THE BEST PRACTICES COLLECTION

of the Baltic Sea Project 1989–2019

Tartu 2019

CONTENT

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1989–2019

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Dear reader,

In 1989, the Finnish National Commission for UNESCO initiated the Baltic Sea Project for the students of the Baltic Sea Countries. Estonian schools have participated in project activities since the project was initiated.

The country officially joined in 1992, when the directive of the Ministry of Education of the Republic of Estonia "Schools of the Baltic Sea Project and their Rules of Procedure" was issued on 16 January. By the directive, the Estonian Youth Nature House was appointed as the coordinating body of the project, succeeded by the Estonian Youth Hobby Centre "TELO" a bit later and since 2001, by the Estonian Youth Work Centre. Since 2012, BSP activities are coordinated by the Tartu Nature House. All nine countries around the Baltic Sea participate in the program and over 150 schools are involved in the activities.

The UNESCO Baltic Sea Project – BSP aims to raise awareness of the environmental problems of the Baltic Sea and the links between man and nature, to notice the surrounding changes, the role of people in these changes, and to lead young people to act responsibly. When initially, the environment and the teaching of natural sciences were at the heart of the program's activities, the program has expanded over time, also in the context of the internationalisation of the project, and attention is paid to intercultural learning and the social dimension of our lives and activities in addition to raising environmental awareness. Schools' activities are carried out in a spirit of sustainable development and they go hand in hand with the UN's Sustainable Development Goals.

In order to celebrate the 30th anniversary of the Baltic Sea Project, Tartu Nature House collected best project-related practices from the schools in Estonia and other BSP countries: guidelines for practical work and observations, collaborative experiences, descriptions of study visits, competitions and events, etc. The aim is to share experiences and provide good ideas for schools interested in environmental education on how to work more effectively and interestingly for a better condition of the Baltic Sea. The target audience of the compendium is mainly teachers. Since years have been eventful and there are many events and methods worth remembering in the schools participating in the Baltic Sea Project, only a small selection of them is presented in the compendium.

Supporting the activities of the Baltic Sea Project is important to the Ministry of Education because we consider international cooperation in the Baltic Sea region and promoting environmental education important.

Over the years, schools have had the opportunity to participate in seven different programs. Under the supervision of teachers, students have conducted coast watch, river watch, and bird ecology programs, phenological studies, environmental measurements, familiarised themselves with environmental history aspects and contributed to sustainable development activities. Within the framework of the project, methodological materials, guidelines and manuals on environmental issues have been prepared in English and Estonian. Every year, environmental camps and in-service training, international conferences and meetings are organised for students. Most of the activities carried out within the framework of the Baltic Sea Project also support the implementation of national curricula and the diversification of the teaching of natural, social and art subjects and the integration of subject studies.

Throughout these decades, a whole generation of environmentally responsible young people have been raised, who are building up the Estonian state now and in the future, and stand for our well-being. We are very grateful to the schools that have participated and are still participating in the project, to their teachers and students, to the leaders of all the sub-programs that have been operating in Estonia during these years. We are especially thankful to the former national coordinators (Jüri Martin, Tiiu Ots, Maris Laja, Anne Kivinukk, Merle Kerde, Reet Kristian, Linda Metsaorg, Sirje Janikson, Kersti Sõgel) and to the current coordinator Gedy Siimenson. Thanks to their organisational capacity, motivation and willingness to act, the project has proven to be very viable throughout the years.

The 30 years of the Baltic Sea Project have created a solid foundation for both the UN's 2009 vision of "The Future We Want" as well as the OECD's 2017 Educational vision 2030 "The Education we want", which supports students in developing competencies such as creating new value, resolving conflicts, and taking responsibility.

IMBI HENNO, PhD
Chief Expert of General Education Department, Ministry of Education and Research

The Baltic Sea Project is one of the most important and major programs for the members of the UNESCO Associated Schools Project Network in Estonia. The Estonian National Commission for UNESCO appreciates the work of the Baltic Sea Project partners, teachers and students, and sincerely wishes to thank everyone who has helped to raise open-minded, respectful and caring people around the Baltic Sea region. We hope that the compendium will help to clarify what has been done and perhaps will guide you to the thoughts that can all be ahead.

We wish you a good experience exchanging and joy of learning!

MADLI KUMPAS
Coordinator of Education Programmes, the Estonian National Commission for UNESCO secretariat

The Tartu Nature House has coordinated the Baltic Sea Project with the support of the Ministry of Education and Research and the Environmental Investment Centre and has systematically provided Estonian schools with various opportunities for raising students' environmental awareness, international tolerance and nature-friendly behavioural habits. The network's activities support the goals of sustainable development and carry the values of UNESCO in an effort to link environmental education with global education. The BSP programs teach you to notice and think about short and long-term changes in nature and emphasise the need to protect the Earth. 30 years is just the necessary time to see signs of climate change in the light of which annual weather data becomes more and more understandable.

Since the aim of the network's activities has been to support high-quality education and provide students with the experience of a scientific research process, comparing nature observations and developing the cloud services for storing the bio-information gathered by students is a dream of recent years, which will be further developed in the future. In this way, schools can contribute to nature studies and students can compile their research based on the data gathered, asking for help from the BSP program managers, if necessary. After 30 years of networking, Finland is also planning a number of changes in international cooperation between schools.

I want the compendium to enable us to learn from each other and our partners and to encourage new collaborative projects.

GEDY SIIMENSON
Tartu Nature House
National BSP coordinator of Estonia

The recently published climate (IPCC, 2018) and biodiversity (IPBES, 2019) reports show us quite frightening pictures of life on Earth if we do not change our environmental behaviour here and now. The humankind is on a shattering suspension bridge over a canyon and there are not too many opportunities to cross this bridge. Obviously, this kind of frightening does not help and does not save the humankind.

What then can be the miraculous key that would open the door to a more sustainable future and the opening of which would give certainty that the world is no longer moving towards a disaster? Cooperation and education, a good example of which is the Baltic Sea Project with its excellent supervisors and programs. The important point here is that working with young people is not based on natural sciences subjects only, but the links between different aspects (ecological, cultural, economic, social) are created so that people could see the whole picture, not only the fragments. Only a skilful vision of such a complete picture provides the opportunity that environmentally conscious behaviour is part of a young person's life, that he knows how the nature is protecting him, that he influences the world, that he knows what he needs to do to keep life going.

On the behalf of the Ministry of the Environment I would like to thank the BSP schools for organising BSP programs and trainings. Education and cooperation – this is the best we can do to avoid an environmental disaster.

LIISA PUUSEPP
Councillor of Environmental Awareness, the Estonian Ministry of the Environment

COOPERATION AND EDUCATION, A GOOD EXAMPLE OF WHICH IS THE BALTIC SEA PROJECT WITH ITS EXCELLENT SUPERVISORS AND PROGRAMS

This year the Baltic Sea Project is celebrating its thirtieth anniversary all around the Baltic Sea. It gives me great pleasure to be able to congratulate all our active members, and especially our Estonian colleagues, for their devoted work and the inspiration they have brought to the collaboration within the entire BSP community. As we all know, the project originated thanks to the collective desire by educators from all of the countries around the Baltic Sea. It was their wish to initiate a lasting and meaningful project in order to educate growing numbers of youths in being able to appreciate and protect our common Baltic Sea environment. On behalf of the project partnership, let me thank the Estonian BSP teachers for your good work and wish you all the best for the future; let me also express our hopes for even more collaborative work in the years to come.

The collection of best practice which has been gathered together by Tartu Nature House, and is presented in this publication, is an interesting sample of the great variety of projects that have been carried out by environmental experts and pedagogues in Estonia and more widely within the BSP area. The collection comes with examples from the early years of the project, as well as a number of fresh new approaches in terms of taking care of present-day environmental issues. As the world is forever changing, we must also be constantly looking for new learning materials to be able to observe and teach about the challenges we meet. This publication is a welcome reminder of the fact that when we work together, we have access to much more innovation and creativity than when working on our own.

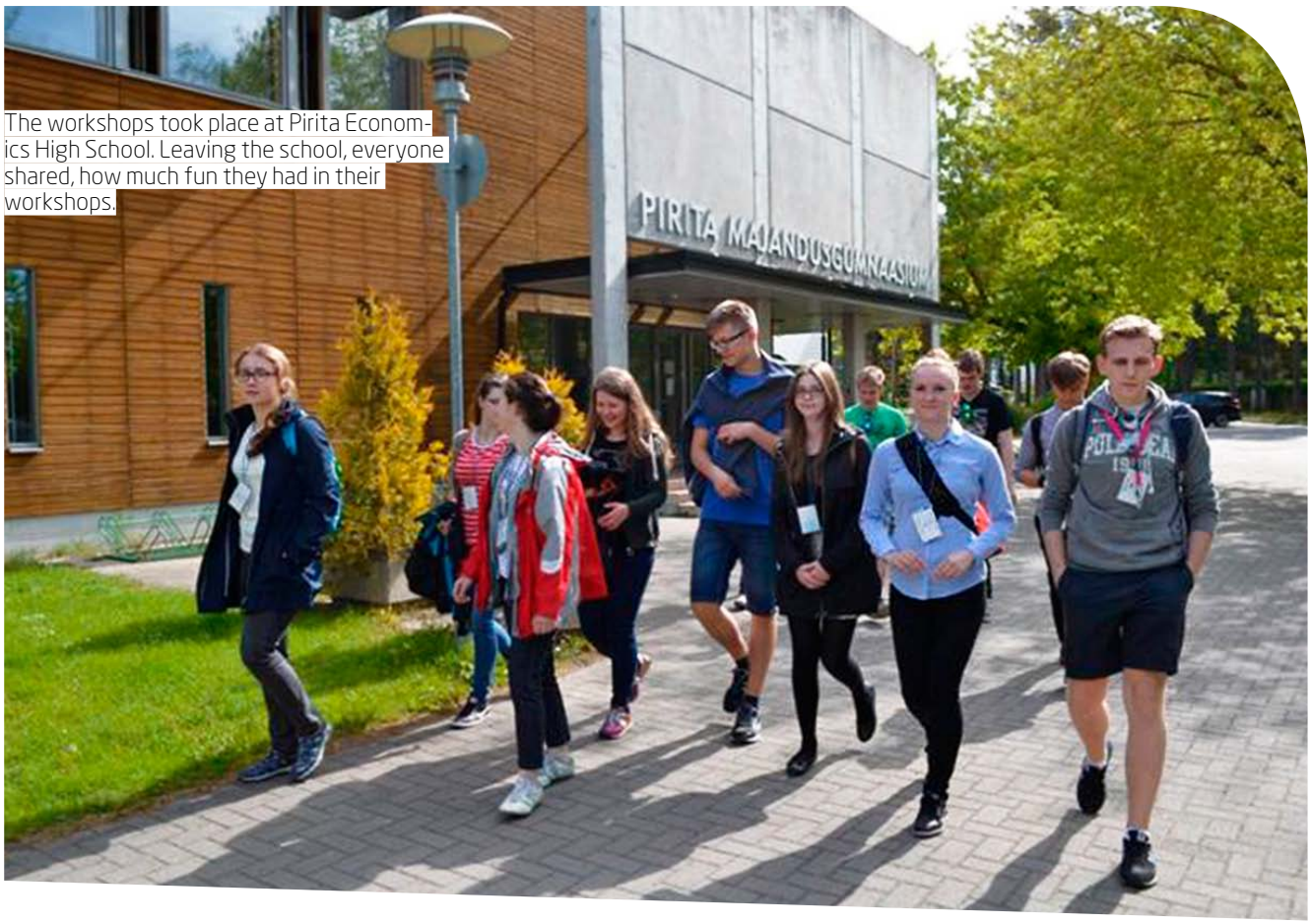
As of autumn 2018, Finland is coordinating the international BSP network for a period of three years. It is our wish to inspire the BSP partners to work and cooperate with an increasingly strong emphasis on UNESCO values, and to achieve a mutual understanding of teachers as well as students in each of our partner countries in regard to adopting the goals of the UN Agenda 2030 for a more sustainable future.

