



# The Baltic Sea Project

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## „Evolution of Environment“

Conference in Vilnius

## The Solovetskie Islands

Expedition in Russia



Švietimo ir mokslo ministerija



# The Baltic Sea Project

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**Cover:** Students during the Summer camp in Lithuanian Young Naturalists' Centre.

Photo: Vytautas Eidėjus.

The BSP objectives are to:

- increase the awareness of the students of the environmental problems in the Baltic Sea area and give them an understanding of the scientific, social and cultural aspects of the interdependence between man and nature,
- develop the students' ability to conduct research on changes in the environment,
- encourage students to participate in developing a sustainable future.

The BSP works with the following means:

- building networks of schools, teachers and educational institutions in the Baltic drainage area,
- creating and developing educational approaches and joint programmes for environmental and international education,
- organising joint activities and events, publishing the BSP Newsletter and issuing other relevant information.

The basic characteristics of the BSP schools:

- active participation in looking for solutions to the environmental problems in the Baltic Sea area,
- networking,
- pilot function in promoting environmental education in the spirit of the Rio Declaration, Agenda 21 & Baltic 21 and Agenda 21 for the Baltic region.

The educational approach for the BSP is to:

- achieve balance between a holistic view and individual subject studies,
- change the role of the student from passive recipient to active constructor,
- change the role of the teacher from supervisor to guide in a learning process,
- use networks to provide participants with opportunities to learn and pass along new ideas,
- use international co-operation as an inherent element of school work.

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# Dear Readers,

You are reading the second issue of our magazine.

Half a year has passed and many things have happened since the first issue of the magazine; however, one of the most important events is the international Baltic Sea Project Conference "Evolution of Environment". This conference attracted many participants from all of the Baltic countries and Japan; Projects that have been implemented for several years were presented.

I must say a sincere *thank you* to all my helpers—teachers and schoolchildren from Žemyna Gymnasium of Vilnius and colleagues from the Lithuanian Young Naturalists' Centre who assisted me throughout the event.

I am particularly grateful to professional teacher Gražina Drebigienė from the Žemyna Gymnasium of Vilnius, director of the Gymnasium Rūta Krasauskienė and director of the Lithuanian Young Naturalists' Centre Ona Sigutė Versockienė, who contributed greatly to the success of this conference.

More about the conference on page 5.

Faraway exotic countries have always attracted people; therefore, in this issue you will find an article on an expedition to the Solovetskie Islands in the White Sea near the North Pole in the Russian Territory. The photos which were taken by participants of the expedition were a real surprise. Nature can be so bewitching!

More about the expedition on page 15.

Other events and trips are of no less interest so do not forget to read about them too.

In a new section "Experience", teachers share their experiences. In these articles you will find many things of interest. In the section "Who we are?" two schools from the towns of Gdynia (Poland) and Lapės (Lithuania) introduce themselves.

The articles from the section "For Consideration" call for consideration and discussion.

The letter from the coordinator of the programme "Bird Ecology" Andrzej Sliwinski did not go down well when he stated that protocols about winter birds were only received from Polish schools.

The coordinator's protocol is on page 24.

I would like to remind readers that the new coordinators Vytautas Eidėjus (Phenological Studies Programme) and Peter Uhl Pedersen (Coast Watch Programme) are also waiting for your protocols. We are particularly interested in your opinions about the renewed protocol of the Phenological Studies Programme. A new *Work Box* will help you fill in this protocol. It is presented on [www.bspinfo.lt](http://www.bspinfo.lt). Birdsongs are also available here.



Photo: Ingrida Ažusienytė

Dear participants of the Baltic Sea Project and readers of this magazine, I kindly invite you to take an active role in all our programmes!

Currently, part VII of the book "Learner's Guide" is being prepared. Teachers and schoolchildren can also write articles for this book.

More about requirements — on the back cover of the magazine or by e-mail through Per Werge [per.werge@nykat-gym.dk](mailto:per.werge@nykat-gym.dk)

Do not forget to visit the official website of the project [www.bspinfo](http://www.bspinfo), where you will find information about future or recent events and other important references. We look forward to your comments and suggestions!

Thank you for choosing this magazine. I trust that this issue of the magazine will be interesting and useful as we are always working for you! Your suggestions are always welcome at [ruta.jociute@b-s-p.org](mailto:ruta.jociute@b-s-p.org) or Džiaugsmo St. 44, LT-11302 Vilnius, Lithuania.

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Photos: Kristina Arvasevičienė, Rūta Jociūtė-Žolynienė, Romualda Fedosejevaitė, Naohiro Ii

# Evolution of *Environment*

## THE BALTIC SEA PROJECT CONFERENCE

Between the 9th and 12th of April, in Vilnius Žemyna Gymnasium and the Lithuanian Young Naturalists' Centre, an international Baltic Sea Project Conference "Evolution of Environment" was held.

The conference was attended by 120 schoolchildren and teachers from Sweden, Denmark, Germany, Russia, Poland, Latvia, Estonia, Lithuania and Japan.

During the conference, 27 reports on investigations and observations carried out by the schoolchildren were presented. Most of the reports were on investigations carried out within the framework of the following Baltic Sea

Project programmes: "Phenological Studies", "Air Quality", "Water Quality", "Bird Ecology" and "Environment History".

Summaries of the reports are available on other pages. Unfortunately, due to limited space, not all of the reports have been published. We offer our sincere apologies to the authors.

During the conference, seven activities were organized, namely, environmental economics, art, dance, technologies, theatre, sand art and observation of the first signs of spring.

# WORKSHOPS



## Looking for Spring

Nature never sits still. From season to season, the weather changes, as the hours of daylight and darkness do. Animals and plants have adapted to fit in with this annual pattern of events, and their life cycles are finely tuned in to the changing conditions. Everything has its season. Wildlife takes its cue from the environment. For example, the warm weather of spring triggers many animals and plants to burst into action. Trees burst out in bud, and young animals appear. The first skylark of the year is not heard on exactly the same day every year. The study of nature's calendar is called phenology.

The word *phenology* comes from the Greek words "*phaino*" (to show or appear) and "*logos*" (to study). It is one of the oldest branches of environmental science, dating back thousands of years. Observations of phenological events have provided indications of the progress of the natural calendar — when seasons begin and change — since pre-agricultural times. The best information comes from Robert Marsham, who began recording his "Indications of Spring" back in 1736 on his family estate near Norwich, Norfolk. He continued to note down significant dates for the next 62 years, recording some 27 natural events for more than 20 animals and plants.

