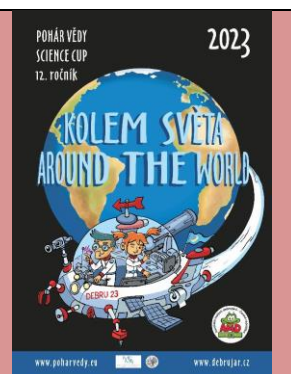




POHÁR VĚDY SCIENCE CUP

Category 4 – High School

1st round – January – deadline 31. 1. 2023 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). 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 first 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 in Nymburk.

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 2023 team - Jit'a H., Katka, Jit'a S., Nad'a and David

1. Creative part (20 %)

What is ORIGAMI?

The principle of this art is to create an interesting shape from a sheet of paper using its folding, gluing and cutting. The resulting shape can be also achieved by folding one or more sheets of paper (usually based on a square, but it is not a rule), which are then inserted into each other. Animals, flowers and vehicles are especially popular.



downloaded from: <https://news.ua.edu/2022/05/more-than-folding-paper-a-look-at-origami/>

Choose one of the following three creative team tasks offered, describe your process of making it and document your activity with your own pictures or photos.

- Make your own paper and write your team name on it/using it
- Fold any origami that describes your team and tell us why it is so
- Create a team fan

2. Experimental part (40 %)

Choose one experiment that would take either to China, to India or Japan.

Both China and India are among the largest producers of rice, tea and various spices.

Did you know that the oldest surviving rice chronicle is written on rice paper? Papyrus is difficult to get in Asia. Rice is native to the tropical regions of Africa and Asia. The first records about rice are from the Pearl River Basin in China, where it was domesticated between 8200 and 13,500 years ago.

China or India - Make a physical or chemical experiment in which either tea, rice or spices play a major role, together with maximum of five other simple aids. Write down the material needed, the procedure, and be sure to explain the experiment. Complete the experiment with your own pictures or photographs.



photos downloaded from: <https://blogs.ncl.ac.uk/stem/>

Japan is one of the nanotechnology giants thanks to its strong historical position in materials research.

Nanotechnology is a technical field that deals with the creation and use of technologies on the scale of nanometers (usually about 1'-100' nm), i.e. 10^{-9} m (billionths of a meter), which is about one thousandth the thickness of a human hair. It is also a study of the possibility of manipulating the matter at the atomic and molecular scale, applying quantum mechanical phenomena that are diametrically beyond the understanding of the world visible to the naked eye. These phenomena described by quantum physics open up new perspectives in magnetic recording media, computing, electronics, optics and other scientific fields.

Japan - Make a physical or chemical experiment in which a substance or material with specific properties (elasticity, malleability, thermal conductivity, magnetic properties, ...) plays the main role, together with up to five other simple tools. Write down the material used, the procedure and do not forget to explain the experiment. Complete the experiment with your own pictures or photographs.



<https://kidscraftsbythreesisters.com>, <https://www.funlittles.com/sensory-activities-for-kids-st-patricks-day-sensory-jars/>

3. Practical part (40 %)

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

We are still in China, Japan and India, similarly to the creative and experimental part. This time, however, you have three related tasks.

Depending on the choice of the main tool or material for the practical part (tea, rice, spices, chopsticks, paper...), which must be typical of the country:

- find out 3 interesting facts about the material or food
- make and describe physical or chemical observations or measurements using the material/food (observe/measure volume, density, pH, determine the center of gravity, etc.)
- from your observations or measurements, draw correct conclusions



Photos downloaded from: <https://www.prodejnabylin.cz/>, https://www.youtube.com/watch?v=PxYL6Lgx_tI, <https://marcosticks.org/>,

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: Nad'a Zíková – zikova@icpf.cas.cz and Jitka Soukupová – jitule.sk@seznam.cz

Turkey: Basriye Öngel – basriye.korkmaz@gmail.com