

Science in Tomorrow's School – Learning Beyond the Classroom

Pilvi Tauer and Piret Karu

Tallinn Secondary School of Science, Estonia (piret.karu@real.edu.ee)

Estonia is a small country with only 1.3 million people. In the capital city Tallinn, there are 60 upper secondary schools with 44650 students in total. In order to make better use of resources, Nature and Science Learning Centres have been created in Tallinn and all of Estonia. These centres are equipped with modern teaching apparatus and expertise, and provide educational programs designed to correspond to the national curriculum. The aim of the programs is to offer inquiry-based learning, hands-on activities and team-building tasks. The goal of these programs is to develop the 4 C's: critical thinking, communication, collaboration, and creativity.

Tallinn City Government promotes accessibility of science education for all students. Learning Beyond Classroom Project provides each class with one field trip per year into the nature and one workshop in a museum or a research institution. The programs are created and prepared in collaboration with teachers.

Examples of programs for students:

- Tallinn Botanic Garden. There are 11 curriculum-based nature programs, which are related to subjects such as mathematics, physics, Estonian language etc. For instance, the Nature and Creativity project day allows students to practice correct planting and explore the growth and living conditions of plants and other organisms.
- Tallinn Zoo has active learning programs for each stage of study at their Zoo School, supervised by zoo educationalists. These programs about nature and animals are designed to support the Estonian education system but they can be modified for other purposes as well.
- Estonian Museum of Natural History offers curriculum-based museum classes for schools and nursery schools, which help children gain an in-depth understanding of nature and the processes therein. The museum promotes interest in the environment and exhibits the diversity of nature. The most popular programs are examining natural resources, minerals, rocks and fossils, and growing minerals.
- Energy Discovery Centre has discovery programs about climate processes, light, sound and electricity.
- The Estonian Health Museum offers workshops on the human organism, healthy lifestyle and first aid.
- Tallinn University of Technology invites students to participate in labs on oil shale research, future energy sources, food chemistry and genetic engineering.
- Nature Schools operating at Nature Education Centres organise field trips and inquiry-based learning projects in order to explore ecosystems and various life forms, as well as orienteering events and survival skills workshops in the nature.

Diverse practical activities have provided Estonian students with very good results in PISA tests:

- In PISA 2015, Estonian basic school students ranked third in the world in science after Singapore and Japan. In Europe, Estonia and Finland shared the first and second place.
 - Estonia's success can be explained by the fact that most of our students have acquired the basic skills and knowledge, and compared to other countries, there are very few students with a very poor level.
 - In collaborative problem solving, Estonia shares the 5th and 6th place with Canada.
- PISA results show that we are on the right course.