The Baltic Sea Project is a sustainable project for a sustainable future!

AIRA UNDÉN-SELANDER
General Coordinator of the Baltic Sea Project

STUDENTS' INITIATIVE and a green conference

GEDY SIIMENSON,
TARTU NATURE HOUSE, ESTONIA



The workshops took place at Pirita Economics High School. Leaving the school, everyone shared, how much fun they had in their workshops.

One of the traditions of the UNESCO Baltic Sea Project (BSP) is to organise the BSP conference with delegates from all the Baltic Sea countries. The conference relates to passing on the coordination from one country to another, which is why the event summarises the work performed within three years. The present article handles involving students in organising a major event in Tallinn in 2015 – conference "Science of Changes" of BSP.

THE PURPOSE OF INVOLVING THE STUDENTS

is to offer them an opportunity for self-realisation. Only continuous mentorship can give students the experiences of international coordination and organisation work, develop their communication skills, realise the special potential of each individual, broaden their horizons about the different ecosystem services of the Baltic Sea and about the activities of the related parties in improving the environmental status.

The sponsors of the conference were the Estonian Ministry of Education and Research, the Environmental Investment Centre, AS Tallink Group, AS Tallink Hotels, AirBaltic and TV3.

HOW DID WE DO IT?

The preparations began already two years before the date of the conference with idea harvesting and fundraising.

- 1 year earlier

Involving sponsors, applying for funding, building of the organising team starts.

The students from Sweden said that the workshops were very informative. Everyone chose what sounded the most interesting and fun.

„It was also impressive to see how willing to help were all the Estonian volunteers and how much energy had Gedy Siimenson and Kersti Sõgel - Ladies, CHAPEAU BAS! Their efforts caused that we felt more like being on a big family reunion rather than a conference."

MARCIN ZIAJKA
Polish delegation

„I was really impressed by Estonian students who organized this conference voluntarily. I will share the results of this conference to the ASPnet school in Japan."

NAOKO MATSUO
Japan delegation

● 7 months earlier

First meeting of the organising team. In our example, the coordinators were Kersti Sõgel and Gedy Siimenson from Tartu Nature House. The coordinators communicated with schools and organised a preparatory BSP winter camp in Jäneda. The winter camp was for students who were interested in organising the conference. The participants got to know each other, practised team building exercises and talked about the essential stages in organising an event. They formed the so-called departments, where the participants joined in according to their experience and interests. For instance, the department handling the technology was smaller than the group dealing with design elements. After the camp, every participant could contemplate on whether they wanted to join in or not. Professor Hideki Maruyama from the University of Sophia, whose students had just organised a UNESCO conference in Japan, was also visiting the camp and shared his tips about organising an international event.

● 6 months earlier

When a student had given their consent on taking part of the organising work, the school and the parents were informed about the involvement of the student and the youngsters started dividing work tasks in the departments. They prepared action plans and schedules, there were also contact teachers in each school to provide their support for the students.

● 4 months earlier

International participants were involved in the preparatory work (dissemination of information, helping out in workshops, taking photos) and an international competition for logo design was organised. Communication was held on Facebook and a blog was created: **https://bsp-science-of-changes.weebly.com/**.

● 2 months earlier

Handcrafting of daily schedules and neck cards, acquisition of gifts, booking catering, accommodation and other essential elements of the conference. All orders were placed in an environmentally friendly in order to save natural resources.

● 1 month earlier

Communicating with schools. Taking into consideration the special needs of registrants and preparing lists.

„It has been a very impressive conference – well organised and for me as a participant it seemed to be done easily – but this really means: hard work in the background!"

UTE GRÖNWOLDT
Germany

Good-bye-session of the conference. Every participant had a send-off with a big hug from the volunteers.

- 1 week earlier

All agreements were checked, each student practised their part and contacted the coordinators in case of any questions.

- 1 day earlier

Meeting of the organising team in the conference centre.

- 1 week after the conference

Analysis of activities and feedback, sharing experiences. For many youngsters it was their first step in organising events.

Let the 9th International Conference of the UNESCO BSP „Science of Changes" in Tallinn – begin!

„…You have tried to change (and have changed) a couple of things into a good new direction in the BSP, and this was and still is very valuable for the project, your Estonian footprint will remain visible for a long time in the BSP!"

MARTIN JARRATH
Germany

TO CONCLUDE

Conference "Science of Changes" organised by Tartu Nature House was awarded a special prize "Environmentally friendly conference" by Estonian Convention Bureau. The title brought the attention of the public on the organisation work of the students and the conference was introduced in Tallinn Television. Additionally, all the 30 volunteers participating in the organisation work received a prize: an excursion to Bastion passages and the Kiek in de Kök fortifications museum followed by a three-course lunch.

WHAT DID WE LEARN, WHAT DID WE GET TO KNOW?

The organisers got excellent experience in time management, organising activities and public speaking. They also became more aware on how international cooperation is essential for improving the environmental status of the Baltic Sea. A real work experience through different meetings, Skype conversations and correspondence encouraged several students to step up as organisers in the future. On the other hand, some students realised that organisation work is not for them.

„I observed the preparation by Estonian students. They looked little confused at the beginning but became more committed themselves to the BSP at the end of the preparation national camp, thanks to good arrangements and care by Gedy and Kersti who were like their big sisters I met many of the students again this time and found their eyes changed sharply…"

HIDEKI MARUYAMA
Japan delegation

The best part of involving the students is that young people take responsibility for achieving goals that are important for them. Organising a major event helped the students to carry out ideas that were essential for them, to have a say in public life and to manage their learning experience.

The conference followed the principles of organising an environmentally friendly conference. We believe that all BSP events (meetings, camps, etc.) could be based on environmentally friendly and fair trade choices (by preferring domestic food, purchasing goods with Fair Trade mark, etc.) because we only convey our message to the youth when acting this way ourselves.

YOUTH AND Climate Change Conference

Delegates from 15 different countries arrived at the conference.
PHOTO: JOLANTA MOL

JOLANTA MOL AND DOROTA GROCHAL, KONOPNICKA SECONDARY SCHOOL, POLAND

Our school, Konopnicka Secondary School in Katowice in cooperation with Wankowicz Secondary School and UNESCO Associated Schools Network in Poland with Ms Malgorzata Herbich – Polish national coordinator of UNESCO Associated Schools were the organisers of an international conference concerning climate "My Region yesterday and today and global climate change".

It took place on 3rd December 2018, in a conference room of Katowice School of Technology – University of Science and Art. It took place at the same time as the United Nations Climate Change Conference COP24 within various events connected with it in Katowice. Our guests, invited by the national Baltic Sea Project coordinator and our biology teacher Jolanta Mol, PhD, came from 15 countries of the world from different UNESCO schools – from Canada, Brasil, Kenya, Peru, Chile and many other. There were also guests from all over Poland who presented the environmental projects their schools take part in. All guests made presentations on issues connected with climate change and ways to deal with the negative influence we as humans have on the planet. It was a fruitful meeting of young people who inspire others to change the way we treat our Earth.

Guests from all the foreign countries spent 2 weeks in Poland, they were both students and teachers who also visited our school on 5th and 6th December – at school the students had a chance not only to get to know the guests and see presentations of their countries but also exchange ideas and make new friends. An international climate change Flash Mob has been organised.

On 10th December we had another visit in our school connected with environmental projects. The members of Global Youth Climate Pact from 10 different countries visited Konopnicka Secondary School. There were representatives of such countries as: Brazil, Columbia, Chile, Ecuador, Dominican Republic, Easter Island, Guinea, France and Germany. They started off with very extraordinary presentations of their exotic countries accompanied by live music, local costumes and dances. Next, they presented their projects connected with protection of the environment – some students travelled 52 hours to get to Poland and present their ideas and innovations during COP24. All those events took place within different meetings connected with COP24 Climate Change Conference. Our school, due to the wonderful opportunity to take part in those extraordinary events had a chance to show young people what can be done to save the planet and how the youth fight for a cleaner environment.

At the same time with the COP24 climate summit a youth conference "My Region yesterday and today and global climate change" took place.
PHOTO: JOLANTA MOL

My choice is a HEALTHY LIFE STYLE

ANNA OBUKHOVSKAYA, LUDMILA BATOVA, ALLA KUSHKHA, LYCEUM NO.179, ST PETERSBURG, RUSSIA

One of the strategic directions of the concept of healthcare development in the Russian Federation until 2020 is the formation of a healthy lifestyle and the prevention of diseases.

Analysis of health-saving and health-creating activities of educational organizations showed that there is now an increasing need to coordinate the efforts of educational institutions, including networking, social partners, and parents to create a healthy and safe educational environment.

Special attention is paid to the development of general medical literacy and a health culture at all levels of education.

