

## Joint projects

Jitka Soukupova | Gymnázium Stribro | Stribro | Czechia  
Janka Siskova | ZS a MS Nižná Brána | Kežmarok | Slovakia

# Czech-Slovak alphabet of science experiments from children to children

The scientific alphabet – joint project of Slovak primary and Czech secondary school

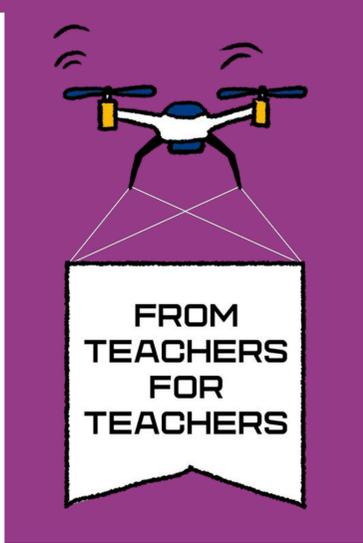
Czech-Slovak alphabet of science experiments from children to children:

- to each letter of the alphabet we added two simple experiments – each one presented by children from each country;
- for each letter of the alphabet, we chose a keyword for which we prepared an information card;
- for each keyword we provided some historical information, interesting facts and instructions for the experiment in Czech and Slovak languages.



### Key steps for students in implementing a joint project:

1. enrichment of vocabulary in English, Slovak and Czech on the basis of simple scientific experiments
2. simple science experiments connected by keywords of the relevant letters of the alphabet and carried out by both teams of students
3. design, implementation and presentation of experiments with respect to the selected letter and keyword - for example see attached cards for letters C, P, M, O with detailed description of the selected experiments
4. teamwork at the international level and across the age categories of primary and secondary school
5. presentation of information and experiments for younger / older pupils from the Czechia / Slovakia
6. finding, processing and presentation of information (historical / cultural / geographical / specific national) about the selected keyword for the performed experiment
7. presentation of a joint project at science events and festivals in the Czechia, Slovakia and abroad
8. presentation of experiments from the project within various charitable events in kindergartens, libraries, retirement homes, etc.
9. preparation and implementation of Czech-Slovak-English brochures and calendars with final project outputs
10. connection of science project activities with other disciplines and school subjects - art and language activities, geography, biology and ecology, history



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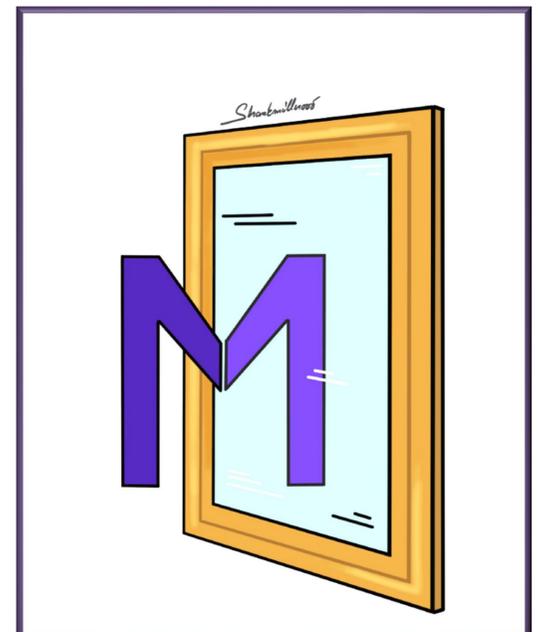
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## M – mirror – zrkadlo - zrcadlo

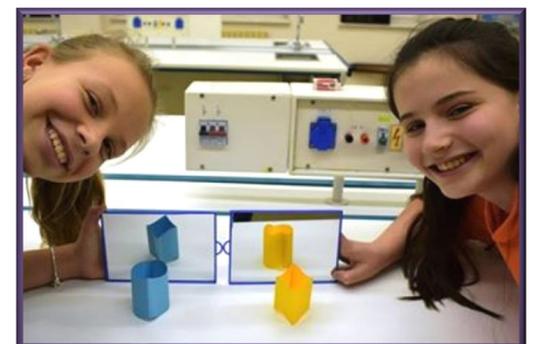
### History of mirror

As the first mirror is the considered water surface, where people could observe both their surroundings and themselves. In the 6th millennium BC, the first objects of the so-called obsidian plate appeared and were used as the first official mirrors. At the beginning of the 2nd century BC, production was already advanced and people invented metal mirrors, which were made of polished bronze.



### Czech team experiment: In front of and behind the mirror

We need: mirror, 3D printed optical illusion The front half of the shape is convex, the back half of the shape is hollow, if we do not have a mirror behind the optical illusion and we do not see the back side, the eye adapts and the brain conceives the image according to the front side. Thanks to the mirror, we observe the front side separately and the back side separately, and the image we see is therefore confusing for humans, because again the brain "conceives" the other half according to visual perception, and so we see two different shapes in front of and behind the mirror.



### Slovak team experiment: Mirror images

We need: 2 mirrors, geometric shapes, (other small objects) Place the two mirrors opposite each other so that they form an angle of  $60^\circ$ . We store geometric shapes or other small objects in the created space. The reflection is repeated in the mirrors, so the image is multiplied 6 times, because we chose an angle of  $60^\circ$ . Depending on which angle we choose, a different image will be created for us. It's a  $360^\circ$  ratio. Does it work with other angles? What we have to think off is a share of 360, which is a full angle. For our angle  $60^\circ$  it is  $360/60 = 6$ ,  $6 - 1 = 5$ . This is the number of reflections in the mirrors. We let students look for other "nice" angles (90,45,30).

