

## PROJECTS AND BEST PRACTICE FROM HUNGARY IN THE START PROJECT

StarT is organized by the LUMA Centre Finland. The primary objective of StarT is to implement a new, interdisciplinary and collaborative StarT way of working and thinking, that emphasizes project-based learning and active collaboration within the learning community. StarT combines inquiry-based learning, integrative learning, and phenomenon-based learning. It promotes the use of modern technology as well as that of other learning environments outside of school. StarT also supports an interest-driven approach to science and mathematics. StarT supports girls' interest towards science, technology and mathematics through creative working methods and contexts that students find fascinating.

From Hungary six teams have participated the StarT project launched by the LUMA Centre Finland, realizing six projects. The teams were supported by two research groups of the University of Szeged: the MTA-SZTE Science Education Research Group and the Szeged Center for Research on Learning and Instruction. The teachers coordinating the projects have been maintaining professional relations with the research groups for several years. They are currently participating in the Content Pedagogy Research Program of the Hungarian Academy of Sciences as part of the research group aiming to improve scientific thinking. They want to integrate the elements of activity-based teaching methods (e.g. project-based, inquiry-based, and problem-based methods) in their everyday teaching practice; thus acting as a bridge between the theory and practice of teaching.

Project managers maintained regular contact with each other and the researchers throughout the realization of the projects. They presented their results and shared their experiences with their fellows and the public at the Science Fair. Besides being an opportunity to build networks between teachers, the fair also allowed teachers to reach teachers in training, who also attended the fair. The pre-service teachers collected information as part of their project "Projects under the magnifying glass."

### THE MATHEMATICS OF THE CHESTNUT

#### **Szivárvány Kindergarten Kistelek**

*Contact person: Anita Habók*

*Kindergarten teacher: Éva Virágné Szűcs*

*Age of the children: 4-5 years*

The project of the group has been organized around mathematics and a healthy lifestyle. In terms of mathematics, the main goal was developing basic counting skills, while the activities were also in connection with nature due to the examination of fruit and nuts. The children had to complete a wide range of tasks with the chestnuts that has made the project interdisciplinary. The activities were in connection with their mother tongue, nature, physical activity, music, drawing, and crafts. The children could work together really well. The planned tasks have been successfully completed, and even more chestnut-related tasks could have been included, though due to the age of the children, this amount was sufficient.

Video:

<https://youtu.be/wbMws4Vzpp4>

Learning diary:

<https://drive.google.com/file/d/0B-XN-CYCTV8sbXJhWXdBFRNzVnM/view?usp=sharing>

## WINTER HEALTH WEEK

### **Szivárvány Kindergarten Kistelek**

*Contact person: Anita Habók*

*Kindergarten teacher: Csilla Novák*

*Age of the children: 4-5 years*

The children familiarized themselves with the habits related to a healthy lifestyle, such as washing their hands, brushing their teeth, etc. They have learned about topics related to their health, talked about healthy foods and even tried some of them. The children could cooperate really effectively in the group. The group activities and the visit to the Health Centre were new and enjoyable experiences for them. A complex project has been carried out that was appropriate for the age of the participating children.

Video:

<https://youtu.be/CAD1kEShg8g>

Learning diary:

<https://drive.google.com/file/d/0B-XN-CYCTV8sbHpRamhwbIN3ZGM/view?usp=sharing>

## MYSTERIES OF THE MULTIFACETED FOREST

### **SZTE Gyakorló Gimnázium és Általános Iskola**

[Teacher Training Primary and Grammar School of the University of Szeged]

*Teacher: Judit Özvegy*

*Age of the children: 8–10 years*

The group's project included activities connected to the topic of forests. In addition to exploring the diversity of nature, students had an opportunity to observe the connections between different creatures and their habitats. They had a chance to experiment, observe, and practice scientific thinking, which is an important aspect of teaching sustainability. We connected the observation of forest creatures to several subjects (literature, biology, home economics) and we utilized a diverse set of techniques and methods. In addition to sites within our school, we also visited external locations, such as a museum, a zoo, and a laboratory.

Video:

<https://youtu.be/da7ue4wF-Jc>

Learning diary:

<https://drive.google.com/file/d/0B-XN-CYCTV8sQ2i0TGFZc2ZiATg/view?usp=sharing>

## BIRD-FRIENDLY GARDEN

**Arany János Általános Iskola Szeged** [Arany János Primary School Szeged]

*Teachers:* Ágnes Kissné Gera, Ildikó Ifkovicsné Karasz, Gyöngyike Holló Szabó, Zsuzsanna Vassné Gémes, Bernadett Nyemcsok-Nagymihály, Gábor Ilosvay, György Jaics, Márta Dobosné Beleki

*Students:* classes 2/A, 3/A, 4/A, 5/A, 5/B, 6/A, 6/B, 6/C, 7/D, 8/A, 8/B

More than 300 students and their teachers carried out the bird-friendly garden project at the Arany János Primary School in Szeged. Parents and other organizations helped the process with their knowledge and work.

