WHAT COLOUR IS THE SUN'S LIGHT?	
Respective blueprint	Disappearing colour disk
Description	Pupils gain knowledge about the sun and light. They will learn why the sun is so important for our lives.
Learning Objectives	The sun – the definition and its importance The definition of light and where it comes from Daylight – composition, colours, light waves
Related curricular subject(s)	Physics, Nature, Environment

Prerequisites / preparatory actions for teachers:

Preparing the materials for the construction of Newton's disk.

Present to children the video of The Sun – formation, composition, oldness and activity (link in the YouTube: https://www.youtube.com/watch?v=2HoTK_Gqi2Q)

Preparing additional material for demonstration of physical principles of light. Teacher will need a prism, a torch or flashlight and optionally also a rectangular container filled with water. A useful experiment to show the different colours of the rainbow is to look through a spectroscope. For this idea, if you want to create a simple spectroscope from a tube and a CD, look at the video. (link in YouTube: https://youtu.be/zdeFcytOcjc).

It is recommended to read additional information in science background and be prepared for answering pupil's questions.

The Sun is a 4.5-billion-year-old star – a hot glowing ball of hydrogen and helium at the center of our solar system. The Sun is about 150 million kilometers from Earth, and without its energy, life as we know it could not exist here on our planet.

The Sun is the largest object in our solar system. The Sun's volume would need 1.3 million Earths to fill it. Its gravity holds the solar system together, keeping everything from the biggest planets to the smallest bits of debris in orbit around it. The hottest part of the Sun is its core, where temperatures top 15 million degrees Celsius.

Light arrives on our planet after a speedy trip from the Sun, 149 million km away. Light travels at 300.000 km per second, so the light you're seeing now was still tucked away in the Sun about eight minutes ago. Put it another way, light takes roughly twice as long to get from the Sun to Earth as it does to make a cup of coffee!

The light that we see is simply one part of the energy that the Sun makes that our eyes can detect. The energy travels in the form of waves (similar to the waves in the sea but about 100 million times smaller)—a vibrating pattern of electricity and magnetism that we call electromagnetic energy. If our eyes could see electricity and magnetism, we might see each ray of light as a wave of electricity vibrating in one direction and a wave of magnetism vibrating at right angles to it. These two waves would travel in step and at the speed of light.

Why is not everything the colour of sunlight? Because sunlight is not light of just one colour—it is what we call white light, made up of all the different colours mixed together. We can see rainbows, those colourful curves that appear in the sky when droplets of water split sunlight into its component colours by refracting (bending) different colours of light by different amounts.

Prerequisites / preparatory actions for students	None.
Age of students	8-15 years old
Duration	1-2 hours, depends on the age of pupils (the older ones will do the blueprint activity faster) and on the duration of the pedagogical activity of the teacher
Level of difficulty	Medium

Step by step description of the tasks

1. The sun.

Watch the video of the sun with the pupils (link is above). If children do not understand English, the teacher can translate the main information.

2. The light – what the pupils already know?

Ask the pupils, what colour is the visible light? Is it yellow, white, or any other colour?

What happens, when the sunlight shines through the rain drops? The rainbow. For the demonstration, the teacher can shine a flashlight into the prism. Students can see the rainbow.

For a better result, make it dark in the classroom and hold a prism in front of the white wall. Try to move the flashlight and the prism forward and backward to get the best results. A similar experiment can be done with a rectangular shaped glass container, filled with water (small aquarium or similar). When you shine a flashlight into the side of the glass container, a rainbow appears.

When the pupils see the rainbow, ask them to list the colours they see. Where are the white and black lights?

Why does tomato look red?
When sunlight shines on a tomato, the red part of the sunlight is reflected back again off the tomato's skin, while all the other colors of lights are absorbed (soaked into) the tomato, so you don't see them.

That's just as true of a blue book, which reflects only the blue part of sunlight but absorbs light of other colors.

Teachers should wait for pupil's answers and just guide them, not answer the questions instead of them. If they do not answer every question, wait until the blueprint activity is done. They may get the right answers after the activity.

3. Hypothesis: White light is composed just from the white colour. TRUE/FALSE

Ask the pupils, what hypothesis can be created to answer our question about light.

4. Creation of the blueprint activity - Newton's disk.

The teacher makes the connection between the rainbow colours and colours of Newton's disk.

When pupils spin the Newton's disk, the colours will disappear. We see the disk all white, when it is spinning very quickly. Try to spin as quickly as you can to get the best results. Ask pupils, what they think - why do all colours disappear and just the white colour appears? What is the answer to the created hypothesis-is it true or false?

5. Explanation of the experiment.

The teacher presents the explanation to the experiment. The white sunlight that we see are electromagnetic waves made up of all the colours of the rainbow. Each colour has its own wavelength. When we

spin the Newton's disk very quickly, the colours disappear and all of them create a white colour.

The teacher should encourage pupils to think and question themselves, trying to get some answers by exploring and doing the activity. Also, the teacher should encourage pupils to ask question and lead a discussion about the topic.

Assessment activities

Possible questions:

- What is the Sun? How hot is on the surface and how hot is in the core?

- Why is the Sun important?

- When does a rainbow appear and why?

- Why is sunlight white?

- Why do we see different colours? Why does something appear as red and something as blue?