

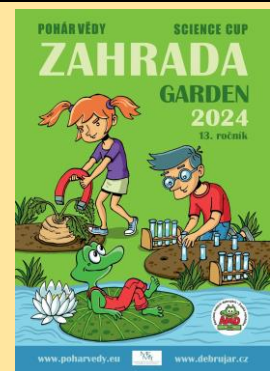
SCIENCE CUP – GARDEN 2024



POHÁR VĚDY SCIENCE CUP

Category 1 – Kindergarten and Pre-School

1st round – January – deadline 31. 1. 2024 23:59



Introduction

Dear competitors,

Welcome to the first round of the 12th Science Cup - AROUND THE WORLD 2023. Before you start with your work, please take a few minutes to learn about the tasks, their solutions and evaluation.

Each month's assignment contains tasks in three areas - Creative part (20%), Experimental part (40%), and Practical part (40%). Describe the solution procedure of each task, the results of your team work, and any additional information, 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). The texts may be written in children's handwriting, scans or photographs of original entries from the researchers' own chronicles or diaries, but please pay attention to the readability, i.e. the evaluability of the submitted entries. However, do not send anything in paper form by post.

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.

And now you can get to work, we wish you not only a lot of success, but especially a lot of fun and new knowledge.

Your Science Cup 2024 team

1. Creative part (20 %)

The theme of this year's Science Cup is The Garden. The pride of various gardens and parks are mazes and labyrinths.

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.

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



Design and create a maze or labyrinth from natural materials. The maze/labyrinth must be large enough for you to walk through. What materials do you plan to use? Where will you build the maze/labyrinth? Ask your grown-ups to take photos of your drawn maze/labyrinth plans and the maze/labyrinths you have created for the solution. What of your plans did you manage to implement? What was a problem and why? Using a long piece of string, measure how big your maze/labyrinth is (the string around the circumference) and how long is the shortest path that goes through it.

2. Experimental part (40 %)

Water is important for plant growth. But how does it get from the roots to the tops of the plants? It's because of capillarity. You'll be familiar with the experiment of paper flowers that bloom when placed on water. Cut a flower out of paper and carefully fold the petals over the centre. Caution: only press the fold with the pads of your fingers! If we squeeze or fold it too much, the cellulose fibres in the paper will break, the water will have no way to esmove through and the flower will not open. Place the folded flower on the water, petals up.



Photo: J. Houfková

1. Test how the speed of opening a flower depends on the type of paper it is made of. Try at least four different types of paper (hard, soft, cardboard, cloth, filter, baking ...). Make sure that all the flowers are the same shape and size.
2. Test how water rises through strings made of different materials. Try at least four types of strings made of different materials (lycra, jute, sisal, paper tissue, cotton, wool, ...). Make sure that all the strings are the same length and immersed in the same length in the water, and that all your testing takes place in the same conditions. Draw and describe your procedure and the results of your testing.
3. Make a multi-layered blooming flower (insert the flowers one inside the other and glue their centres together) and test how it blooms.

4. Cover the undersides of the petals of the lowest flower with wax (just paint with wax pencil) so that the flower does not absorb water through them. Test that you have waxed the petals thoroughly and that the flower does not bloom.
5. Now add a root to the multilayered waxed flower - pull a string from the material through which water rises best, through the centre of the flower, make a knot at the top or twist it and glue it to the centre of the flower from above. Test to see if the flower will now bloom.

3. Practical part (40 %)

Gardens and fields sleep in winter. But many of their crops can be stored and enjoyed throughout the winter. Carrots, for example. And they will play a major role in your next experimenting.



<https://pxhere.com/cs/photo/975812>

1. Use a carrot as a measuring device. Try to measure:
 - a. How many carrots the long side of your table measures, and others at least three lengths,
 - b. How many carrots your favourite book weighs, and others at least three weights.
 - c. Think of something else you can use a carrot to measure.
 - d. Why don't we commonly use carrots to measure? What would be the problems with it?
2. Devise an experiment, physics or chemistry, in which you use carrots. Ask your grown-ups to describe what tools you needed for the experiment and how you carried it out. Draw pictures of you doing the experiment.

Long-term observation

Task that you will HAND IN in the FEBRUARY round

What influences seed sprouting

Because seed sprouting can sometimes be difficult and you may not be able to complete this task in one month, we are assigning it now, but you will have to report the results to us in the next round of the competition in February.

You may have heard that an apple is used, for example, when we want a fruit or vegetable to ripen faster. We will explore how the apple affects the sprouting of seeds.

Materials: 2 mason jars, a smaller apple (to fit the whole apple into the jar), 2 yoghurt cups (must be small enough to fit into the jar), cling film, duct tape, scissors, paper or newspaper, water, some soil (approx. 1 yoghurt cup), watercress seeds (or other fast sprouting plants)

1. Prepare both glasses and the apple. Make a ball from crumpled paper or newspaper similar in size to the apple, moisten it with water and wrap it loosely in foil. Place the apple in the bottom of one of the jars and the ball in the other.

2. Cut/cut both cups about 2 cm above the bottom to make a bowl. Fill the cups with soil, which you moisten and sow 10-20 watercress seeds (or another plant that germinates quickly) in each cup.
3. Place one of the trays in each jar (place them on top of the apple/sphere) and cover the necks of the jars with foil and tape them with duct tape. The jars must be tightly sealed.
4. Place the jars in a window (so that the germinating plants have enough light). Leave them in place for at least 14 days. You can watch the seeds germinate continuously. Do not open the jars during the experiment.
5. Make a note of how you expect your experiment to turn out. Do you expect the plants in each jar to be different? If so, how?
6. After 14 days, if the plants have already sprouted (if not, you can wait a few more days or try again with different seeds), take the cups out of the jars and examine the plants carefully. How big are they? How are the plants in the apple jar and the paper ball jar different? Carefully document the differences - both photographically and with pictures.
7. Did the experiment turn out as you expected? Was there anything in the experiment that surprised you?



Photo: L. H. Houšková

Credits: Thanks to L. H. Houšková and the Golden Leaf competition for the photo and inspiration. If you are interested in similar challenges, check out <https://zlatylist.cz/>.

Document your experiments with photographs and pictures, and ask your leader to write down the important parts. We suggest you to make research diaries, in which you will write and draw everything. You will not send us the diaries.

But do not forget that in order to be able to judge all your solutions at all, 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 your own 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.