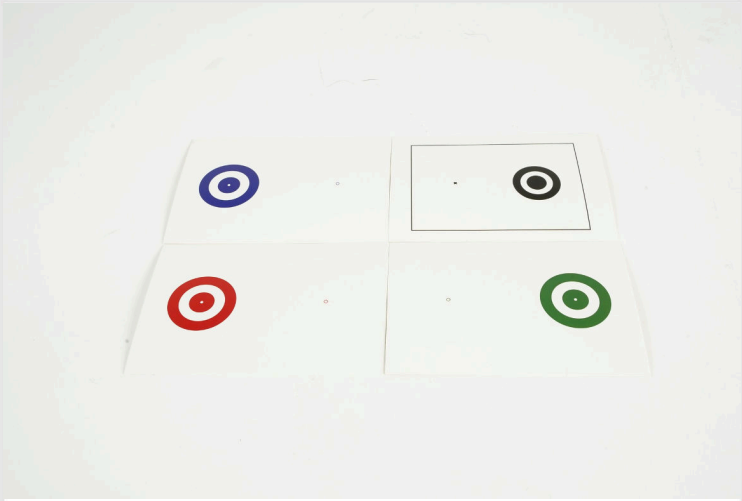

Cards for creating colour afterimages

- Place one of the coloured afterimage cards on the table in front of you.
- Fix your gaze on the centre of the coloured circle for about a minute.
- Then look at the small dot on the map and see what happens.
- Repeat this process with the other cards and compare the colours of the resulting phantom images with each other.

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Report

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Task 1

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Drag the matching words into the gaps.

If you look at a blue dot for a long time and then look at a white surface, you will see a _____ on the white surface. This is an example of a _____. It occurs because the _____ in our eyes that react to the blue light are "resting" while the other receptors continue to work and perceive the _____.

yellow afterimage
coloured afterimage
complementary colour
cones

Check

Task 2

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What happens if you look at a red dot for a long time and then at a white surface?

- ○ You will see a green dot on the white area.
- ○ You don't see anything special.
- ○ You will see a red dot on the white area.

Check

Red poppy blossom

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Slide	Score / Total
Slide 12: Cause of the coloured afterimage	0/4
Slide 13: Complementary colour red	0/1

Total amount 0 / 5

Solutions Repeat

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