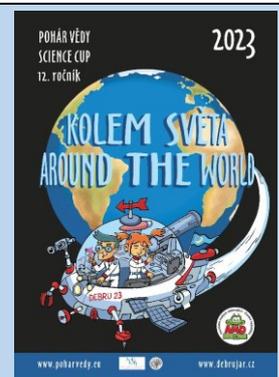


# SCIENCE CUP – AROUND THE WORLD 2023



Category 2 – Primary School

1st round – January – deadline 31. 1. 2022 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.

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 - Jít'a H., Katka, Jít'a S., Nad'a and David

## 1. Creative part (20 %)

On our around-the-world journey, this round we look to Asia. We'll visit Japan, China and India.

Locate these countries on the map and find out one interesting fact that relates to science or technology about each of them .

And because these countries tend to be very warm, we need a fan to cool us down. Make a fan that characterises your team and introduces its members to us. You can make one fan together or make each of your own. Ask your grown-ups to take photos of your fan(s) and write to us about what you captured on them. Also try to describe in simple terms how such a fan actually works as a cooler.

Hint: You can perhaps make a fan out of paper. To make it hold well and work for a long time, you can make the edges of the fan stronger by gluing two spatulas with holes drilled in the bottom of the spatulas, through which you can put a ribbon to tie the edges together.



Photo: J. Houfková

Instead of a fan, you can try origami, the art of paper folding that has been around in Japan since the 9th century. Choose and fold the origami that characterises your team. Take a picture of the origami and tell us how and why it relates to your team and why you chose it. Also for the origami, add a short note about how the paper puzzle holds without glue.

## 2. Experimental part (40 %)

In the countries we are visiting in this round, rice and tea are grown and eaten and drunk. Try the following two experiments and document how they went. Answer all our questions carefully.

### Experiment with rice and pencil



Photo: J. Houfková

Materials: plastic bottle (approx. 0.3 l is enough), raw rice, pencil, plastic box/box/tray - only for catching the rice

Fill the plastic bottle with rice and tap the bottom of the bottle on the table several times. Push the pencil into the bottle with all your might so that only a piece of the pencil sticks out. Place the bottle and pencil in a plastic box/box/tray to prevent the rice from falling around.

Your job now will be to gently grasp and lift the pencil. But first, think about and answer the question of what you expect to happen. How will the pencil be lifted? Will anything interesting happen?

Now grasp the pencil, lift it gently and observe what happens.

Did anything surprising happen? Why do you think it happened?

How can you get the pencil out of the rice?

### Experiment with tea - extracting water from brewed tea

Materials: a wider glass, a small glass (to stand in the wider glass), brewed tea, cling film, a rubber band, a pebble (or another small object to weigh down the food foil)

Pour the warm tea into the larger glass (be careful: not boiling hot tea - the glass may crack) and place the small glass into the middle of the larger one. The tea must not overflow into the small glass. And if the small glass floats in the tea, weigh it down with a clean small object (like a pebble).

Cover the top of the larger glass with cling film or a piece of plastic, secure with a rubber band and place a pebble or other small object in the middle so that the cling film slopes down to the small glass (but doesn't touch it).

Leave the experiment to stand still for 24 hours. Think and answer the question, what do you expect to observe? Will anything interesting happen?

After 24 hours, carefully remove the cling film and take out the small glass. What do you see in the small glass now? How is this possible?

Would anything change if you let the experiment "run" for more than 24 hours? What and why?

Does where you place the glasses affect the outcome of the experiment? Try placing them in different warm places - on a heater, on a window, in a cellar... Can you think of anything else that might affect the outcome of the experiment? Let us know what and how you think it will affect the experiment. You can even try out your ideas.



*Photo: J. Houfková*

## 3. Practical part (40 %)

We will stay with rice in this part as well. Do the experiments with rice described below and carefully record and document everything.

### Measurements with rice

- Figure out how to determine as accurately as possible how much a grain of rice weighs.
- How much water can a grain of rice absorb (at room temperature)? Work out how to measure this.
- How does the weight of a grain change when it is cooked until soft?
- Try at least three different types of rice - first describe how each type of rice differs and then compare how much the grains weigh, how much water they absorb and the change in weight when cooked.

Can you think of anything else you can investigate or measure on/with rice?

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!

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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: Jitka Houfková – [jitka.houfkova@gmail.com](mailto:jitka.houfkova@gmail.com) and Kateřina Vágnerová – [Katerina.Vagnerova@seznam.cz](mailto:Katerina.Vagnerova@seznam.cz)

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