Between the 9th and 12th of April, during the international Baltic Sea Project Conference "Evolution of Environment", which was held in the Lithuanian Young Naturalists' Centre based in Vilnius, both schoolchildren and teachers participated in the workshop "Clock of Nature". The group consisted of 24 schoolchildren and four teachers from Lithuania, Latvia, Sweden, Finland, Poland, Russia and Japan. After a sportive introduction around the simulated Baltic Sea, participants listened to a report on phenology and the observations of nature in spring. This was only the beginning. After the lecture, the group went on an extreme 2.5 hour trip to search for the first signs of spring. I cannot tell how many kilometres we covered but every one of



us had corns on our feet "as is a gift for our efforts ☺". We crossed hills covered with forests, went down steep sandy scarps, crossed a river using hanging "monkey" bridges, passed a waterfall, and climbed some steep mounds. You never know where spring is hiding.

And spring is indeed already here. The first sign is litter strewn all over the place. Participants on the trip recorded about twelve phenological signs. We heard a lark, a thrush, a starling and a finch. Parks and forests were full of violets, windflowers and coltsfoots; bumble bees were humming in sallow blossoms and thousands of frogs were seen jumping on the road. Ants on the march and pink nut-tree pussies also bore witness to spring. Unfortunately, it was a cloudy day and there were no butterflies in sight.

The schoolchildren and their teachers returned from the trip tired out but in good spirits; and more importantly—they had found the first signs of spring!

I invite everybody to spend leisure time outdoors, watch the phenological phenomena, and be active in the Baltic Sea Project Programme "Phenological Studies". Do not forget that we will soon be looking for the first signs of autumn (the autumn observation table will be available on the website [www.bspinfo.lt](http://www.bspinfo.lt)).

### *Vytautas Eidejus*

Phenological Studies programme coordinator  
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## Ecological Economics and Sustainable Fishing

BSP students participating in the conference in Vilnius learned and discussed one afternoon about theories of ecological economics and sustainable development. The students also applied their new theoretical insights to an actual case: fishing for cod in the Baltic Sea. The two seminar leaders from Nacka Gymnasium in Sweden, Carina Bladh and Rolf Erikson, teachers of economics and biology respectively, have complementary bases of knowledge and a common interest in this new academic field that integrates fundamentals of ecological, social and economic sciences. They wish it could be a more frequent theme in education, at least in upper secondary schools, and the enthusiasm and sharpness of the seminar participants in Vilnius proved that it should be.

The seminar addressed questions and issues of importance when defining sustainable development, and the students were guided into the thoughts and ideas of ecological economics, a fairly new scientific discipline that aims to integrate environmental and social considerations into economic calculations and decisions. For example, gross national product (GNP), the most widely used measure of growth and welfare, does not take into account costs of environmental and social degradation when summing up the economic values of goods and services produced within a country. It should be replaced by new welfare indexes like the Human Development Index (HDI) or the Index of Sustainable Economic Welfare (ISEW), which also include other important factors for the well being of human and which give a much truer picture of the state of development and justice in the world. The over-exploitation of our world's resources was illustrated by the "ecological footprint", showing how much of the productive surface of the globe is used up by different countries and their populations. Not surprisingly, there is a need for more than one globe if everyone lives their lives as we do in the Western world, whilst the ecological footprint of poor people in poor countries is very little. The "tragedy of the commons", when resources like air, water, fish, etc, which are owned by everyone but over-exploited by a greedy few, was also discussed.

After a rather long session of theories and discussions about how to form global sustainable development and

after a refreshing break, the students were invited to play roles as Baltic Sea fishermen. Ships from the nine riparian states went out to fish for cod in a game specially constructed in order to demonstrate the effects of the tragedy of the common. Consequently, after a few "years" of unregulated fishing and despite the natural reproduction of fish, there was no cod left in the imaginary Baltic Sea. When the game restarted, the fishermen were advised to discuss and make agreements. Then the fish stock lasted longer, and the participants could envision the possibility that the reproduction and population growth of cod in the Baltic Sea could be managed in favour of big and sustainable catches, although egoistic interests of catching more



than others always lurked under the surface and threatened to deplete the stock once more. The game session was concluded by listening to the remarks and analyses of the observers who had taken notes of everything that happened in and around the imaginary Baltic Sea.

The last part of the seminar described the actual situation of cod and fishing in the Baltic Sea. Graphs on biomass, catches, economic balance, etc. all show a dramatic decrease, and there is no doubt that cod and cod fishing will soon become history in the Baltic Sea. The reason for this situation was analysed with the help of economic models, showing how competition and short-term profits govern the fishing policy and how EU subsidies and illegal fishing make the situation even worse. The presentation also focused on cod as a predator and its effect on other organisms and the food chain in the Baltic Sea. It was shown how the total ecosystem will change completely and irreversibly because of the overfishing of cod. In a sustainable perspective, this is disastrous for the cod and for the ecosystem, but it is also unacceptable for the society in which fishing is an important economic activity and for the consumers who will miss a first class food product, which, if well managed, could be a cheap and common "everyday" meal. The session ended with the formation of small groups in which the students discussed what could be done to stop the overfishing of cod in the Baltic Sea.

*Carina Bladh*

*Rolf Erikson*

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# SUMMARIES



Stock photos: Image DJ, PhotoDisc

## The Index of Nemunas Water Quality

*Authors: Mantė Agnė Jurkevičiūtė, Aušra Počkevičiūtė*

*Teacher: Virginija Kerevičienė*

Alytus Dainavos Secondary School, Lithuania

Water is one of the most important chemical compounds in the world. The ecological situation is getting worse and worse and it makes us think about the survival of humanity. Our aim is to investigate the quality of Nemunas water (the biggest river in Lithuania). Whilst carrying out chemical researches we have experimentally measured water quality according to the indexes:

- pH
- Nitrate
- Nitrite
- Total Alkalinity
- Total Hardness
- Free Chlorine
- Total Chlorine
- Iron
- Copper
- Dissolved oxygen

It is true to say that when people are involved in water's cycle they not only force it to work for man's benefit, but they also start to pollute it. Since the 20th century water pollution has become a major problem in a global context, and one of the biggest for our civilization. It has been suggested that it is the leading worldwide cause of death and disease, accounting for the deaths of more than 14,000 people a day. In Lithuania most of the water is not cleaned thoroughly enough. When this partly clean water accesses open mines, it can pollute underground water. Groundwater pollution is much more difficult to abate than surface pollution because groundwater can move great distances through unseen aquifers. Pollutants in water include a wide spectrum of chemicals, pathogens, and physical chemistry or sensory changes. Many of the chemical substances are toxic. Pathogens can produce waterborne diseases in either human or animal hosts.

Specimens were taken from different parts of the River Nemunas so we could compare the results and estimate the influence of man's activities on water quality. We used two scholastic water analysis laboratories, namely,

"WaterWorks" and "Visicolor". We recorded comprehensive results of our analysis and findings. We also recorded citizens' and school students' opinions about river pollution and recreation in its vicinity. Furthermore, the work was supplemented by a photographic cycle "Water through the prism of 24 hours" and historical facts. The researches were carried out between 2007 and 2008.



