

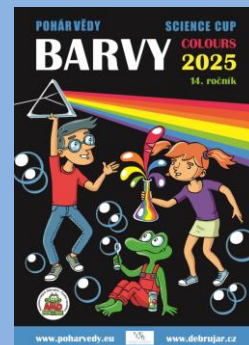
SCIENCE CUP – COLOURS 2025



POHÁR VĚDY SCIENCE CUP

Category 2 – Primary School

1st round – January – deadline 14. 2. 2025 23:59



Introduction

Dear competitors welcome to the first round of the 14th **Science Cup—COLOURS 2025**. Before you start your work, please take a few minutes to learn about the tasks, their solutions, and evaluation.

The assignments for the corresponding rounds for each month (January, February, and March) include tasks in three areas - The creative part (assessed 20%), the Experimental part (assessed 40%), and the Practical part (assessed 40%). Describe the solution procedure of each task using your own words, and document them with your pictures or photos.

Solutions must be submitted no later than 23:59 on the last day of the round.

By the deadline, the solution must be uploaded to the system on the competition website in the form of a single PDF file of a maximum size of 10 MB. The file's contents (text, sketches, photos) must not exceed 3 A4 pages and must be easy to read (simple font, minimum font size 11).

We know you would be able to fill far more than three pages. However, we must also ensure that the evaluators can review all the solutions and give them a fair evaluation. Therefore, we will—albeit reluctantly—penalize solutions that do not meet all these requirements with a loss of 20 points.

On the other hand, for a complete solution, you can get 20 points from the evaluators for the Creative part, 40 points for the Experimental part, and 40 points for the Practical part. Therefore, you can earn up to 100 points for each of the three rounds of the basic correspondence part of the competition between January and April. Each evaluation includes verbal feedback on what you did well or what you can improve for next time. The team members' own work, not the leader's, is essential for the evaluation.

Online national round will follow the corresponding part in May/June, where the top teams from the corresponding rounds of categories 2 - 4 will advance.

And now you can get to work; we wish you success and much fun.

Your Science Cup 2025 team

1. Creative part (20 points)



Photo: J. Houfková

The world around us is full of beautiful colours! Take a good look around you and notice what colours you find on the things around you. Your task will be to create a colourful logo or emblem for your team only from commonly available items you find at home or at school.

Your task is:

1. Create a logo or emblem of your team (indoors/outdoors) using different coloured objects (e.g. toys, papers, natural materials, crockery, clothes, etc.) with a maximum size of 20 cm x 30 cm x 20 cm.
2. Take at least 2 photographs of the activity: one documenting your work on the logo and one photograph of the created logo.
3. Include a short description of what your logo represents and what colours you used.

Don't forget to be original and imaginative when selecting the items to create your logo

Have fun discovering the beauty of colours around us!

2. Experimental part (40 points)

Natural indicators

There are many interesting substances in nature that can change colour depending on whether they are in an acidic, neutral or alkaline environment. These substances are called indicators. Your task will be to find out which natural substances can be used as indicators and conduct your own scientific experiment with some of them.

1. What is an indicator?

First, try looking up information in an encyclopaedia, textbook or on the Internet:

- What does the word **indicator** mean?
- How natural indicators work and what common plants or substances from nature contain them?

2. Make your own natural indicator

- Choose one natural substance and prepare an indicator from it (e.g. red cabbage or red poinsettia leaves by pouring hot water over the chopped/crushed leaves and straining after a while).

3. Investigation of acidity and alkalinity of common liquids

Use your natural indicator and explore how it reacts to different liquids you find at home or at school. For example: vinegar, lemon juice, juice, coca-cola, soapy water, baking soda dissolved in water, plain water, salty water.

The procedure:

- Think about how you will measure equal amounts of each liquid and equal amounts of the indicator.
- Put a little bit of liquid in a small jar and add a bit of your indicator.
- Observe what colour the indicator gets in the liquid.

4. Your findings:

- Record what you found:
 - How did the colour of the indicator change in each liquid?
 - Which liquids are acidic, neutral, and basic?
- Write down or draw your findings. You may attach photographs of your indicator and the experiments you performed.



Foto: J. Soukupová

5. Try something more!

- If you have extra time, try comparing several different natural indicators (e.g. from red cabbage, blueberries, red poinsettia leaves or from fruit or hibiscus teas). Does their behaviour differ?

We wish you lots of fun and discovery as you explore the chemistry that surrounds us!

3. Practical part (40 points)

Investigation of coloured papers

We use papers every day, but have you ever wondered what properties they have? Your task will be to do your own research on coloured papers and compare them with ordinary white paper.

1. Prepare your materials:

- One sheet of A4 white paper (regular office printer paper).
- At least one sheet of A4 coloured paper.
- Prepare various tools for exploration (ruler, scale, glass of water, coloured lights (you can use coloured LEDs, coloured lights from the tree or you can use coloured transparent foils and shine a regular torch through them, etc., optional UV light).

2. Investigate and compare the following properties:

- Size: Are the papers the same size? What are their exact dimensions?
- Weight: Can the weight of one sheet of paper be determined? If not, can you devise and carry out a measurement to determine the weight of one sheet of paper? Does the weight of coloured and white paper differ?
- Tensile strength/elasticity: Try gently stretching the papers - which stretches more or breaks more easily? How do you even investigate such properties?
- Absorbency: put a few drops of water on each paper. What happens? How quickly does the water soak in?
- Solubility: If you dip the papers in water for a while, how do they behave? Do they disintegrate?
- Reaction to UV light: Shine a UV light on the papers. What do they look like? Do any colours glow?

3. Experiment with coloured lights and filters:

- Shine different coloured lights (e.g. red, green, blue) on coloured and white paper. What do you observe? Try to find an explanation for your observations.
- Draw a picture on coloured paper with different coloured crayons. What do the pictures look like under different lights? Try to find explanations for your observations.

4. What else can you research?

- Think about what else you can try to investigate and measure on coloured and white papers. If you have the time and energy, you can implement some of your ideas and document them.

Your findings:

- Write down what you found for each property and compare the differences between white and coloured paper.
- Attach pictures or photos and notes of your research.

Don't be afraid to experiment and discover! And most importantly, have fun exploring what papers can do.

Document your experiments with photographs and pictures, and write everything down carefully. We suggest you make research diaries, in which you will write and draw everything. You will not send us the diaries, but if you are promoted to the finals, you will take them with you together with the products from the individual rounds.

Remember, however, that in order for us to be able to evaluate all your solutions, what you send us must not exceed three pages!

We are looking forward to your solutions and see you in the next round!

Describe the solution procedure of each task, the results of your team work, and any additional information, and document them with photos.

The solution can be handed in only before the deadline. Only the solutions fulfilling all the requisites given in the propositions will be judged without any point loss.

If you have any questions, you can ask a category consultant in your country, see poharvedy.eu for contacts.