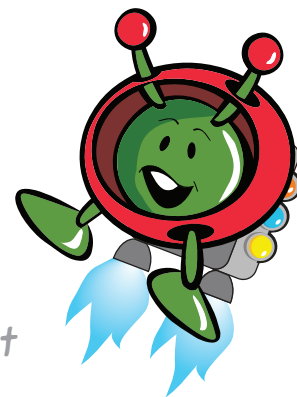


# teach with space

## → THE MAGIC OF LIGHT

Using spectrosopes and colour wheels to study the properties of light





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Using spectrosopes and colour wheels to study the properties of light

This set of eight enquiry-based activities allows pupils to study light and colour using spectrosopes and colour wheels. A summary of the eight activities is provided on the next page, including information on their subjects, expected outcomes, and any necessary requirements (e.g. completion of a previous activity). With this modular approach, it is at your discretion whether you try all of the activities or choose a smaller selection.

### FAST FACTS

**Age range:** 8–12 years old

**Type:** pupil (group) activity

**Complexity:** medium

**Teacher preparation time:** 30 minutes

**Cost per activity:** low (less than 10 euro)

**Location:** indoor (any classroom)

**Includes the use of:** CDs or DVDs, phone camera (optional), screens, scissors, glue

### Outline

In this set of activities, pupils work individually or in groups to build a spectroscope that can be used to look at light sources possibly including the Sun, LEDs, and a screen. By doing this they will understand that white light can be broken down into many different colours, and that complex colours are made up of combinations of the three basic colours (red, green and blue). They can then make their own complex colours by mixing basic colours in a colour wheel, and can make white light with a colour wheel containing all the colours of the rainbow.

### Pupils will learn

- Understanding the methods and processes of science through different types of scientific enquiries
- Using scientific knowledge to understand the implications of science
- Exploring ideas and asking relevant questions to expand understanding and knowledge of a subject
- Exploring, talking about, testing and developing ideas about everyday phenomena
- Using straightforward scientific evidence to answer questions
- Recognising and controlling variables when necessary
- Understanding more abstract ideas and being able to recognise how these explain the surrounding environment
- Reporting findings from a scientific study in oral and written form
- Improving spoken language skills through discussion of results
- Exploring ideas and recording experiences through creative work
- Using a variety of materials and techniques



# Summary of activities

Table 1

	Title	Subject	Outcome	Requirements	Time
1	What is a light source?	Talking about and identifying different sources of light.	To clarify the students' ideas about natural and artificial light source examples.	None	30 minutes
2	How can we study light?	Building a tool to study light.	To have the spectroscope ready to be used in later activities.	None	45 minutes
3	Is white light truly white?	Using the spectroscope to look at different light sources.	To understand that white light can be broken down into many different colours of the rainbow.	Completion of Activity 2	30 minutes
4	How does your screen produce colours?	Understanding how colours are produced on a computer screen.	To understand that pixels are made up of three basic colours (red, green and blue).	None	30 minutes
5	How can you break down a complex colour into basic colours? (I)	Looking at complex colours using the spectroscope.	To understand that complex colours are produced from basic colours (red, green and blue).	Completion of Activity 2	30 minutes
6	How can you break down a complex colour into basic colours? (II)	Looking at even more complex colours using the spectroscope.	To better understand how complex colours are produced from basic colours (red, green and blue).	Completion of Activity 2	30 minutes
7	Can we make our own complex colours?	Building a colour wheel to study the effects of combining different basic colours.	To understand that we can combine the basic colours (red, green and blue) to make more complex colours.	None	45 minutes
8	What happens when we mix all the colours of the rainbow?	Building a colour wheel to study how every colour can be combined.	To understand that white light can be made from all the colours of the rainbow.	None	45 minutes

## NOTES

In the appendix you will find the following:

- Spectroscope template, required for Activity 2.
- Four colour wheels. Activity 7 requires wheels 1 and 2 OR wheel 3. Activity 8 requires wheel 3 OR wheel 4.
- A series of coloured pages. These are required for Activities 4 and 5 but you must not print these. Instead you should display them one by one on a screen or with a projector for the students to observe using their spectroscope. Ensure that you are zoomed in so that the colour covers the entire screen and that there are no other light sources in the room.



## Links

### Teach with space

ESA classroom resources: [www.esa.int/Education/Classroom\\_resources](http://www.esa.int/Education/Classroom_resources)

### ESA Kids (child-friendly fun & information in several European languages)

ESA Kids homepage: [www.esa.int/esaKIDSen/](http://www.esa.int/esaKIDSen/)

The Sun: [www.esa.int/esaKIDSen/TheSun.html](http://www.esa.int/esaKIDSen/TheSun.html)

Paxi fun book: [esamultimedia.esa.int/multimedia/publications/PaxiFunBook/](http://esamultimedia.esa.int/multimedia/publications/PaxiFunBook/)

### ESA Missions

Rosetta mission: [www.esa.int/Our\\_Activities/Space\\_Science/Rosetta](http://www.esa.int/Our_Activities/Space_Science/Rosetta)

Euclid mission: [www.esa.int/Our\\_Activities/Space\\_Science/Euclid\\_overview](http://www.esa.int/Our_Activities/Space_Science/Euclid_overview)

The International Space Station: [www.esa.int/esaKIDSen/SEMZXJWJD1E\\_LifeinSpace\\_o.html](http://www.esa.int/esaKIDSen/SEMZXJWJD1E_LifeinSpace_o.html)



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