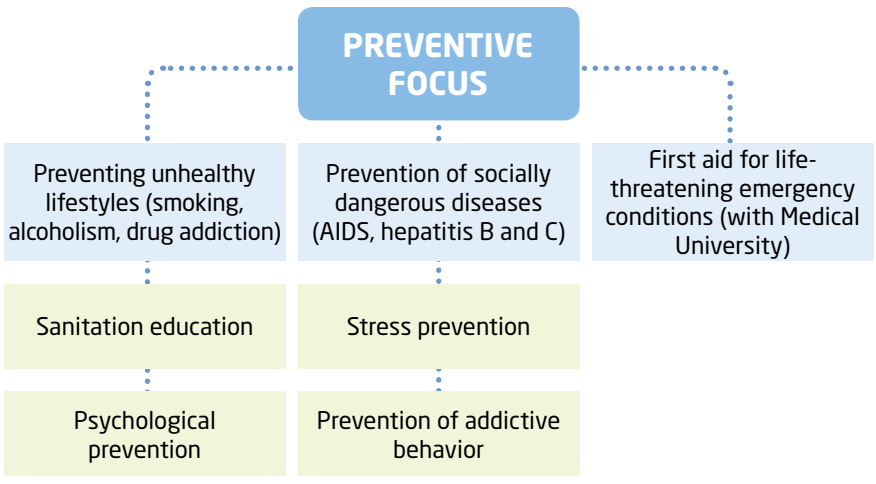
THE WORK IS BASED ON THE PRINCIPLES:

- The principle of nature conformance, understood as the satisfaction of basic human needs, which corresponds to the definition of health in the WHO Constitution.
- Student-centered and practice-oriented approaches in the course-extracurricular activities.
- Solutions to the problems of restoring the efficiency and motivation of knowledge, creating a situation of success, cooperation, personal development, creative and cognitive potential of students.
- Integration of the content of the foundations of a healthy lifestyle and the prevention of bad habits in the content of different subject areas.
- Actualization of existing social experience and its enrichment through practice-oriented educational process in the system of formal and non-formal education.

PROJECTS AND EVENTS

Projects and events taking place in the Lyceum 179 are focused on the formation of a conscious and responsible attitude of students to their health and the health of their closed ones. For example:

- Medical and environmental lecture. The educational work carried out by students on the formation of a healthy lifestyle and the prevention of bad habits, HIV / AIDS, hepatitis B and C is being implemented.



- Medical and environmental practices.
- Youth movement, volunteers “From Senior to Junior”.
- First aid school.
- Holding conferences, seminars, panel discussions for students of different age groups. For example, the city forum “My choice is a healthy lifestyle”, where students’ performances, essay contests, posters and drawings contests were presented.
- Project and research activities of participants in different sections of the High School and High Technologies and Ecology Club.

The coordinating council of the lyceum, whose members are the lyceum administration, social partners, representatives of the parent committee and volunteers, helps to implement plans for the formation of a health-saving educational environment. One of the key activities of the Lyceum is interdisciplinary integration.

All this requires high professionalism from teachers. In the Lyceum, training of teachers was organized through active teaching methods (lectures, seminars, and conversations), problem-targeted trainings, and methodological support.

The experience of such training, including the development of a health-saving educational environment, is actively transmitted through conferences, seminars and publications.

CITY YOUTH FORUM “MY CHOICE IS HEALTHY LIFE STYLE“

In February 2019, we held a city youth forum “My choice is a healthy lifestyle.” More than 200 students of 6–10 classes of various educational institutions of the city of St. Petersburg and the Leningrad region attended.

FORUM NOMINATIONS:

- “I am responsible for my health” – movies, videos like **http://bit.ly/2W8I8Jw**
- “I want to be heard” – posters, pictures, booklets, leaflets.
- “Volunteers” – performance of teams (15 min).
- “Debate” – a discussion role-playing game (a team of 4 people).

ISSUES FOR DISCUSSION IN THE “DEBATE”:

- How to help students realize a healthy lifestyle?
- What methods and activities proposed to students do not work for the formation of a healthy lifestyle?
- How to make effective promotion of healthy lifestyles
- What prevents us from being healthy
- Pros and cons of eating fast food
- Pros and cons of computer games
- Pros and cons of eSports
- Pros and cons of life in the metropolis

At the end of the forum, an appeal was made by the students, on the need to comply with the norms and rules of a healthy lifestyle, and to increase volunteering activities “My choice is a healthy lifestyle”.

The listed events help to form the basis of medical literacy, medical and ecological outlook, responsible attitude to their health and awareness of the importance of a healthy lifestyle.

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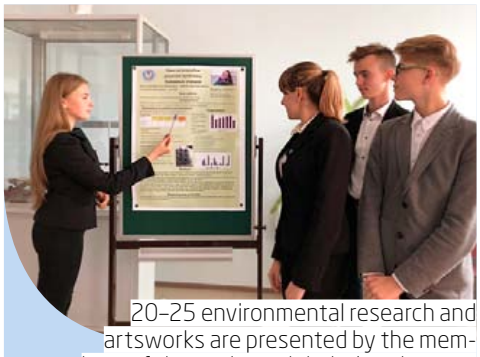


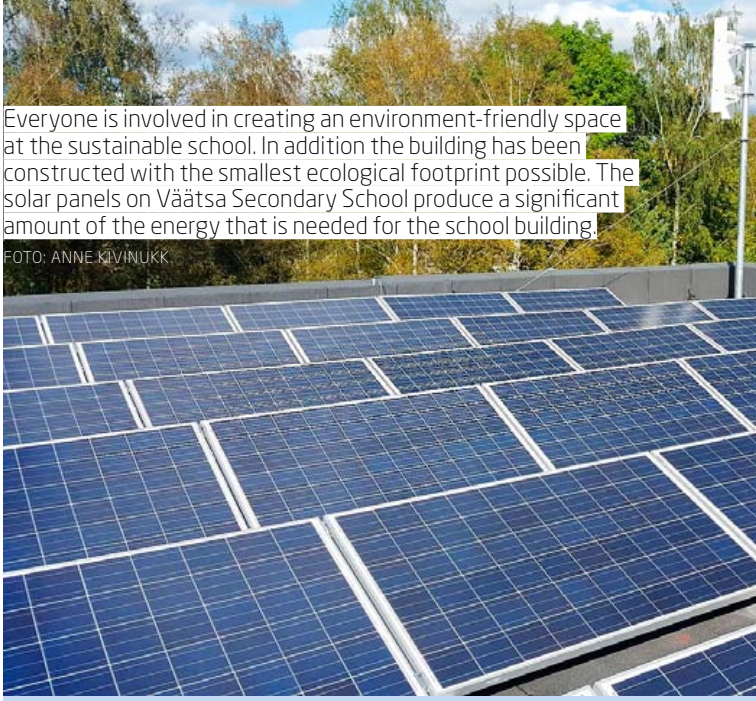
20–25 environmental research and artsworks are presented by the members of the ecology club during the year.

The ecology club in Lyceum No. 179 in St. Petersburg

ANNA OBUKHOVSKAYA, ALLA KUSHKHA, LYCEUM NO.179, ST PETERSBURG, RUSSIA

For many years, the State Budgetary Educational Institution Lyceum No. 179 in St. Petersburg has been paying special attention to the formation of environmental outlook, responsibility and culture among students. We are involved in a number of international projects for example, “Baltic Sea Project”, “Coast Watch”, “Sustainable Development”.

This year, the High School Students Club is 25 years old. The guys are engaged in different sections of the club: chemical analysis, bio testing and bioindication, microbiology, communal hygiene, normal physiology. Students monitor the waters of the Gulf of Finland, the Obvodny Canal and the Griboedov Canal, the Neva River, the Okhta River, the Karpovka River and other local reservoirs. They investigate the quality of sand in children’s sandboxes, the soil and the atmospheric air in different districts of St. Petersburg. The results of the study are presented at Olympiads and conferences, they make presentations to schoolchildren and the general public. Traditionally, 20-25 environmental research and design works are performed at the lyceum during the year.



Everyone is involved in creating an environment-friendly space at the sustainable school. In addition the building has been constructed with the smallest ecological footprint possible. The solar panels on Väätsa Secondary School produce a significant amount of the energy that is needed for the school building.
FOTO: ANNE KIVINUKK

Sustainable development **plan for schools**

ANNE KIVINUKK,
ENVIRONMENTAL EDUCATION ASSOCIATION ETALON, ESTONIA

Five Estonian BSP schools have prepared their sustainable development plan. The purpose is to design an environmentally friendly learning environment in the school and on the school territory, which would have the smallest negative impact on the surrounding environment.

The Estonian Youth Nature House organised an environmental camp where the student groups discussed about sustainable development in their scool and community. At home, the participants finished their plans that they had started in the camp.

Preparation of a sustainable development plan for a school requires broad cooperation by involving as many people in the discussions as possible. The best is to prepare such plan during groupworks.

The prepared development plan must follow a certain structure:

- Analyse the current situation in the school – give it an evaluation, determine the most important issues.
- The development plan must contain a vision for the future – a vision of the situation that must be achieved by a certain time (year); mark it down.
- You may probably have several beautiful goals, but they cannot be achieved all at once, hence, determine the most important ones, prioritise your goals.
- Where possible, set numerical values for your goals (e.g., reduce water costs by ... euros in a month, etc.).
- Prepare an action plan; plan your activities with the aim to achieve the established goals.
- Prepare a time schedule for your activities.
- Think about how you can later assess your activities and the consequences.

Write your plan down in detail and discuss it with your schoolmates – with students, teachers and other staff. Take your ideas to the local government who stands for local development. Local governments have prepared a plan for developing local life and the school definitely plays a great role there.

Green thinking in school

In an environmentally friendly school, the green thinking is supported by teachers, students and the whole school staff. Both the structure of the school building as well as its maintenance correspond to the principles of sustainable development. What is more – starting from 2021, new or renovated buildings must correspond to the nearly zero energy building (NZEB) requirements. Such buildings have heat recovery ventilation system, local energy production facilities (usually solar power) and the monitoring of both indoor and outdoor climate. Hundreds of sensor and digital data sources will be installed in the building.

Väätsa schoolhouse in Central Estonia is already a nearly zero energy building. Every day, a large amount of data is gathered from the building, which is then turned into interesting study materials by the physics teacher. By using the data registered by the sensors,

- The students solve problems where they clarify the reasons of unpleasant indoor climate.
- In nature class, they find connections between temperature, air humidity and wind speed.

The long-term data series of carbon dioxide and energy meters allow the students to do a sort of ´detective work´ by researching and investigating what was done in certain rooms a couple of days or a week ago. Additionally, the students create study films to account for the operation of the vital systems of the building. All these observations help the students to understand in the example of their own school how near zero energy technology helps the school to save energy and money in addition to create a healthy indoor climate.

Learning in the example of their own school building promotes the engineering technical development of the thinking of the students and helps to understand the necessity of smart use of natural resources.

Source: **http://bit.ly/2vYQ1I4**

UNDP Goal 14: Life Below Water.
The aim is sustainably manage and protect marine and coastal ecosystems from pollution.