## BSP Air Quality Programme in Tartu Nature School

*Authors: Kirsi Kriit, Janne-Mai Liias*

*Teacher: Sirje Janikson*

Tartu Nature School, Estonia

The students of Tartu Nature School have participated in the BSP Air Quality Programme for four years. We carried out observations in three different parks in Tartu (Toome, Raadi and Emajõe).

First we estimated the needle loss of fir trees (*Picea abies*). In Toome Park we found more damaged trees (II class) and in Raadi Park we found both damaged and healthy trees, but none of the trees were badly damaged. Secondly, we observed the age of needles on a branch. In Toome Park the average generation of needles was five years, in Raadi Park 7–8 years.

We also examined the occurrence of lichens on five trees. In Toome Park the average coverage of lichens was 59%, but most of it was crustose lichens, and to a lesser degree fructifolose lichens. In Raadi Park the average was 42% but there were more foliose lichens than fructifolose lichens. In Emajõe Park the average was 22% and we found two different species of crustose and foliose lichens. There were no fructifolose lichens.

We noticed tar spot fungus only on the maples in Raadi Park. Tar spot fungus is a fungal disease. The fungus grows only where the air is clean, but it is still a disease for the maple tree because it is a parasite that lives on the maple leaf. It does not cause much damage as the fungus covers only a small part of the leaf.

Toome Park is located in the centre of the city on a hill. According to the fir tree watch, the air in the park is slightly polluted but still relatively clean judging by the lichens.



In Emajōe Park the air is polluted, which isn't unusual, because the park is next to a busy street. In Emajōe Park there were no fir trees, so we studied Colorado Spruce (*Picea pungens*) instead. The results cannot be compared to those of the fir trees because the Colorado Spruce is more resistant than the fir tree.

In Raadi Park we found a lot of different species of lichens; there were also some fructifera lichens which shows the air is clean. This result is also confirmed by the fir tree watch and the growth of tar spot fungus.

Based on our observations we can say that the air in Raadi Park is the cleanest, which is presumably because it is in the suburbs.



## The Attitude which We should take when looking at Asia from various Viewpoints

*Authors: Akane Aoki, Eri Adachi, Tmotaka Isono, Ryobei Itsuaki, Nana Kifushi, Yukiko Kishimoto, Anna Kunimatsu, Yuka Nishizaki, Satomi Minagarwa*  
*Teachers: Naohiro Ii, Masako Nakamura*  
 Ikeda Senior High School attached to Osaka Kyoiku University, Japan

Currently, we are working on ESD (Education for Sustainable Development) in our integrated studies classes in school. The first year group of senior high school will have this lesson for one hour a week, and the second year group will have it for two hours. Though not every school works on ESD, all of the students in our school work on this topic, as it is one of the ASP schools. The themes of the study are environment, human rights, poverty, peace, multiculturalism, biodiversity, endangered species, health, women's equality, and agricultural development.

Having studied all these topics, we would like to make a presentation about our thoughts on **environmental issues** in Asia from various viewpoints. There was a famous speech by Severn Suzuki at the Earth Summit in Rio in 1992, about the environment, poverty, the divide of economic power and other issues. After taking a closer look at her speech, we realized that there are several points that relate to issues happening in Japan and other Asian countries today. Therefore, we wanted to explain these, using specific examples and showing a diagram of the vicious circle which we compiled. We then came up with a solution on how to break this vicious circle, and we also compiled a report from Asia's point of view bearing the problems of Japan, our homeland, in mind. Finally, we reached the con-



clusion that what we really need to do is reduce the divide between the socially vulnerable and socially invulnerable.

### View points

- Different opinions between developed countries and developing countries.
- Destruction for survival.
- Conflicts in emerging from poverty.
- Poverty caused through robbing necessity for living.
- Environmental destruction for countries' own personal gain.
- Grabbing resources from others.
- Conflicts caused by environmental destruction.
- Scramble for limited resources causing conflict.
- Sharing happiness
- Searching for happiness for the Earth
- Individuals' search for profit



## Biological Diversity in the Natural Environment

*Authors: Gatis Brikmanis, Didzis Dobelis*  
*Teacher: Lilita Skulte*  
 Aizpute Secondary School, Latvia

**Aim of the project:** to make a training film about biodiversity and the possibility of preserving nature in its natural environment near Dzintere's castle mound.

### Tasks of the project:

- to find information about biodiversity in river areas, and aspects which help ensure this;
- to survey the territory;
- to establish the species of fish, plants, birds and trees;
- to consult with ornithologists and fishermen; to make an informative film and educational material.

The Tebra is 69 km long and together with the River Durbe it builds up to become the River Saka, which flows into the Baltic Sea. 14 km from Aizpute we found a semi-natural environment and wide range of biodiversity by the river Tebra. If our attitude towards nature and its management does not change, the biodiversity of the environment will be reduced.



The territory „Dzintere” is located some distance up to sea from Apriķi self-government and there the valley of Tebra reaches its maximum level — in some places more than 15 metres. There are escarpments on both riversides. The Dzinteres castle mound is located on the Tebra riverside in this area. The fight between the cours and cursanders in 1262, when the castle was burnt down, is mentioned in the chronicles.

We studied information about the biodiversity of trees, birds, plants and water-plants in river areas; and aspects which help ensure this. By the time we came to conduct the survey we had already established species of trees, birds, plants and fish. The type of forest was also defined — European board-leaved forest. Fishermen and ornithologists helped us to establish species of fish and birds. We filmed the river and its surroundings before we carried out our research on the area and completed the film and educational material.

There was one very important species of bird noted by the fishermen — the kingfisher. It is an indicator of biological diversity in nature. The territory “Dzintere” and the castle mound remain unspoilt, because people have left it in its natural state, and this is the most important factor for natural resources. The film and educational material we have compiled puts emphasis on the importance of keeping the natural environment the way it is. We also show how to solve problems which are caused by inappropriate agricultural actions.

#### Our target audience is:

- agriculturists who have farmland near the River Tebra;
- competent institutions (self governments);
- students — because we can make them show an interest in how important it is to save our natural environment.



## Development and Environment of the Bledow Desert

*Authors: Michał Prażanowski, Kamil Tkacz*

*Teacher: dr. Jolanta Mol*

II LO im. Marii Konopnickiej w Katowicach, Poland

The Błęarów Desert is regarded as a great natural peculiarity not only in Poland. It is situated in the eastern part of the Silesian Upland. The origin of this landscape however is not natural. It is connected to human industrial activities dating back to early medieval times when a strong centre of mining and metallurgy was created. To begin with let us just clarify: “the Błęarów Desert” is only a geographic name, introduced into literature in the mid-19th century to define this unique area situated between Błęarów, Chechło and Klucze. Recent and especially present development of the landscape of the Błęarów Desert has created a large sandy area with active aeolian processes. Here a battle between sandstorms and plants is being observed — unfortunately the landscape is quickly heading for extinction. The Błęarów Desert as such is a man-made form and it is disappearing due to man. Therefore, it is man’s responsibility to rescue this barren landscape, as only he has the resources to do so. It is worth saving!