The three subprojects of the bird-friendly garden – development of habitat, spice garden and composting – have played a great part in the community life of the school. A widespread knowledge-sharing has developed by the interaction of different age groups. The students gained knowledge about their direct environment, the functioning of the soil and composting while they have been doing activities based on experience. Their knowledge of species has been extended, they have learnt about the birds and flora of the school yard. They were enthusiastic during the implementation; they even enriched the project with their own ideas.

They collected information about spice gardens and the building of these gardens, they learnt about the basis of and the tools for garden maintenance. Students who grow up in a block of flats have little opportunity to get close to nature, most of them took a spade and shovel in their hands for the first time. The students experienced that the three subprojects (building of the garden, the spice garden and composting) are integrally joined and they make a unified whole. They have modelled the attachment of processes in nature, which helped them in the formation of their complex ecological approach. During the project the children experienced landscaping, examined and researched their surroundings, expanded their knowledge about several species (plants and birds) thus they developed their knowledge that they acquired on lessons. Their sense of responsibility increased toward nature. During the activities, teachers and students have gotten closer to each other. The emotional relationship had a positive effect on the mood of the lessons, and it raised the cooperation of both the teachers and students.

The work that the children started at school was taken to their homes; they made small herb gardens on their balconies, and they fed the birds throughout the winter.

As a result there is more varied vegetation in the schoolyard, our environment is more spectacular, and we created the basic requirements for the increase of the numbers of birds. The project hasn't finished yet. We learnt from our mistakes and by correcting them we want to continue the work.

Video:

<https://youtu.be/fnMvCqJYC60>

Learning diary:

<https://drive.google.com/file/d/0B-XN-CYCTV8sR2UtRWJvZkNjaFk/view?usp=sharing>

## IN SEARCH OF VITAMIN C

### SZTE Gyakorló Gimnázium és Általános Iskola

[Teacher Training Primary and Grammar School of the University of Szeged]

*Teachers:* Veronika Németh, Gábor Z. Orosz, Zoltán Somogyi

*Students:* class 10/A

Our project had two goals. First, we wanted the students to get acquainted with the work of the Nobel-prize winning scientist of our city, Albert Szent-Györgyi, and we primarily focused on his research with vitamin C in the 1930s. The other goal was to provide them chemical knowledge necessary to detect vitamin C. They had to perform comparable investigations regarding the concentration of vitamin C in different fruits and vegetables. We incorporated into the project, elements of the investigation-based learning as well. We were looking for the answer to the following questions: (1) Is it true that the plant considered to have the highest concentration of vitamin C has really the highest concentration? (2) How can we lay out an investigation that could be repeated by others? (3) How to make the results obtained from different plants comparable with the other results obtained from other plants and with the results of the other groups?

In order to achieve the first goal, two 10-minute presentations were held by two students in chemistry class. One of them showed the work of Szent-Györgyi and the other was about the history of vitamin C and its chemical properties. We also carried out an easy chemical experiment (the reaction of starch and iodine) which later we would need to detect vitamin C.

We divided our learning community into five groups. We visited the places in our city where Albert Szent-Györgyi lived and worked and those that are mentioned by him in his memoirs. The students talked with the professor of the university who is an expert in Szent-Györgyi's life. He told them a lot of interesting facts. The groups divided the "sightseeing" task as it had to be done after school time.

However, everyone participated in the experimental work at the same time, but still working in groups. This part of the project was carried out in class lessons (Friday, 6<sup>th</sup> and 7<sup>th</sup> lessons). Earlier that day, one of the groups went to the market and they bought the ingredients needed for the experiments (paprika, lemon, apple, cabbage and sauerkraut). For the chemical experiments we used tools that can be found in every school cabinet. The chemical knowledge required for this project is easy to be interpreted by a 16-17 year old student. The results planted more questions, so we are planning to carry out further investigation with vitamin C.

From the point of view of the teachers, the incorporation of the project method into the Hungarian chemistry education meant a difficult challenge because of the oversized content knowledge and the low number of chemical lessons.

Time demand (without the preparation exercises and post-works): to carry out the project we needed four lessons and each group needed approximately one hour for the after-school activities.