Discussions during the workshops resulted in the artwork and installation which pointed out the waste problems in the cities.
PHOTOS: HTTPS://OULUMA.FI

Theme course about sustainability science

JUSSI TOMBERG,
OULU, FINLAND

The theme course about sustainability science is a course for upper secondary school students. It is a possibility for students to get abilities needed in the future and to influence on the environment and on well-being in their school or in their neighborhood in a tangible way. During this course the students will develop their creativity, working skills in projects, problem solving and their skills for living within the limits of one planet. In addition, they'll get contacts to their possible future places of work and study, to other students from high schools and university and to experts of different fields of work, like companies, organizations and the city and the university of Oulu. All this is convergent with the new national core curriculum for general upper secondary schools.

This pilot course is held for the first time in Oulu and is based on a course held last year in Helsinki, but this course goes even further in having a concrete influence on the school or the environment. During this spring the students will plan and carry out a project that is based on the Agenda 2030 Sustainable Development Goals. The students will be supported by mentors from different fields of expertise, by tutors that are student teachers interested in sustainability issues and by the course teacher.

The course started in December by a kickoff event where there were some inspiring presentations about sustainability and working in groups. During the spring the groups of students will meet at their own schools. To sum up the course, there will be an event where the groups will present their projects to other students, mentors, tutors, teachers and decision-makers. They will have some feedback and there will be presentations and music performances regarding sustainability issues.

Integrating the Baltic Sea Project into formal education

SIRET PUNG,
KADRINA SECONDARY SCHOOL, ESTONIA

Students and teachers at Kadrina Secondary School have been involved in the Baltic Sea Project since as long ago as 1989. For the first ten years of this period participation was alongside fellow activity-partner schools, Haukivuori High School (Finland) and Jakobsberg High School (Sweden). Close cooperation took place with the students and teachers of each high school via common projects and conferences. One interesting experience was a four-year-long joint project with the junior level of Sønderskov School in Denmark. In 1999 a local BSP conference took place in Kadrina where, besides the work of our own high school students, presentations and an exhibition were also given by the fourth grade. After 1999 the optional course for environmental projects took off at our high school level, which for the last eight years has been part of the course within the natural sciences field.

THE OPTIONAL COURSE GREW OUT OF THE PROJECT WORK

The environmental projects course aims to combine formal education with the BSP programmes, thereby providing more in-depth training. The course is a good fit for the biology course which covers ecology and environmental protection.

SEVERAL METHODS HAVE BEEN USED AND DEVELOPED DURING THE STUDIES:

- A 'Coast Watch' programme at Vainupea
- An 'Air Quality' programme at Neeruti, Kadrina, Vainupea, Lahemaa, etc
- A 'River Watch' programme in the Loobu and Vainupea river areas
- Several lake studies in Neeruti's nature protection reservation
- A 'Bird Ecology' programme
- The questions in the BSP WebQuiz as a learning tool (which are also available in English)

Thanks to these BSP programmes, students have gained a more sophisticated overview of the Baltic Sea as an

eco-system: they have learned which species go towards making up the aquatic biota, estimated the chemical and physical attributes of the water, compared the conditions of the different water bodies, studied more thoroughly the structure and the species both of lichens and mosses, used a bio-indication method for estimating air quality levels, compiled herbariums, learned about the species of trees, birds, and forest flora, and lots more. Thorough student research has covered the River Loobu, Neeruti's lakes, and the air quality levels in Kadrina, Neeruti, and Rakvere. In 2011-2012, we participated in the national-level integrated research project which had been initiated by the Estonian Environmental Board, called 'The biological, cultural and economic assets of my local waterbody', which studies were again related to the River Loobu and during which we could implement our know-how which had been gained from the Baltic Sea Project. In addition, new and interesting study areas were included which covered the economy, culture, and history. Study visits were made to the Kadrina wastewater treatment plant, with these having become a tradition, alongside trips to the River Loobu, Neeruti, Lahemaa, and others.

Determining oxygen in the water of Loobu River.
PHOTO: SIRET PUNG

THANKS TO BSP PROGRAMMES, STUDENTS HAVE GAINED A MORE SOPHISTICATED OVERVIEW OF THE BALTIC SEA AS AN ECO-SYSTEM.

A teacher is interested in bentic animals.
PHOTO: EVE KANGER

The students of Kadrina School determine the fauna of the River Loobu.
FOTO: SIRET PUNG

BSP SUPPORTS DAILY EDUCATIONAL ACTIVITIES AT SCHOOL

The BSP Learner's Guides and other materials are designed for high school students to be able to complement their education. The materials provide additional information on topics for which there is no inclusion time when it comes to the official curriculum. Students are more than happy to be able to visit the various waterbodies, or go to the forest, or go elsewhere in the countryside to be able to determine various species, study the state of the environment, co-operate with each other in their work, and to enjoy the beauty of nature itself.

On the way back from seal watching.
PHOTO: NICOLAI KRICHEVSKY

International Baltic Sea summer camp on ÅRØ

"The Baltic Sea was the one thing the students from all the different countries shared. Together we investigated nature, we cooked with fresh herbs from the sea and we sang along at the big beach bonfire. We shared the wish to protect our environment for our common future."

LISA SCHINKEL
teacher

NICOLAI KRICHEVSKY, ROBERT-BOSCH-GESAMTSCHULE, GERMANY

The Baltic Sea Summer Camp gives young scientifically and environmentally interested individuals an opportunity to come together in an international setting. Students from all nine Baltic Sea countries join in this authentic experience where they take part in workshops, conduct research and connect to like-minded individuals. The little island of Årø, off of the east coast of Denmark, serves as our home and research base during the week-long stay.

THE AIM

of the summer camp is to provide approximately 75 students, aged 16-19, with the opportunity to extend their knowledge about the Baltic Sea region by taking them out of a typical school environment and educating them in

"The camp exceeded my expectations. The projects were designed to be very hands-on. We were given a lot of room for expressing our own ideas which lead to very interesting results."
LOTTA LÖWE
student

Discovering the world under water while diving in the Baltic Sea.
PHOTO: NICOLAI KRICHEVSKY

a setting which provides authentic interdisciplinary topics. We hope to spark their interest in making a difference in their homes, schools and communities becoming global citizens with a sense of responsibility and the necessary self-confidence to make a difference in this world.

The most important form of work during the camp are the projects and workshops offered during the week.

In projects students work in a group of mixed nationalities on one topic during the entire week. Usually one teacher or project leader accompanies the group. Projects are presented at the end of the week and it is great if the results can be shared or if the project can be continued even after the camp has ended. Some examples of projects were 'Big mammals of the Baltic Sea', 'Save the Baltic Sea – a Media Campaign' or 'Clean Energy – a Clear Solution?'

In workshops the students also work in groups of mixed nationalities, but the duration is only 2–4 hours. The workshop provides insight into different topics/aspects of Global Citizen Education, sustainable development, environmental literacy or the Baltic Sea. So examples of Workshops were 'Baltic Citizenship', 'Baltic Sea from Below', 'Recycling and Eco-Products' or 'Microplastic in the Ocean'.

Students upcycling plastic bottles during the workshop.
PHOTO: NICOLAI KRICHEVSKY

FINDINGS, LESSONS LEARNED

Many of the projects were a great success. The students who did research on the wildlife or the changing coast line were able to compare their results with data from the past and now their results are available for future students as well. Other projects, such as a documentary film are still being shown several years after the end of the camp. The students take back what they have learned and act as multipliers at their own schools and in their communities.

WHY THIS METHOD COULD BE RECOMMENDED?

It is a lot of work to host such a camp, but for the students it becomes something much more than school. They are put into a challenging situation where they are forced to communicate in a foreign language with people they have only just met and cooperate to solve larger problems. These challenges and experiences shape their values and interests for the rest of their lives.

The BSP Rivers program

SØREN LEVRING,
BSP RIVERS PROGRAM COORDINATOR

Rivers´ ecosystem is a perfect tool for the students to learn and understand processes in nature. Every river, big or small, tells a story about the living environment and human activity.

The Rivers program observation´s questionnaire has been worked out by the BSP teachers and used by students and teachers from 9 countries around the Baltic Sea.

A general introduction of the program is given in a BSP Learner´s guide nr 4, Rivers (2000): **http://www.b-s-p.org/home/guides/lg4/**

A BSP Rivers programm coordinator concludes the results of surveillance reports of all countries in a Yearly report which is available on BSP's international website **http://www.b-s-p.org/home/**.

The teacher has to show, how to carry out sampling and identify species.

There is no need for sophisticated equipment or chemical analysis to estimate the water body condition. Water quality of a river can be monitored with simple tools available at the nearby store for 5 euros.

PHOTO: SOREN LEVRING

Tips for teacher

THE AIM OF THE RIVERWATCH PROGRAMM

is to learn about inland human activities and its effects to the Baltic Sea biology and chemistry.

- Background information and instruction for riverwatch you can find in BSP Leaner's Guide number 10 „Hatching new scientists across the borders. Theory and exercises for teachers" (2014) **http://www.b-s-p.org/upload/guides/bsp_book_lg10_final.pdf** page 21 written by Jaan Pärn.
- You may find additional information about BSP joint programs at **https://bsp.teec.ee/materjalid/** .

INSTRUCTIONS

- The investigations are made 2 times in year, during spring and autumn. The difference between a clean and a polluted river does not need chemical measures. It is enough to find the animals (as indicators) and look at the surroundings.
- Two steps are needed:
  – Description of the environment
  – Finding the animals

HOW TO FIND THE ANIMALS?

- Take up stones and look carefully after movement at the surface.
- Use the the sieve between the vegetation while it is advancing. Rinse the contents of the sieve and put it in a white tray with only a little water.

Which are the characteristics for the 4. groups of water quality? What is the best?

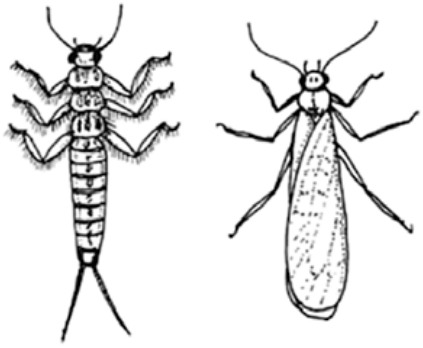
How to know, which category they are? Teach the studens to count the tails and legs!