## Mine Waste heaps Reclamation as a Process of alternative Use of Waste Banks

*Authors: Wojtek Egan, Paweł Bryll*

*Teacher: mgr. Marzena Jerczyńska*

III LO im. Mikołaja Kopernika w Wałbrzychu, Poland

The problem of post-mining reclamation is close to me because of my origin. Wałbrzych is my hometown. It is a town which used to be vibrant with life and was one of the main coalfields of Poland. Today its landscape is dominated by the remains of pit-shafts and lots of mine waste dumps. The dumps are quite a serious problem in our region. Mine waste heaps, among other factors, cause soil erosion as well as water and air pollution. Reclamation of the heaps seems to be one possible solution to reduce or even eliminate their harmful influence. The process of reclamation enables us to introduce flora as well as fauna and therefore restore the landscape of the area. Together with secondary succession, which is a natural process, post-mining reclamation leads to restoration of the areas damaged by coal extraction. While in Wałbrzych there is the problem of mine heaps which are no longer used, in other regions of Poland, where coal extraction is still taking place, the number and size of heaps is constantly growing. I will show in my work that there is also a possibility to reclaim the heaps in use, and the results are even better in comparison with the closed heaps. Reclamation of the heaps not only restores the landscape but also improves air quality, and therefore has some positive impact as far as global warming and acid rain are concerned. After reclamation, a lot of mine waste dumps have become local attractions, sport centres or other unique places that catch people's attention.

Bearing all this in mind, I think the process of mine waste heap reclamation is worth a closer look, hence the presentation.



Photo: imeleon.com

## Oaks are the Witnesses of Family History

*Author: Gintarė Petraitytė*

*Teacher: Birutė Jasinskienė*

Mastaičiai Basic School, Kaunas Region, Lithuania

Lithuanian people have a very old and nice tradition. They plant oaks in order to mark the most important event in a family, or even the whole nation.

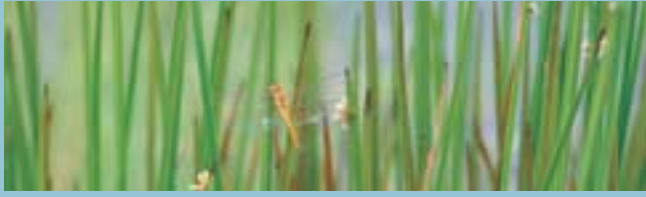
At my grandparents' farm, in Smailiai village in the Kaunas district, two very old oaks grow. They are over one hundred years old. I've often wondered when, and on what occasion they were planted.



Having asked my mother and my grandfather, and studied old photographs and documents, I found out that these oaks were planted by my grandfather's grandfather. They were planted in 1922 when the new village was established. The name of the village was taken from my grandparents' surname.

The giant oaks suffered severely in 1999 when the farm was destroyed by fire. Since then, they have started to dry out, and they may disappear one day. Thus, in order to continue the family tradition, my mother and I have planted two young oaks next to the old ones.

Every five years our extended family visits my grandparents' farm. They come from all over the world, they share memories of their youth and childhood, and they are happy to learn the family history.



## The specific Variety of Plants and Evaluation of Air Pollution using Bio-Indicators in Žvērinčius Forest in the Nemunas Loops Regional Park

**Author:** Marija Kardokaitė

**Teacher:** Rasa Kučinskienė

Prienai „Žiburyš“ gymnasium

The objective of this work is to examine a variety of plants and measure air pollution according to the extent of conifer tree defoliation and species of lichen.

The Žvērinčius Forest is situated in the Prienai District to the North West of Birštonas, on the right hand side of the Nemunas River. The forest is unique in several aspects:

**Geographic location** — one of the most unique spots in Lithuania, situated in the Nemunas Loops Regional Park.

**Historical past** — mentioned in sourcebooks in 1518 when Žygimantas the Old delegated his Birštonas estate administration to a forester and set the amount of beasts to be hunted. Žvērinčius (“beast place”) derives its name from territories designated for the Lithuanian Dukes hunting grounds.

**Botanical aspect** — characterized by a variety of species: 75 types of plant are inventoried, and four types of pine tree, considering the cortex, are set; the rarest one — shingle pine or *f. annulata* - and the most common (60%) — ridged pine — are among them. The investigation is carried out in four archetypal sectors — pine wood, forest outskirts, sparsely populated forest and swamp. The formation of vegetation in habitats is set. The wealth of species and rated accrete is estimated. Due to prevailing species (*Pinus silvestris*, *Picea abies*, *Juniperus communis*) the forest is attributed to Vaccinio-Piceetea (Braun-Blanquet).

**Ecological aspect** — this is important in establishing the conifers response to the changing surroundings. The work examines the type and level of conifer defoliation. Three types of foliose and fruticose lichen (*Hypogymnia physodes*, *Pseudevernia furfuracea*, *Cladonia chlorophaea*) predominate. The forest belongs to the 3rd – 4th zone of air pollution.

**Recreational aspect** — attracts plenty of tourists with its fitted cycling routes, rest zones, and sculptures; a natural monument — Žvērinčius Oak — which is said to have witnessed the times of Grand Lithuanian Duke Vytautas, is located here.



## “Little Rivers” in the Leningrad Region – the River Tihvinka

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**Teachers:** Irina Trofimova, Tatiana Sigacheva

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The purpose of the present work is to form community awareness and the responsible attitude of pupils towards the environment, based on knowledge of the problems of the Tihvinka River (a world heritage site).

Russia is rich in water resources. The dense river system with its waterways of 5–9 kilometres long comprises 76% of the total amount of rivers (known as “little rivers”), and includes the Tihvinka River. Every year surface waters are increasingly polluted by industrial, domestic and agricultural waste, which makes river waters ecologically unfavourable and unserviceable, even for irrigation and industrial use.

The protection of water sources from pollution, and their preservation and efficient usage determine the conditions in which we will live in the future.

That is why we decided to undertake research and estimate the ecological condition of the Tihvinka River, and how it relates to “little rivers” in the Leningrad region.



## Is the increased Mortality of Sea Birds a Result of the Overfishing of Cod in the Baltic Sea?

**Authors:** Irina Galiulina, Josefine Malmkvist

**Teachers:** Carina Bladh, Rolf Erikson

Nacka Gymnasium, Sweden

We, Irina Galiulina and Josefine Malmkvist, are first year students in the upper secondary school program of natural sciences at the Nacka Gymnasium in Sweden. We have studied the cascading bottom up and top down effect in the trophic web of pelagic waters in the Baltic Sea, in which phytoplankton constitutes the lowest and primary level; and cod, which is parallel to sea birds and seals, is the top predator, feeding on sprat, herring and other small

fish. These small fish have increased in number during the last few decades and as they feed on, and compete for zooplankton, their food source has accordingly decreased in abundance and biomass during the same period. This fact, alongside nutrient enrichment and eutrophication, is a possible explanation for the frequent algal blooms in the Baltic Sea. The phytoplankton is no longer efficiently grazed. The same discussion may be valid for the increase in small fish. There are not enough predators to eat them, mainly due to over fishing and the low reproduction of cod. They will continue to multiply, and with a limited food supply, this will result in high numbers of individual fish that are starved, small and lean, and low in nutritional value.

