

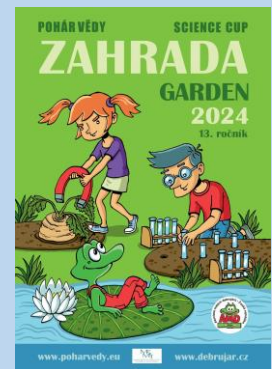
# SCIENCE CUP – GARDEN 2024



## POHÁR VĚDY SCIENCE CUP

Category 4 – High School

1st round – January – deadline 15. 2. 2024 23:59



## Introduction

Dear competitors, welcome to the first round of the 13th **Science Cup - GARDEN 2024**. Before you start with 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 - Creative part (assessed 20%), Experimental part (assessed 40%), and 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.

The solution must be uploaded to the system on the competition website by the deadline in the form of a single PDF file of maximum 10 MB in size. All contents of the file (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 are able to go through 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. In total, 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 March. 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.

The corresponding part will be followed by online regional finals in May, where the top teams from the corresponding rounds of categories 2 - 4 will advance. And in June, the best regional finalists will be invited to a three-day central round.

For the presentation of the central round of the competition, the team will have **ONLY** a table or bench with approximate dimensions of 1 x 1.5 m (the exact dimensions will be specified to the finalists in the invitation letter to the finals) and the surrounding area of this bench within 10 cm from the bench and no other place will be used (walls, bulletin boards etc.), so when preparing individual tasks, please take into account the size of your products in relation to this condition. And now you can get to work, we wish you not only success, but also a lot of fun.

Your Science Cup 2024 team

## 1. Creative part (20 %)

Design a maze for your garden or park. Your maze can be made of any material, a ball, a magnet, or any other small item of your choice can pass through it. The only condition is that the dimensions of the maze must not exceed 30 cm in length and 20 cm in width (approximately an A4 notebook). The maze should correspond in a way with the theme of this year's Science Cup - Garden.

*A maze is a large, complex structure designed to make it difficult to find your way out of it. Sometimes a maze is distinguished as having branching paths with multiple possible routes to choose from, while a labyrinth contains only a single path to its center. Labyrinths can be realized physically, for example from hedges in a castle garden, or symbolically.*



<https://cs.wikipedia.org/wiki/Labyrint>

Write down the material used and document your activity with photographs. Take a picture of the final product together with all team members so that we can get to know your team at least by picture in the first round.

## 2. Experimental part (40 %)

Choose one experiment in which you use anything "from your or your neighbor's garden" (neighbor's garden = it can be a plant that is not grown in your country) as a natural acid-base indicator. Then use this experiment to draw a "colored" picture on a filter paper.

*Some organic substances change the structure of the molecule depending on the pH of the environment, which is reflected in a change of color of the solution. Such substances are called acid-base indicators. Many of these molecules occur naturally, for example, anthocyanins found in flowers, fruits and vegetables: red cabbage leaves, rose petals, blueberries, rhubarb stalks, hydrangea flowers and poppy flowers.*



Source: <https://cs.eferrit.com/definice-a-priklady-indikatoru-ph/>

Photo: J. Soukupová

Make a chemical experiment in which any flower, plant, or part of a plant that serves as a natural acid-base indicator, plays the main role. Write down the material needed, the procedure, and be sure to explain the experiment and how the picture was created. Complete the experiment and picture with your own photographs.

### 3. Practical part (40 %)

In the practical part we will combine theory, practice and observation or measurement.

We stay in the GARDEN.

This time you have three related tasks.

For your observation or measurement, choose one vegetable "from your or your neighbor's garden"

- find out 3 interesting facts about the chosen vegetable
- make and describe a physical or chemical observation or measurement with the vegetable (volume, density, determination of center of gravity, etc.)
- from your observations or measurements, draw correct conclusions



*Photos downloaded from: Chemistry Club of VŠCHT*

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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:

Czech Republic and Slovakia: Naďa Zíková – [zikova@icpf.cas.cz](mailto:zikova@icpf.cas.cz) and Jitka Soukupová – [jitule.sk@seznam.cz](mailto:jitule.sk@seznam.cz)

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