FINDINGS

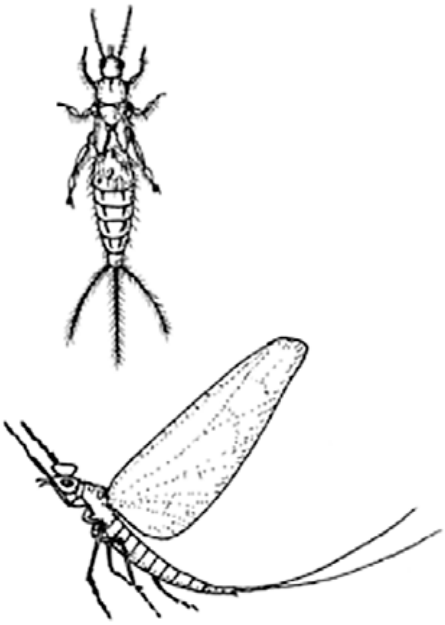
An instruction of the observation can be found at BSP homepage. All investigations must be reported at observation report or protocol **bit.ly/2YwQKWf**. You may fill this observation report in teams, we suggest that each will make one section. Make sure the river and school name and date are the same.

- When you have filled in the survey make sure to send it by clicking on "Finish".
- The participants can send the results by e-mail to programme coordinator: Søren Levring, **karetmagerhuset@gmail.com**

Enjoy the nature!



Indicator Group 1:
Stoneflies (*Plecoptera*) 2 ´tails



Indicator Group 2:
Mayflies (*Ephemeroptera*) 3 ´tails

Picture by Reet Kristian

Microscopic animals of the Neva River

and their role in the ecosystem

ANASTASIA VASILYEVA AND ALEXANDRA AL-ZAANEN, GRADE 10, LYCEUM NO.179, ST PETERSBURG, RUSSIA

The main water intake in St. Petersburg is carried out in the Neva River. The health of the inhabitants of our city depends on the level of safety of the water in the Neva. In nature, there is a natural process – self-cleaning. This process involves microorganisms that decompose organic matter into inorganic and microscopic animals that perform the function of bacteriophages, sedimentations, biofilters. Their role in water purification is difficult to overestimate.

Approximately 80% of all diseases in the world are associated with unsatisfied water quality and violations of sanitary and hygienic standards of water supply.

The importance of water in the spread of infection is explained by the fact that it is not only a habitat for microorganisms, but also spreads them over long distances. This applies to both surface and groundwater.

The formation of the reservoir biocenosis depends largely on the species composition of microscopic animals.

The study of microscopic animals in the water of the Neva River, which is the main source of water supply in St. Petersburg and the Leningrad Region, is relevant and significant.

THE OBJECTIVE OF THE WORK

is to describe the qualitative composition of microscopic animals and their role in the ecosystem of the Neva River.

ROLE OF MICROSCOPIC ANIMALS IN ECOSYSTEM

In addition to zooplankton, zoo benthos organisms can be found in samples - inhabitants of the bottom, which enter the water column with intense flows.

Plankton crustaceans are peculiar filters, as for their nutrition they filter bacteria, phytoplankton and various particles of dead organic matter – detritus from water. Lower crustaceans are active filter feeders. They filter a large amount of water through their bodies, retaining suspended substances, partially mineralize them, and throw the residues out in a compact (glued) state. Food for them are bacteria, small algae, organic suspension. Many of these organisms feed on detritus, which sink to the bottom. And also some species are sedimentators.

Another ecological aspect of the role of microscopic animals is that in the process of their vital activity, they release various soluble organic and inorganic substances. For example, phosphorus and nitrogen compounds that can be directly used by phytoplankton for their development.

TOOLS NECESSARY

To study microscopic animals, water was sampled along the Neva River in the city center (under the Troitsky Bridge). For this was used the so-called plankton network. It is a bag of mill gas (sieve), sewn in the shape of a cone. A special glass, usually metal, is sewn to the top of the cone-shaped plankton net, into which a small amount of water is collected with filtered plankton. At the bottom of the glass there is a tap that allows you to drain into the sample container.

We used the microbiological research method – the analysis was carried out on an MSP-1 V.22 microscope under a magnification of 40 times, equipped with a TOUPCAM video camera.

To determine the qualitative composition of microscopic animals, a brief determinant of freshwater invertebrates from the center of European Russia was used (M. V. Chertoprud, E. S. Chertoprud).

FINDINGS

The most numerous animals in the sample were rotifers – 75%, which is important and significant, as they purify water, destroying masses of bacteria, algae and detritus that they serve as food. At the same time, rotifers themselves serve as food for other organisms. Copepods and branchy ones have the same functions, but they are found to be much smaller (20% and 3%, respectively). Only 2% of benthic organisms are found, since these organisms live on the bottom and rarely fall into the water column. Benthos serves as food for fish and other aquatic animals.

The content of microscopic animals we have determined by biomass, where the main part is benthos (43%) and copepods (46%), since they are large in comparison with rotifers (8%) and branchy creepers (3%).

Representatives of branchy species such as *Daphnia*, *Bosmina*, *Leptodora*, *Polyphemus* were found in the sample. In addition to zooplankton, such representatives of zoo benthos were found in the sample: *Oligochaeta*, *Nematoda* and *Tardigrada*.

Thus, the species composition of microscopic animals is diverse. In the water of the Neva, rotifers, branchy, copepods, oligochaeta, nematodes, slow moving fish, and Diptera larvae are identified.

- The species diversity of the microscopic animals of the Neva provides the species diversity of the microscopic animals of the Neva Bay, since the Neva flows into the Neva Bay.
- The presence of the species diversity of the Neva River favorably affects the ecology, since microscopic animals filter out water, secrete useful organic and inorganic substances, and serve as food for many aquatic inhabitants.

Authors of the study, Anna and Anastasia in biology classroom.

Mayflies are aquatic insects who belong to the order *Ephemeroptera*. Their immature stages are aquatic fresh water forms, whose presence indicates a clean, unpolluted environment.

The caddisflies, or order *Trichoptera*, are a group of insects with aquatic larvae and terrestrial adults.

Bird watching tours
in the coastal nature of Pärispea

LINDA METSAORG,
ERU BAY SOCIETY OF COASTAL VILLAGES, ESTONIA

Pärispea Peninsula with its far north stretching Purekkari cape is one of the most visited sites in Lahemaa National Park in Estonia. The area boasts with versatile habitats on the coasts of Eru and Hara Bays as well as in the forests of the inner part of the peninsula. In spring and autumn numerous geese, brand geese and other birds nesting in arctic areas travel over the peninsula.

The coastal nature study trail established on Pärispea Peninsula allow to get acquainted with habitats valued in Europe, such as sandy beach with vegetation cover, dunes with herbs and pine forest, sands, etc. There are information stands that introduce the study trail on the site and there is an option to use a brochure.

There are several good places for bird watching on Pärispea Peninsula, for instance the observation points of Purekkari cape and Mähu cape, but the greatest variety of species can be found on Vihasoo coastal meadow and near the alvars of Eru Bay. For better observation of birds, observation towers have been established in Viinistu and on the coastal meadow of Vihasoo.

Beach nature offers secondary school students good opportunities for practical merging of the school curriculum with the topic of the environment of the Baltic Sea, bird enthusiasts for participating in international bird watching days or for about anybody to enjoy beautiful coastal biotypes that are valued in Europe.

Of all the listed possibilities, bird watching and counting are the activities carried out the most in Pärispea. Therefore, the below stated experience in organising bird watching tours in Estonia will be introduced at the annual bird watching days that are held in spring, autumn and winter. Such observations also give an input for the BSP Bird Ecology Programme.

> "During my four years as Norway's ambassador in Estonia, I have enjoyed travelling and exploring the natural treasures of your beautiful country, and in particular the rich bird life along the coast. I discovered a very solid and nice bird watching tower in Eru bay, and found to my pleasant surprise a sign with a text – even in Norwegian! – explaining that the tower was built and donated by Nordic Houses! Among the many birds I was able to observe, I was amazed to follow an Osprey catching a big fish an fly away with it. The most amazing thing was, however, when I could see no less than five White-tailed Eagles at the same time – an incredible sight.
>
> **DAGFINN SØRLI,**
> *ambassador of Norway 2014-2018."*

A group of birdwatchers are going to a nature trail by the guidance of Linda Metsaorg.

Bird watching tours in coastal nature

The instructions are prepared based on the bird watching tours carried out in Pärispea Peninsula.

PURPOSE OF THE WORK

The purpose is to increase environmental awareness through observing the life of birds, rising interest in knowing and preserving nature and reflecting the status of our environment through bird watching.

TOOLS NECESSARY

Transport to the starting point of the trail is needed for carrying out the study trip and for moving between the observation points. The participants need binoculars, a spotting scope and a bird guide for carrying out the observation. For registering the observed species, counting cards (Annex 1) and an observation protocol (Annex 2) are needed.

THE COURSE OF OBSERVATIONS

Preparation at the beginning of the observation day

- At the beginning of the observation day, before going to the study trail, the participants are given a short introduction about the potentially observed species during the tour.
- One counting card is given for every two participants. The names of the count-takers and the number of birds observed throughout the route (without marking the observation spots) will be recorded on the map.

Observations

- In observation points, the participants search for birds active on the landscape by using binoculars or a spotting scope and learn to determine them with the help of the bird guide and the explanations of the instructor.
- The instructor helps to determine the bird species, the students count birds.

Making summaries

- The participants announce the results of their count and give their counting cards to the instructor.
- Based on the counting cards, the results of the bird watching tour are summarized and formalised in the observation protocol. The beginning and the end of the route are marked in the observation protocol as well as the data about weather on the observation day.

TIPS FOR TEACHER

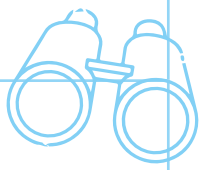
- The method described above is suitable for getting to know birds in the event where a larger number of people take part in the study trip, such as a nature club or a class. All students can be the counters of birds.
- Observations can be differentiated according to the skills of the people: beginners count best known species, advanced observers more complex bird groups such as dabbling ducks, diving ducks, etc. The instructor takes into account the knowledge of the participants and hands out suitable counting cards.
- We recommend filling in the counting card on two sides, where on the front page there are data about the counting, on the other side, however, data about birds.
- After the bird watching tour, one common observation protocol will be prepared based on the counting cards.
- When filling in the counting card, it is useful to also write down the telephone number of the observer. These are often necessary for quick data specification when filling in the observation protocol.

WHY IS THIS METHOD GOOD?

Participants of a bird watching tour get to know bird species and prepare observation data. They learn how to participate in the BSP Bird Ecology Programme. The environmental awareness of the participants increases because interest in nature is triggered through exciting objects of nature, the birds. The participants form an understanding that observing bird life gives us information about the condition of the environment. If the birds do well, then our whole environment is balanced.