Parallel to the reports on over fishing of cod, high numbers of sprat and herring, and frequent algal blooms, there have been more reports on the increased mortality of sea birds of late. For example, the survival rate of young Common Guillemots nesting on the cliffs of islands in the middle of the Baltic Sea appears to be lower. The parents feed their chicks by diving for small fish to bring home to the nest. Despite previous efforts, the fish nowadays are less nutritious; this might be a major factor affecting the mortality of young Common Guillemots, and therefore could be a direct result of the over fishing of cod. Our bird ecology study will examine this possibility.



## Porpoises

*Authors: Almut Lütge, Mechthild Lütge, Nina Graßnick*

*Teacher: Hans-Joachim Hartje*

Robert-Bosch-Comprehensive School, Germany

Porpoises are divided into six different species: Finless Porpoise, Common Porpoise, Vaquita, Spectacled Porpoise, Burmeister's Porpoise, Dall's Porpoise. The Common Porpoise (*Phocoena phocoena*) also known as harbour porpoise is one of the most popular cetaceans found in European coastal waters. It belongs to the family of toothed cetaceans and is a dolphin-like aquatic mammal. Porpoises are distinguished externally from dolphins by their chubbier shape, they are usually smaller in size — maximum length about two metres — and they have a blunt, rather than beaklike, snout. They also have different markings; they usually have a black back and white belly, but occasionally they are totally black. Male and female porpoises can be distinguished by their reproductive organs, and their overall length. The calves become sexually mature after about four years, and the female gestation period is 11 months. Porpoises come close to the coast in early summer to give birth. They usually live in groups of between two and five, and feed mostly on small fish, par-



ticularly herring, capelin, and sprat. Generally they stay close to the shore, where they root about with their snouts like hogs, and they are often seen rolling and tumbling in the water as they rise to the surface to breathe with a puffing sound. Porpoises inhabit cool and cold water in the Northern Hemisphere, such as the North Atlantic, the Pacific, the Arctic and the Black Sea. Sometimes they are also found in rivers, like the Elbe or the Thames. The majority of porpoises live in the North-west Atlantic; there are about 15,000 in the eastern coastal waters of Greenland, but in other areas there aren't as many. This number is continuously on the decline, therefore porpoises are classified as endangered in the 2000 Red List and are also protected by other international agreements. It is illegal to hunt porpoises, but some people ignore these regulations. The reasons for the threat to porpoises are human disturbance, habitat loss, prey loss, prey depletion, pollution and entanglement in nets. When they get entangled in fishing nets, they drown due to lack of air. Industrial fishing also makes it difficult for them to find prey. Pollution, for example, caused by chlorinated hydrocarbons, decreases their fertility; furthermore heavy metals cause damage to their internal organs. Human disturbance, like for example water sports, frightens the porpoises and disturbs them while they are bearing and rearing their young; and the sonar devices on ships damages their hearing. In addition to this they can sustain injuries from ships' propellers and die as a result of infection.

The public is only now beginning to become aware of the threat to porpoises, but in order to protect them it is necessary to learn more about them, their lifestyle and habitat. So it is the primary aim of the Robert-Bosch-Comprehensive School to investigate the living conditions of the remaining porpoises in the Baltic Sea, as a part of the UNESCO-Baltic-Sea-Project. Therefore groups of students are observing and recording porpoises and their habits around the Danish island of Arö.





## Air Pollution from Sulphur Oxides in Vilnius

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*Teacher: Gražina Drebickienė*  
 Vilnius Žemyna Gymnasium, Lithuania

Work purpose — examine and compare how air pollution from sulphur dioxide is changing in the Vilnius Old Town, and Justiniškės, Pašilaičiai, Fabijoniškės, and Šeškinė districts.

The research on air pollution was carried out every October between 2003 and 2007.



**Conclusion:** the most polluted areas in 2007, as in 2006, were The Vilnius Old Town and Šeškinė district; the least polluted districts in Vilnius in 2007 were Justiniškės and Fabijoniškės; air pollution from sulphur oxides was higher in 2007 compared to earlier research results; pollution is on the increase due to the higher volume of traffic in Vilnius, and new supermarkets being built. Also, Vilnius is preparing to become European Capital of Culture in 2009, and therefore a lot of restoration and construction work is taking place in the city.



## The Change in Vegetation Types [Vicissitude] in Vilnius

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In June 2007 the government adopted a new “sprouting” law. The law was an important step forward, as it was recognised that care of the cities` vegetation was deteriorating, and not enough attention was being paid to the plants inventory and database.

The purpose of the work is to examine protected territo-

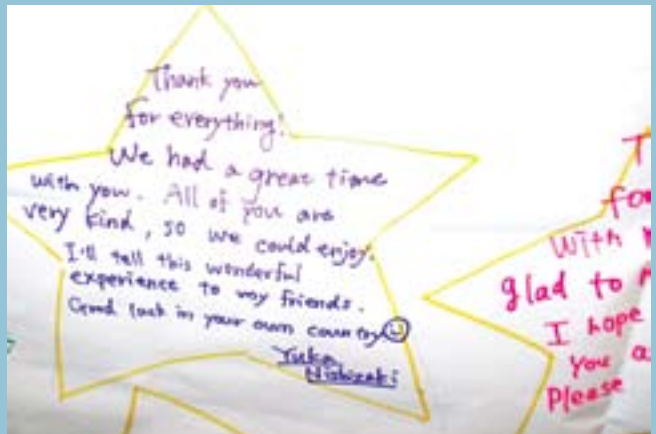


ries in Vilnius, and check on their security and vegetation changes. Studies also need to be carried out on how the variety of plants has changed where planting has taken place in newly built streets and squares.

The research has shown that there are 13 protected areas in Vilnius. They occupy 7,700 hectares. These areas are particularly sensitive to the process of urbanization, therefore recreation and other activities are controlled. A map has been prepared with all the protected territories highlighted.

Our examination showed that changes in vegetation have been influenced by:

- Urbanization
- Air pollution, exhaust fumes
- Plant diseases and acclimatization
- Different citizens` opinions.





Photos: Stanislav Babitch

# The Solovetskie Islands

*These islands are located in the White Sea, near the Arctic Circle.*

Their general area is 347 square kilometers. Among a great number of small islands, there are six major islands: three larger islands: Big Solovetskii (9246.9 km<sup>2</sup>), Anzer (24 km<sup>2</sup>), and Big Muksalma (17.6 km<sup>2</sup>) and three smaller islands: Small Muksalma and Big and Small Zayatskie. Along the major islands there are chains and groups of small islands covered by forests and bushes and also small stony islands called *lud* and heaps of stones called *korg* jutting out of the water.