Video:

[https://youtu.be/\\_9T1yomMw7k](https://youtu.be/_9T1yomMw7k)

Learning diary:

<https://drive.google.com/file/d/0B-XN-CYCTV8sWW9qNnV1MC1UQ1U/view?usp=sharing>

## ADAPTING? OR EFFECTING CHANGE?

**Közgazdasági Politechnikum Alternatív Gimnázium**  
[Alternative Secondary School of Economics Budapest]  
*Teachers: Ágota Somogyi, Zsuzsa Nádasdi*  
*Students: 9<sup>th</sup> grade*

The idea of the project originates from the science teachers of the Közgazdasági Politechnikum School. Ágota Somogyi, Zsuzsanna Oláhné Nádasdi, and Dorottya Névery designed a project where students could make their own decisions. The teachers only provided the framework, decided how the project would be presented and set the developmental aims. The participants of the project, which was initially planned to be three days long, were all 9th-year students who joined voluntarily. First, they researched the greenhouse effect and the various effects of human activity individually, then, after a brainstorming session, they formed three smaller groups and worked together to create the product of their choice. All three groups worked together on the materials that they would display on the website (<http://greenstep.poli.hu/index.html>). They also planned a class for the other students, deciding what they would present and how. Everyone worked hard and helped their teammates recognize and make use of their strengths.

Although the brainstorming and the creation of the product went smoothly, there were some disagreements and misunderstandings during planning concerning the details which took a while to resolve but were eventually resolved nonetheless, since all students had a positive attitude and were willing to accept each other's reasoning. Students have learned how to ask effective questions and to pay attention to others.

The project remains ongoing, as the students have decided that they would continue trying to influence the attitude of their school and their social circle.

Video:

<https://youtu.be/337S8Mw8Wyo>

Learning diary:

<https://drive.google.com/open?id=0B53RfC5xYFT2eHVQeTVLVEF3UHc>

## SCIENCE FAIR – PROJECTS UNDER THE MAGNIFYING GLASS

*Organizer:* MTA-SZTE Science Education Research Group

*Coordinators:* Erzsébet Korom, Erzsébet Nagyné Antal, Veronika Németh, Ágnes Kissné Gera

The StarT project is an opportunity to bring together teachers using project-based teaching methods in cooperation with research groups at the University of Szeged (MTA-SZTE Science Education Research Group; Center for Research on Learning and Instruction). All projects (6 projects from Szeged, Kistelek and Budapest) submitted to the StarT will be presented at the science fair organised by the research groups. This event is part of the methodological curriculum of students training to be biology, physics or chemistry teachers. The central topic of the pre-service teachers' project (it will be submitted to the StarT too, with title: "Projects under the magnifying glass") is the application of project-based learning in primary and secondary education. Through the StarT project, relationships have been built between the education and teacher training communities. The participants have been given many ideas and feedback on their work.

Video:

<https://youtu.be/vjaSJdLJmZ8>

Diary of the Science Fair:

<https://drive.google.com/file/d/0B-XN-CYCTV8sUUM5eFVFZzgZLXM/view?usp=sharing>

The goal of the project was to get those practice teachers, who will become science teachers, familiar with the project-based learning in practice as well. This was carried out in two ways: they worked using this method and also the whole topic was about it. The project was included in a methodology course. The practice teachers started to work on their project "Projects under the magnifying glass" in January of 2017 with the guidance of our colleagues who give lectures on the methodology of teaching biology and chemistry. They gathered what they knew about project-based learning (theoretical knowledge, personal experiences), they systemised the information, and then, as future teachers, they discussed those aspects that they would like to see in practice as well. The Science Fair, organised within the confines of StarT, presented the opportunity for them to gain experience. They were divided into three groups. The task of the groups was to take a closer look at a project that was carried out within the confines of StarT for a certain age group.

- Group 1 (kindergarten): The mathematics of the chestnut; Winter Health Week
- Group 2 (primary school): Mysteries of the multifaceted forest; Bird-friendly garden
- Group 3 (secondary school): In search of Vitamin C; Adapting or effecting change?

Every group discussed the questions they wanted to answer in the fair. They assigned the tasks to each other, who would interview the teachers, and who the students. Each group analysed the experiences gained on their own and at a methodology class they presented their work, talked about the conclusions, planned the diary of the project and assigned the tasks in order to write the diary.

Pre-service teachers' learning diary:

<https://drive.google.com/file/d/0B-XN-CYCTV8seHRsdF91MXpTTzg/view?usp=sharing>