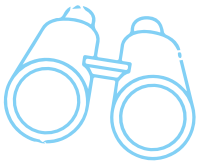
COUNTING CARD · DATA ON COUNTING

Beginning of the bird watching tour	End of the bird watching tour
Time	Time
Place	Place



Names of count-takers	Telephone numbers

COUNTING CARD · DATA ON BIRDS

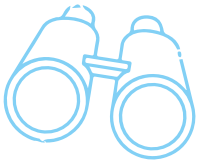


Counted bird species or group of birds.
How many of these birds do you see on the tour?
Mark down the number without an observation site, e.g., 8 + 4 + 5 + etc.

Counted bird species / group	The number of birds, e.g., 8 + 4 + ... etc.	Total
Number of bird species		Total number of observed birds

OBSERVATION PROTOCOL

BSP Bird Ecology program

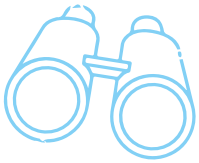


Organising authority (school, nature centre, etc.)	
Participating schools	

Bird watching tour	Winter count January	Easter bird watching Beginning of April	Spring time water bird count, End of April	Autumn bird watching, October
Date				
Name of instructor				
Number of participants				
Route length				
Route starting point				
Route end point				
Main community on the route (coastal area, forest, field, etc.)				
Temperature				
Visibility (very good >5 km; good 2-5 km; satisfactory 1-2 km; bad <1 km)				
Ice conditions: free water, ice near the shore, ice field				
Wind direction				
Wind strength (light, moderate, strong, storm)				
Notes: What has changed on the observation route (logging, meadow maintenance, dumping rubbish, water pollution or other)?				
Total number of observed birds				

OBSERVATION PROTOCOL

BSP Bird Ecology program



Bird species	Winter count	Easter bird watching	Spring time water bird count	Autumn bird watching

Environmental CHANGES and bird migration

THIS EXAMPLE IS DESCRIBED BY
VILJA PADONIK, RAKVERE BASIC SCHOOL, ESTONIA

Phenological studies (watching seasonal changes in nature) have a long tradition in Estonia – phenological studies as part of the BSP programme were launched in 1994.

Long-term nature observation makes it possible for us to notice changes in nature. This article focuses upon how the systematic observation of birds will provide vital information regarding changes both in the surroundings of birds and people.

Around 40% of the world's birds are migratory, but the rate for migratory birds in the rough environmental conditions of Estonia is almost 90%. The main reason for any migration is the lack of food during winter and the short daytimes.

PURPOSE OF THE WORK

- Learn to spot and identify various species of bird
- Learn to understand and appreciate the role of birds in nature and in the lives of people
- Develop observation skills, critical thinking, and a spirit of cooperation
- Acknowledge the impact of environmental changes on nature that have been caused by people.

TOOLS NECESSARY

- A bird guide or bird identification tables (internet freeware)
- Info tables on selected species
- Political and physical maps of Europe, Asia, and Africa
- Bird migration maps for the species
- A worksheet with selected questions and writing boards
- Observation tools such as binoculars and spotting scopes

THE COURSE OF WORK

Before beginning any observation, a review is being conducted of general knowledge about the migration patterns for particular species. Also the most common species will be introduced. Something that could be also discussed is the question of why birds migrate and how does such a migration differ from a migration by people. Cause-and-effect relationships could be outlined, such as the lack of resources, etc.

During group work, students are given photos of one or two bird species by means of a general pot-luck draw, and they are to identify the birds and fill out their worksheets using supporting material. If possible, an outdoors observation will follow, with the birds being identified, and the results of the observation being noted. The suggested period for this work is during the time in which each species of bird could best be observed with the help of the observation tools. In cases in which any practical observation is not possible, short presentations could be made by the groups, either in digital or oral format.

WHAT DO WE LEARN?

Using the supplied materials, students gain information about bird migration, and discussions reflect the role of the birds within people's lives and the need to protect birds. Information that has been gathered over the years during phenological studies and weather observations provide a level of insight of whether climate change has had an impact on the environment and how it may have done so.

WHY IS THIS METHOD GOOD?

Thanks to this method, students are able to explore for themselves how the knowledge is interrelated. Following some preparatory work, students can study the behaviour of birds and discuss the impact of environmental change on bird migration.

ESTONIAN MIGRATORY BIRDS

Members of the group:	Date

Species of bird	
Arrival in Estonia (or the first observation date)	
Leaving Estonia (or the last observation date)	
Staying in Estonia (approximate number of days)	
Wintering area	
Which countries do the birds pass over when migrating?	
Length of migratory route (km)	
Duration of migration (number of days)	
Average speed of migration (km/h)	
According to the distance (mark with a cross):	
short-distance migratory bird	
mean-distance migratory bird	
long-distance migratory bird	
Migrating at night or during the day?	
Migrating alone or in flocks?	

FACTORS WHICH INFLUENCE MIGRATORY BIRDS

Which environmental challenges could influence these species?
Your estimation: + somewhat influences, ++ average influence, +++ huge influence

Species of bird	
Factor	**Estimation**
Unexpected snowfall and cold seasons may occur during an early spring that has been caused by global warming	
Insect abundance may occur earlier during an early spring which has been caused by global warming	
Breeding areas move nort-hwards due to global warming	
Breeding places and food are in deficit due to logging in ancient forests	
Meadow mowing too early and too hastily	
Extensive use of plant protection products in fields and gardens	
Increasing melting of sea ice due to global warming in Antarctica	
Expansion of the Sahara Desert	
Illegal bird hunting in the Mediterranean region	
Dumping into the oceans: micro-refuse and refuse islands	
Which role do these species play in nature and in people's lives? What can you do to protect these species?	

The impact of TRAFFIC on air quality

THIS EXAMPLE IS DESCRIBED BY **ANNE KIVINUKK, ENVIRONMENTAL EDUCATION ASSOCIATION, ESTONIA**

Emissions from transport are an increasing factor in air pollution. The more numerous vehicles on land, sea and in air are the main source of polluting gases, especially nitrogen and carbon oxides, and hydrocarbons. Emissions from burning fuels belong among greenhouse gases, nitrogen oxides create acid precipitations when reacting with humidity. In urban areas, dust from the traffic also proves to be a problem.

Air pollution can be avoided by smart traffic arrangement. The number of cars in a city can be reduced by promoting public transport, calming the traffic, implementation of more environmentally friendly vehicles, establishing bike lanes, etc.

Since the use of old cars pollutes the environment, we see that air quality is indirectly also linked to the standard of living.

Lichens are sensitive organisms towards air pollutants, the resistance of species varies largely. Some species are especially sensitive (*Usnea sp*), others (*Hypogymnia physodes*) tolerate more.

WHAT DO WE LEARN?

In most cases, this observation reveals a picture which clearly indicates that lichen growing on tree trunks deeper in the forest are in better condition than those growing immediately beside the road.

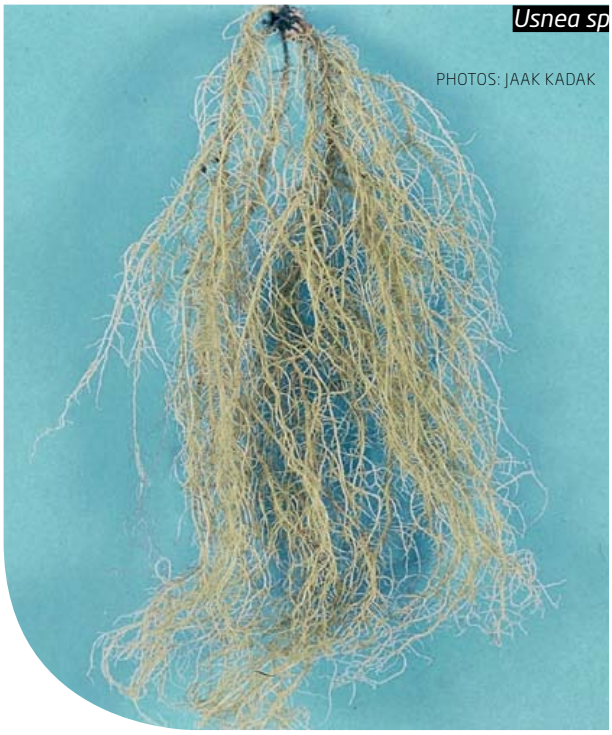
WHY IS THIS METHOD GOOD?

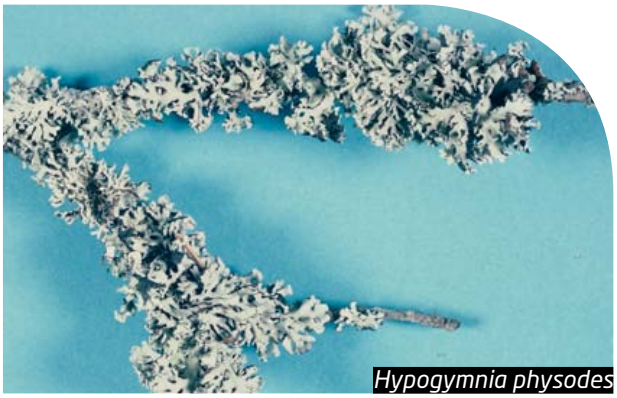
It is quite a simple observation for students that are enthusiastic about nature and it can be carried out for instance in a nature camp.

This observation can be carried out during two days. The preparatory group can first select the observation point and the trees to be observed and measure traffic density.

Both lichens and needles can provide information about air quality. Kadrina High School are going to estimate air quality on the basis of bioindicators.
PHOTO: SIRET PUNG

Photo below: *Usnea sp*





Assessing the impact of traffic by using epiphytic[1] lichen

PURPOSE OF THE WORK

is to investigate the impact of road traffic on air quality.

TOOLS NECESSARY

A 10 x 10 square patterned transparent film (20 x 20 cm), a pencil, a tape measure, instruction, worksheet.

THE COURSE OF WORK

Carry out the observation in a coniferous forest where the majority of the trees are pines.

- Determine the traffic density on the road. For this, count the number of cars passing from your observation point within 10 minutes. Calculate the number of cars passing this point in one hour.
- Choose 5 observation points, the distance of which is 0, 20, 120 and 470 m crosswise from the direction of the road. Hence, the first observation point is located immediately by the road. Mark the observation points.
- At each point, select at least 5 pine trees which will become your objects of observation, whereas the trees must grow quite near to one another, be of the same diameter, same age, fully grown and without injuries.
- Place the transparent film tightly on the tree trunk at the height of about 1.3 m.
- Count the number of squares where you can find lichen. Count lichen both on the roadside (RS) of the tree trunk as well as on the opposite side (OS). The results will be in per cents. Write the results in the table.
- Assess the damage class of *Hypogymnia physodes* on every observed pine according to the scale provided below. Select one specimen on both side of the trunk.
  Class 1 – healthy
  Class 2 – some damages
  Class 3 – practically destroyed

Perform the observations on both sides of the tree trunk and mark down the results in the table.