In 1998 the historical and architectural complex of these islands was nominated for the UNESCO World Heritage List of cultural monuments.

It is really one of the most unique historical, architectural and religious complexes in Russia.

One of the most esteemed Orthodox monasteries in Russia is located on the main island. There are also about 20 churches and other monastic objects and places of pilgrimage, including a church constructed with the help of Peter I on the islands. In the 19th century, one of these churches was equipped as a beacon and has been and is a unique historical and technical object that still operates. Monks also constructed a lot of objects that have technical and historical value: dams, systems of channels connecting lakes, water supply systems, an artificial pool with sea water for breeding fish, and unique labyrinths constructed in the 16–18 centuries.

The purpose of these mysterious labyrinths remains unknown. They labyrinths have been dated at different periods, including the 3rd century of our era.

In the following year, UNESCO monitoring will be held on the islands. A group of students and teachers has decided to prepare material to change the nomination of this object; it can be nominated as a historical and natural object.

The islands really represent a unique natural and landscape complex.

On the limited territory, plenty of types of landscapes are combined: tundra (the most southern border of distribution of its biome), a coniferous taiga, mixed woods, meadows, various types of coasts, bogs (riding, local and aapa), and lakes

The ornithological fauna of the islands is also very interesting and includes loons, eiders, ravens, various kinds of sea gulls, grey cranes (on the Russian list of endangered species), sea eagles (also on the Russian endangered species list), and fish hawks.

Unique flora include six kinds of orchids, oaks (an oak of a very interesting form — clustering oak), dancing birches, and sundews.

## Beluga Cape

When talking about the details of an expedition, we may say that the most fascinating and hard was our journey to Beluga Cape. What kind of animals are white whales or belugas in nature, what do they look like, and is it true that



they're really white? Those were the most important questions for us.

While making our way to Beluga Cape, we saw ravens and were quite surprised and then thought that Solovki could be considered the raven's most northern habitat. We also saw polar loon. During the pursuits of the road to the cape we discovered lots of berry fields (crowberries *Empetrum* and great bilberry *Vaccinium uliginosum* L.), mushrooms, and, what was a kind of relief and reward, we found a sea eagle aerie.

That aerie was also a sign that we are on the right road to the cape, and some time later we found the log path which was supposed to lead to the cape. Walking on the log path was more like a journey to the past: sometimes it seemed that we were in the jungle or that we were characters in Ray Bradbury's *A Sound of Thunder*. Since the log path itself was built on marshland, it was a bit scary and dangerous to cross it. Altogether, there were different types of landscapes: upper swamps, lower and transitional ones, water meadows, and real taiga. During our way through the forest we found such plants as orchids (five types) and a dwarfish birch and mushrooms. A small lizard was also found.



We reached the cape and perched in the observation cabin. It was a bit stormy that day but that was not an obstacle, and we finally managed to view white whales with calves and their breeding games and realized that they really are white as snow. Finally the goal of the whole expedition was achieved. Later we were also told that this cape is the only place in the world where the observation for belugas can be done from the shore.

### The Botanical Garden

For about two weeks, precisely 12 days, we have been living in a Solovki's Botanical Garden.

It is not a place known as much as its monastery, but it is still quite famous to specialists because it is one of the most northern botanical gardens in the world, situated only 160 kilometers from the Arctic Circle.



It is really a unique place! Just imagine; the introduction of more than 100 varieties of plants was carried out there. Workers at the garden add all new and new species annually. For example in 2005, 47 kinds and grades of trees and bushes and 55 kinds and grades of grassy plants were planted; and it is all done in semi-polar conditions, where the mid-summer temperature reaches only +11.3°C!

two times a day. On a drained strip there are many brown seaweed, but most of them are in the bottom part of littoral zone and close to the line of small water.

Here seaweed forms a continuous belt basically of three kinds of a fucus. And there are enough *gammarus dubeni*, invertebrate sea animals. On the silted littoral zone, it is possible to see small sandy knolls. These are the traces of



There are a lot of other interesting places to have a look at.

And one of the most important is the aapa bog, also situated near the garden. Here a big colony of sundews (*Drosera*) lives. Believe me; it will make indelible impression on you and your companions. Keeping a watch on sundews hunting after poor insects draws you in so much that you can spend all the day observing it.

**Littoral Zone** — the site of coast which is flooded during inflow and is drained during outflow. Settles down between water levels in the highest inflow and the lowest outflow. Flooding and drainage of the littoral zone occurs

the activity of a large *polychaete*, the lobworm (*Arenicola marina*). In silty sand live a lot of folding mollusks. The most widespread is *macoma baltica*, *mya Arenaria*. It is easy to spot this mollusk by crescent traces about 5 centimeters long that it leaves. It gives out itself by large apertures on the surface of silty sand. On stones and other surfaces live motionless cancroid (*Semibalanus balanoides*). In the top part of littoral zone are usual saltish maximum plants: - saltwort, sea aster, triglochin sea and others.

As a result of our research, we found 10 kinds of sea invertebrates in the littoral zone of the White Sea in area of the Filippovsky fish ponds:



#### Multishield worms:

Lobworm (*Arenicola marina*)

#### Molluscs:

- 1) *mya arenaria*
- 2) *mytilus edulis*
- 3) *macoma balbtica*
- 4) *littorina obtusata*
- 5) *littorina littorea*
- 6) *buccinum undatum*
- 7) *arctica islandica*

#### Cancroids:

*Gammarus dubeni*, *Semibalanus balanoides* and

#### The family of Orchidaceae.

In the moderate areas, there are *Orchidaceae* — perennial ground grasses with underground rhizomes or tubers and usually with not bright flowers. Very often they are not appreciable in glades, in the thickets of bushes, deciduous and coniferous woods and sometimes are sharply allocated with bright candles of inflorescences among greens of flat and mountain meadows and bogs.

## Results of Research

We have placed the results of our research in the table.

**Table. Orchidaceae found on Solovetsky Islands.**

Species	Description
1. <i>Coeloglossum viride</i>	perennial plant, 10–30 (40) cm in height
2. <i>Platanthera bifolia</i>	Flower: white or greenish and odorous. A plant with two brilliant green leaves; perennial plant. Up to 60cm in height
3. <i>Gymnadenia conopsea</i>	Flower: pink or purple. Leaves: 4–7; perennial plant, 30–60 (75) mm in height.
4. <i>Dactylorhiza traunsteineri</i>	Flower: pink-violet. Leaves: 2–5; perennial plant, up to 30–40 cm in height
5. <i>Dactylorhiza maculata</i>	Flower: pink-violet. Leaves: usually spotty; perennial plant, up to 40–60 cm in height.
6. <i>Listera ovata</i>	Plant up to 60 cm in height; with rather large leaves; perennial plant.
7. <i>Listera cordata</i>	Plant small, up to 30 cm in height; with three-cornered, heart-shaped leaves; perennial plant.

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Photos: Rūta Jociūtė-Zolymienė

# Baltic Sea Project Tour de Baltic

## GDANSK TO ST. PETERSBURG IN 12 DAYS

### Introduction

The Baltic Sea is shared among the countries with coastal areas bordering it. We share a common environment — for better or for worse. Therefore, all 15 Danish BSP schools showed great interest in embarking on a network-building tour by visiting Gdansk, Kaliningrad, Vilnius, Riga, Tallinn and St. Petersburg.

In every city, we visited BSP schools and possible new BSP schools. The meetings with colleagues and students were interesting and inspiring. Not only do we share environment but also history. Traveling by bus through all the countries gave us a very intimate experience of just how different and yet similar all our countries are.

### Purpose of the tour

The idea was to create direct links between teachers and students in the Baltic countries and Denmark and to encourage students and teachers to interact with each other about projects relating to the BSP programmes.

This was achieved in almost every school, where visiting teachers and the teachers being visited exchanged contact information. The greatest barrier apart from the daily structural obstacles of meeting curricular demands seems to be language. Interacting through internet resources in a language that is not your mother tongue is a great challenge — both for teachers and students. It seems as though many teachers do not recognize their own communication skills in a foreign language since they are so used to being very communicative in their own. So the language barrier causes them embarrassment — a situation that is not attractive.

The impetus to enhance cross-border communication in spite of these barriers could be the wish to motivate students by enabling them to have direct interaction with fellow students in other countries.

We were presented with different approaches to the BSP programme, and in the following a few examples are chosen to illustrate this.

We visited a high school that has a very interesting BSP activity about air pollution in Vilnius due to traffic. A report presented by two enthusiastic and capable students, Roma and Simona, informed us that air pollution is steadily rising

in Vilnius. This was measured both by observing acid spots on leaves and by measuring the content of SO<sub>2</sub> in the air.

The high school showed a very conscious approach towards and is therefore expected to be interested in cooperation with Danish schools.



### New BSP communication site – the possibility to interact directly

To facilitate direct communication between teachers and students in different countries, a communication site has been established. The address is [www.unesco-asp.dk/bsp](http://www.unesco-asp.dk/bsp).

The idea is to mix the internet interaction between the students with the work you have to do in school to enhance the motivation of the students to share both topics and BSP-initiated activities. Each BSP programme has its own section with descriptions, material that can be downloaded, and the contact information of the international programme coordinator. There is a discussion forum for each topic and possibilities to upload files, text and images that you intend to share with others. By following the same activity patterns, it is possible to compare results from the same observations and activities, thereby enhancing not only the learning potential, but also the potential to get to know each other across borders.

The greatest barrier for everybody is the English language that is not the mother tongue of any of the participants. This barrier could be resolved by using more images and illustrations and less text.

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Photos: authors

# BSP Summer Seminar in Ogresgals

The Baltic Sea Project seminar was held in Ogresgals, Latvia from the 27th to the 29th of August. We spent three days in the lovely Ogresgals primary school, which is our BSP school and also the Eco-school with the green flag. There were students and teachers from Aizpute, Riga, Lielvarde, Staicele, Valmiera, Rujiena, Vecpiebalga, and Ogresgals.

First we greeted friends from other parts of Latvia and created work groups. Then we studied air quality by the amount of species of lichens and lichen diversity. On the first day we investigated the quality of air around Ogresgals School. Some of us conducted this research in the school, and they compared the species of lichens. We determined that there is a big diversity of lichens on the trees near the school. This means that the air quality near the school is good. It was very hard to qualify some of the lichen species because of their similarity. But there was one – bitter lichen – that everyone recognized because of its horrible bitterness. We came to the conclusion that the air near Ogresgals School is comparatively pure.

We determined water quality using indicators. We researched water quality in the Ranka River and in Ogresgals Spring as well. Ogresgals' inhabitants take drinking water from this spring. After determining the results, we summarised and analysed them and tried to make conclusions for the presentation.

The first evening was exciting. We had sport activities, different tasks, and games.

The second day of the seminar began with art. We made bowls, frames, and coloured balls using natural materials. These art activities were very interesting, and the result –

original works of art – was surprising for many of us. In the afternoon we went on an excursion to Dole Island. Dole Island lies in Latvia's biggest river – the Daugava. Before Riga HES was built, the island was 8.7 km long. Now it is partially flooded and connected to land – the territory of the city of Salaspils. The island's length is 5.2 km, breadth – 2-2.5 km, and area – 975 ha. Dole Nature Park covers the entire territory of the island. The majority of this island is a plane. In the relief we can see the old branch of the Daugava – the Lebjava riverbed. The branches of the riverbed divide the island into two parts. The nature of the lower part of the island hasn't changed. But the upper side has changed greatly. We observed the rapid growth of private building and areas where walking is prohibited. It was sad to see a dead oak tree – an important and well-known protected nature object. But its death is partly the result of irresponsible human behaviour. We are thankful for our National BSP coordinator Velga Kakse. She was an excellent guide during the excursion to Dole. In the evening we had a nice picnic with a camp fire, sandwiches, sausages, and rain.

The last day of the seminar was the presentation day. Each group presented the results of the air and water quality and answered questions. It was interesting to see the groups present the themes "Save energy!", "Don't pollute air!", "Don't pollute water!", "Sort garbage!". One group created a silent show, another revealed the problem via common situations between friends and families, and another set submit with pantomimic faces. Everybody did well. The performances were very interesting to watch, and the variety, creativity, and talent of some of the groups was surprising.



All three days of the seminar were full of new knowledge as well as kind and friendly emotions. We were happy to take part in this seminar – but it was too short.

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Photos: Aušra Žemaitytė, Rūta Jociūtė-Žolynienė

# The Spring Awakening

## PHENOLOGICAL OBSERVATIONS

Weather in the spring in Lithuania is fairly volatile. March and April are rich in cloudy days, whereas there is more sun in May. It's considered that spring has begun when migratory birds arrive, the first butterflies are seen, and hazel trees, coltsfoot, and violets start to blossom. This period is also called early spring or pre-spring. The aforementioned plants all start blossoming at different times. When warm southern weather dominates in the spring, hazel trees are the first to blossom, followed by alder and coltsfoot. And when wintry eastern winds and cold dry air flows from the continent dominate, coltsfoot is the first to blossom, followed by alder and hazel trees. If Atlantic weather is dominant in the spring, the first to blossom is alder, followed by coltsfoot and hazel trees. These conclusions were drawn by the founder of phenological studies in Lithuania, Professor Stasys Nacevičius, upon completion of his long-term observations.