- Count all the Usnea specimens starting from the foot of the tree up to the height of 2 m. Write the results in the table.
- Measure the length of the longest Usnea (mm), write the result in the table.
- Count the number of all epiphytic lichen from the foot the tree up to the height of 2 m. If possible, try to determine the species. If species can be determined, prepare a list of all the observed lichen species in each observation point. Assess the condition of lichen (colour, shape, changes in size, etc.).

PREPARE SUMMARIES IN CLASS:

a) calculate the averages

b) you can draw the respective illustrative diagrams:

- tree trunk coverage with *Hypogymnia physodes*;
- damage rate of *Hypogymnia physodes*;
- number of *Usnea species*;
- maximum length of *Usnea*;
- number of different lichen species.

c) What are your conclusions?

[1] *Epiphyte is a plant organism which is attached to or grows on another living plant without damaging it.*

ASSESSING THE IMPACT OF TRAFFIC BY USING EPIPHYTIC LICHEN

Date	
Name of the observer	
Observation point	
Tree species	
Possible source of pollution	
Distance of the source of pollution from the observation point	
Traffic density	

Tree trunk coverage with *Hypogymnia physodes*	Tree number					Average coverage (%)
	1	2	3	4	5	
RS						
OS						

Hypogymnia physodes damage class (1–3)	Tree number					
	1	2	3	4	5	Average
RS						
OS						

Number of *Usnea* specimen	Tree number					
	1	2	3	4	5	Average
RS						
OS						

Maximum length of *Usnea*	Tree number					
	1	2	3	4	5	Average
RS						
OS						

Number of ohter lichen species	Tree number					
	1	2	3	4	5	Average
RS						
OS						

List of lichen species (not obligatory)	
Conclusion	

The drawing competition received 215 submissions, of which 104 were displayed at the exhibition. Reason to be proud!

Drawing contest and postcard campaign **uniting the BSP schools**

GEDY SIIMENSON,
TARTU NATURE HOUSE, ESTONIA

Three countries – Finland, Estonia and Russia – celebrated a Year of Finnish Gulf in 2014. With their presidents serving as their patrons, these countries took actions in making their cooperation more efficient in improving the environmental status of the sea. The Baltic Sea Project also celebrated the Gulf of Finland Year by organising a drawing competition "The coast and biota of the Gulf of Finland" for the schools of Finland, Russia and Estonia.

The purpose of the competition was to inform schoolchildren about the environmental problems of the Gulf of Finland and the Baltic Sea and to encourage people to cooperate internationally in order to improve the situation. The organisers wished to bring together the schools from different countries and hence to liven up their communication.

The activities were supported by the Estonian Ministry of Education and Research and the Environmental Investment Centre.

DRAWING COMPETITION "THE COAST AND BIOTA OF THE GULF OF FINLAND"

A total of 215 pictures were sent to the drawing competition, 104 of which were displayed at an exhibition. Additionally, 10 drawings were selected to be printed into nautical postcards to be used in the upcoming postcard campaign. Recycled paper was used for printing the postcards.

The terms and conditions of the competition are available at **http://bit.ly/2JCAMEM** .

POSTCARD CAMPAIGN "WE ARE CONNECTED"

The purpose of the postcard campaign was to increase communication between the schools of the Baltic Sea countries. The campaign used postcards that were printouts of the selected works from the drawing campaign.

The postcards were sent to BSP schools before the international BSP meeting in Tallinn in 2015. Each school wrote a good wish, a cooperation idea, an invitation to a joint event or for finding a partner school on the postcard and sent them to another BSP school. The necessary contacts were found from the BSP website.

The message arrived to the school was photographed and then posted on the BSP Facebook wall (**https://www.facebook.com/unesco.bsp**), where a summary of the campaign was made later on. Hopefully the campaign encouraged students in international communication and realisation of joint ideas in protecting the Baltic Sea.

Read more about the postcard campaign at **http://bit.ly/30zAjdj**.

TRAVELLING EXHIBITION

A travelling exhibition was compiled out of the best works of the drawing competition, which was then available for order by Estonian schools. The tour of the travelling exhibition ended in summer 2015 when it was exhibited at the international conference of BSP **http://bit.ly/2XLPXRb**.

FUND-RAISING AUCTION

After the end of the conference, some pictures were sold in an auction. The collected sum was donated to the Estonian Fund for Nature for organising a nature maintenance campaign and promoting activities related to the Baltic Sea. Some of the works were given to shipping company AS Tallink for informing the passengers about the status of the Baltic Sea.

WHAT DO WE LEARN?

One drawing may have several roles by forwarding natural scientific background information and global education message, by offering the opportunities for mutual communication and creative expression, by joining schools and countries, etc. Drawings can also be used as learning materials. In our project, the drawings also served as the object of charity auction and thus helped to improve the environment of the Baltic Sea.

WHY IS THIS METHOD GOOD?

Drawings do not have to be only on classroom walls. They can convey a powerful message that the students believe in and based on which they are also ready to act.

Some pictures were sold at an auction pro bono in order to promote the activities related to the Baltic Sea.

Photos were taken in daytime, at night, and during sunrise

PHOTO: ANNE KIVINUKK

PHOTO CONTEST
"The Baltic Sea in Change"

„The project opened our eyes and now we can actually see what people can do with their achievements. If we choose wrong path, we will soon ruin this planet - the only planet we have!"

STUDENTS FROM KAARINA COLLEGE, FINLAND

ANNE KIVINUKK AND MAIKEN STAAK, ENVIRONMENTAL EDUCATION ASSOCIATION ETALON, ESTONIA

On World Water Day, 22 March 2011, an environmental education photo contest entitled as 'The Baltic Sea in Change' was launched for schools in Estonia, Latvia, and Finland. Participants were aged between 16–18, forming groups of between three and five.

Participants took a photo once a week for five weeks along Baltic Sea coast or near its watershed, resulting a five-photo-series. Captions were added to the photo series in order to describe the changes that had been witnessed, such as the coming of spring, a shift caused by economic activities, high water levels, and so on.

The best team from each country was invited to attend the nature photography workshop, 'Art and Environment', which took place on the island of Aegna, Estonia. The focus was on the Baltic Sea and its surrounding environment. Professional photographers shared tips for taking better nature photos. Different techniques were introduced, and photos were taken in daytime, at night, and during sunrise.

WHAT DID WE LEARN?

Twenty-two series were submitted for the contest. The winner was the Langinkoski School from Finland, which described the impact on the sea of the rapidly developing urban area. Liepaja Rainis High School (Latvia) followed the shore of Liepaja and its pier, observing the sea organisms that were carried by the waves from the sea and also the human-created waste in or near the sea. The group from Nõmme Youth Nature House (Estonia) compared two different waterbodies – a clean spring

„The coastline might change, the city and the buildings might "move closer", the forest might not be there and stream might dry out in some years time but none of that change the fact that spring comes every year."

STUDENTS FROM TALLINN ENGLISH COLLEGE, ESTONIA

Boat trip towards Aegna island.
PHOTO: ANNE KIVINUKK

and a stream from Männiku village – during the springtime flood. The audience's favourite was a team from Saue High School, 'Hans and Mikk', who followed waterfall at Keila-Joa during springtime. All photo series were published on a website and were available to the public for a year.

WHY THIS METHOD COULD BE RECOMMENDED?

Using photographs is one way of diversifying education and combining different subjects. Photography offers various opportunities for teaching natural sciences, where it is suggested that students bring examples, and the students are encouraged to form an interest in the subject. The teacher can use photos in creating teaching tools. Photos can be used to make up interesting teaching methods.

While using photography, the teacher may set the following objectives:

- Experiment with photography in order to diversify outdoor lessons and carry out research studies.
- Use the materials that have been gained – in the form of photos – to enhance knowledge on the topic.
- Deepen the observation skills of the students.
- Deepen the skills of the students when it comes to using technology in gathering and processing information.

Today students have the opportunity to use a variety of electronic and portable devices. The students of today are quite willing to use them and are certainly capable of using them. However, the main focus should be on the content of the photo itself, not on its technical quality.

Photos taken by Langinkoski High School team from Finland.

Using camera for nature studies
"THE BALTIC SEA IN CHANGE"

THE GOAL
is to attract public attention to the condition of the Baltic Sea, sea – related changes and the need to protect the maritime environment. To meet this goal, a series of 5 photos and an explanatory essay will be composed.

TOOLS NECESSARY
Camera, phone or iPad; computer with Google Maps application.

THE COURSE OF WORK
- Find a suitable place for observation and photography on the Baltic Sea, on the coast or in the watershed of the Baltic Sea.
- Take 1 photo of the chosen spot every week for 5 weeks. The photos have to depict changes or processes related to the Baltic Sea.
- Save the photos as Jpegs (jpg) file.
- Write a short text about the pictures. The text has to include the following information: The title of the picture series; The place where the photos were taken; A description of the changes/process that answers the following questions:
  - What was a change or process, which took place during the observation period?
  - How does the described change influence the Baltic Sea?
  - How does the Baltic Sea influence the observed place?
  - Does the described process entail any dangers or risks for the Baltic Sea? What are the dangers or risks?
  - In your opinion, what will the described spot look like after 20 years?

The text may include other relevant and interesting information about the chosen place. The possible topics may be coming spring, influence of human activities to the sea, high water, erosion etc.
The number of pages used to describe the Baltic Sea related changes is not important. It may be less than one page if it contains everything necessary.

SUBMISSION OF ENTRIES
- The selected spot should be marked on a map (using the interfaced Google Maps application).
- Each photo must include the date. If a picture has coordinates in its EXIF data (saved by the camera or phone), the program will import these automatically after the picture has been uploaded.
- Enter the name of the administrative unit (county, rural municipality) of the observation place.
- You can use Padlet: **https://padlet.com/dashboard** and share the photos with each other.

Photos taken by Salacgriva School team from Latvia.

Creating artworks under microscope

THIS EXAMPLE IS DESCRIBED BY
GEDY SIIMENSON, TARTU NATURE HOUSE, ESTONIA

Natural and exact science are more and more related with social sciences when teaching natural, exact and engineering science. Ecocriticism is the field of literature which studies the interconnections between the environment, literature and culture. Its purpose is to acknowledge environmental problems, give a central place to nature in critical thinking, valuing the environment and breaking down human-centred hierarchy. The methods of ecocriticism can also be used when handling the topic of the Baltic Sea.

THE PURPOSE OF THE WORK

is to offer students an opportunity to creatively express their natural scientific knowledge about the Baltic Sea and global environmental problems by using different means of natural and precision science and technology.

KATARIINA KURINA, GRADE 11 TH

Microplastic - a scourge companion
Not only our friends plants and animals are our companions in life but also microplastic. Keep the environment safe! Do not buy cosmetic products which contain microplastics!

AS THE RESULT OF THE WORK, THE STUDENTS

- Can recognise ecocritical texts which support the development of their critical thinking.
- Can use a microscope, a digital magnifier and simpler photo editing programs on a computer.
- Can express themselves creatively and prepare pieces for exhibition.
- The students are motivated for sharing messages with the public. The lesson offers opportunities for developing ICT competences.

WHY RECOMMEND THIS METHOD?

The method helps students to express themselves creatively and motivates students to share their viewpoints with the general public through the exhibition. This is the first step as an active citizen to stress the severity of environmental problems and the need to find solutions for them.

ECOCRITICISM AND MICROSCOPIC ART

TOOLS NECESSARY

- For the presentation and watching the video: computer, projector, screen and speakers.
- For executing the practical part: a microscope (40x magnification), a digital magnifier or microscope camera, a computer with Paint program, a printer and photopaper, Petri cups, tweezers, preparation needles, different textiles and pieces of plastic and plant parts for making the artwork, food colours, water and dropper (for painting).

BACKGROUND INFORMATION

The teacher can find information from sources:
http://bit.ly/2LOv4nq
http://bit.ly/2YBmYQW
Selection of videos can be demonstrated during a lesson:
http://bit.ly/30oAwRb
http://bit.ly/2Jo8EHH
Videos about Willard Wigan:
http://bit.ly/2JMDglB
http://bit.ly/2Hrh79K
http://bit.ly/30oAwRb

THE COURSE OF WORK

Lesson plan

- Introduction to the topic of the lesson.
- Explaining the notion of ecocriticism, examples.
- Writing ecocritical texts.
- Watching videos of microscopic art.
- Creating own artworks under microscope.
- Taking photos of the artworks, printing them, adding texts and framing the photos.
- Duration 60 minutes.

At the beginning of the lesson, a teacher makes a presentation of ecocriticism and brings examples related to the Baltic Sea. One of the environmental problems could be, for instance, the topic of microplastics of which the students prepare an ecocritical short description (5–10 sentences). After that, they watch a video of Willard Wigan, a British artist who makes microscopic art.
After that, the students are given means for creating their own piece of art to go with the ecocritical text. This can be compiled of pieces of microplastics, dead skin cells, dust, sand grains, etc. If desired, food colours can also be used for enhancing the appearance of the artwork. When the image has been set on the Petri cup with the help of tweezers and preparation needles, a digital magnifier or a microscope camera is used for making a photograph of it. The photo is saved to the computer or a screenshot is made of it, which can easily be edited in Paint, if necessary and saved as a JPG file. After that, the photos are printed out and displayed as an exhibition.

Online quiz about the Baltic Sea

GEDY SIIMENSON,
TARTU NATURE HOUSE, ESTONIA

A job shadow day together with the scientists from Tallinn University is about to start. Studying coastal areas on Saaremaa island, West Estonia.

As of 2013, Tartu Nature House organises an international online quiz to raise the awareness of the people about the environmental status of the Baltic Sea and the impact of human activities on the sea.

Each year, a quiz consisting of 10 questions is prepared, which takes about 60 minutes to resolve. The questions are prepared by the teachers of BSP schools, coordinators, programme managers and cooperation partners. The questions of all previous quizzes and the answers are available at BSP website http://bsp.teec.ee/veebiviktoriin/ .

The best performers of the online quiz receive keepsakes as prizes. The best solvers in Estonia get to become job shadows for natural scientists.

The purpose of the online quiz is to offer teachers an opportunity for a more versatile handling of the topic of the Baltic Sea. The students obtain knowledge about the biota of the Baltic Sea and the impact of human activities on the marine environment. They can develop their sense of investigation, critical thinking, ability to analyse and by using ITC skills to enhance their skills of searching data on the internet. Job shadow days give the students an opportunity to implement their knowledge in practice while doing field work.

Online quiz is held annually from 1 October to 30 November. The students can participate either together as a class or individually by answering the questions at home. The results are published in December.

JOB SHADOWING

As of 2017, the students who have achieved the maximum result are given an opportunity to be a job shadow at the specialists of the field. For instance, the job shadows accompanied a scientist of the Estonian University of Life Sciences Priit Bernotas to a scientific fishing trip and the coastal areas of Saaremaa were investigated together with a scientist of Tallinn University Are Kont. In this way the Tartu Nature House cooperated with several universities, who gave their consent to offer to the students scientific work experience.

Tartu Nature House and the host institutions agree on the job shadow days within April and prepare an agreement with three parties. The students participate in the job shadow days according to the established schedule from May to September.

The students who participated in job shadow days and the specialists who hosted the job shadows are asked to come to an acknowledgement event in September, where the students can briefly share their experiences.

THE PURPOSE OF THE ONLINE QUIZ IS TO OFFER:

- Obtain information on the internet about the environmental status of the Baltic Sea.
- Account for the peculiar features of the Baltic Sea.
- Make conclusions about the extent of human impact.
- Compare one's knowledge and skills with 1,200 other students from the Baltic Sea countries.
- Test their knowledge on the job shadow days and cooperate with Estonian specialists.

WHY RECOMMEND THIS METHOD?

The online quiz broadens the horizons of the participants, teaches to use field-specific English, introduces the different databases on the internet and creates a communication path between the students of different countries. Job shadow days give the students an opportunity to collect knowledge necessary for solving the online quiz and to design their career choices.

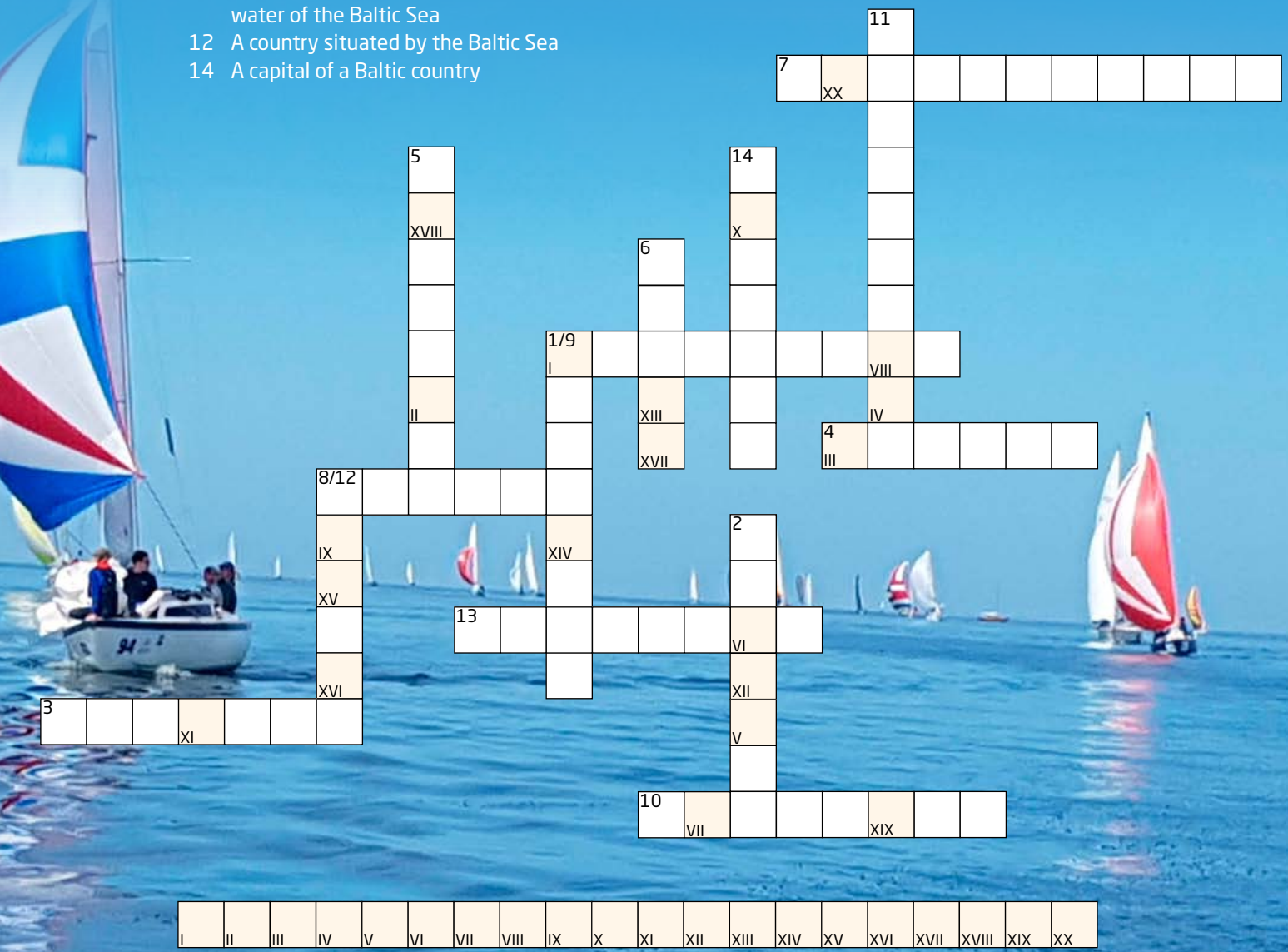
Crossword puzzle about the Baltic Sea

Horizontal:

3 The most important person in every boat
4 A Polish city on the Baltic coast
7 *Cygnus Cygnus*, national bird of Finland
8 *Salmo salar*, migratory fish, who goes to spawn in native freshwater streams
9 The biggest brackish sea in the World
10 Diverse collection of microscopically small plants and animals in water
13 A physical parameter which influences sea communities

Vertical:

1 A Danish island in the Baltic Sea
2 The northernmost gulf of the Baltic Sea
5 Animal, *Halichoerus grypus*, called as "hooked-nosed sea pig"
6 Landform at the mouth of a river
11 *Phragmites australis*, aquatic plant, tolerates brackish water of the Baltic Sea
12 A country situated by the Baltic Sea
14 A capital of a Baltic country



I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	XIX	XX

Upon the correct solution a sentence will appear.

You can do the same in your computer or smart phone:
http://bit.ly/2JY2Xjb

Moon jelly

Aurelia aurita, also known among other names as moon jellyfish, caught by photographer **Kaido Haagen**'s camera lens, is the only jellyfish species found in the Baltic Sea. The moon jelly needs a relatively clean environment to thrive. That being said, it is a joy to spot these creatures at the end of summer also in Estonian coastal waters where they end up carried by the west wind. Moon jelly embodies the symbolic value of a clean aquatic environment.