The movement of tree and bush sap is the first sign of spring. The blossoming of trees and bushes pollinated by the wind (hazel trees and willows) is the second sign of spring. The third sign is the blossoming of perennial herb plants (such as violets and snowdrop windflowers) in leaf-bearing forests. By observing the impact of spring phenomena on the life of plants, the proper dates for various agricultural works can be established and thus timely preparations for these works can be made.

We watch the environment, and enjoy the first spring flowers from the very moment they appear. We teach children to love nature as soon as they start going to school. We observe nature, yet we don't document our observations. We started to document the first heralds of spring only in the spring of 2002. We take into account just some of the plants included in the phenological protocol. Phenological observations are carried out by 5th-8th form pupils. The

objectives and tasks of such observations are as follows: to establish what phenomena show the approaching of the spring and to observe where and when the heralds of spring are first to appear. These include *Tussilago farfara* (coltsfoot), *Hepatica*, *Anemone nemorosa* (snowdrop windflower), *Corylus avellana* (common hazel tree), *Salix caprea* (goat willow), and other plants entered in the phenological observations protocol. We listen to the birds singing, and we can hear them both next to our home and school. We examine phenological observation protocols, learn how to fill them in, and learn to collect and analyse data.

Deimantė Stulgytė and Solveiga Dabrišiūtė have been taking part in phenological observation activity since the fifth form. At present, they are in the eighth form. The pupils analysed and tried to establish when spring was early and when it was late, taking into account the available data. They studied the characteristics of plants, as well as their ecological significance and use. The observations made by the pupils are consistently documented, and the plants being analysed are described in a comprehensive manner. Here is a short analysis they made:

*Tussilago farfara* (coltsfoot) starts blossoming in the beginning of April and in May. It grows next to ditches, clayey hillsides, and at roadsides. It is a melliferous medicinal plant. With the number of people falling ill with cold-related diseases, more attention should be paid to health and health promotion. A number of medicinal plants help to strengthen the human immune system. Coltsfoot is one of these.

*Hepatica nobilis* blossoms in April and May. It is usually found on hillsides and in forests. This plant is poisonous and sometimes poisons cattle. It is grown in gardens, and can be various types and colours.

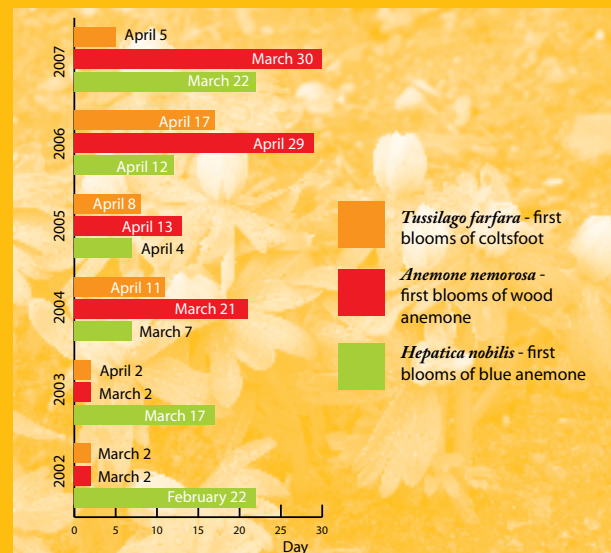
*Anemone nemorosa* (snowdrop windflower) blossoms in April and May, when trees still don't have any leaves. Even though the plant is beautiful it is not suited for bouquets because it withers quickly and can be harmful due to its poisonous attributes. It can be grown in gardens.

*Corylus avellana* (common hazel tree) blossoms before the leaves open. The wood is well-suited for making furniture and rims. Hazelnuts are eaten fresh, and oil is produced from nuts, and is then used in confectionary, cosmetics, and production of lacquers and varnish. Marc is used for producing halvah. Forest animals also like hazelnuts. Hazel trees help to regulate the level of humidity, improve the soil with their leaves, and are well-suited for strengthening hillsides and protection areas.

*Salix caprea* (goat willow) blossoms in April, prior to the opening of leaves. It rarely lives for more than 60 years. The tree needs plenty of light and is resistant to cold and drought. It is a melliferous plant. The bark is used for production of black varnish. Wood is used as firewood, for various carvings, and for production of cellulose.

We observe our plants at Aleksotas hillsides, next to the observational platform, which we pass by every day on our way to and from school. We selected the earliest observations for the past six years and present them in the following table and graphs:

Year	Month	<i>Corylus avellana</i> (common hazel tree)	<i>Salix caprea</i> (goat willow)	<i>Hepatica nobilis</i>	<i>Anemone nemorosa</i> (snowdrop windflower)	<i>Tussilago farfara</i> (coltsfoot)
2002	February					22
	March			2	2	
	April					
2003	February					
	March			17		2
	April				2	
2004	February					
	March			7		21
	April				11	
2005	February					
	March					
	April	7	5	4	13	8
2006	February					
	March					
	April	12	14	12	29	17
2007	February					
	March			22	30	
	April	15	28			5



In accordance with our phenological observation data for the past six years, the earliest spring was in 2002, the latest – in 2007. The time periods between the awakening of the spring plants are usually two weeks. Our elders establish the time when various vegetables and flowers may be sown in gardens by taking into account the time of awakening of spring plants.”

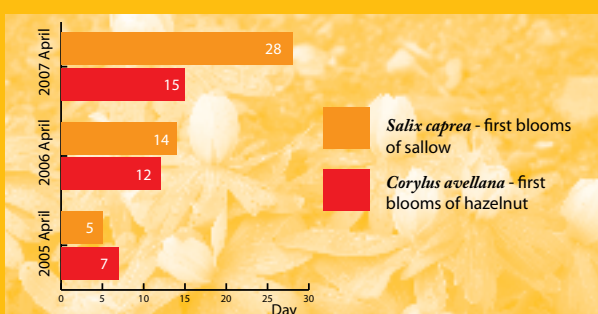
These activities are integrated in the educational schemes of environmental science, Chemistry, and Biology. During these lessons pupils learn to observe natural phenomena, to work in teams and cooperate, and develop their sense of responsibility, love for nature, and creativity. During educational trips pupils learn about the biological diversity of their native land. The most dedicated BSP participants of the environmental development and phenological observations:

Here are the impressions of Egidijus Ževkovas after a trip with the BSP project participants:

“This winter break was an exciting one. After Christmas I went to Poland together with other BSP project participants. At first, I felt somewhat uneasy knowing that I will meet BSP participants from other schools. In the bus, I sat next to Marija, a girl I got along great with. We visited three cities. Before going to Sopot we visited some interesting sites. The one that I remember best was Hitler’s military headquarters – the “Wolf’s lair”. Sopot is a resort town, and I liked it. I would like to visit it in summer. Then we went to Gdansk. It is the most beautiful city I’ve ever seen, and the most beautiful part of it is the market square. Afterwards, we went to Malbork, the former capital of the Teutonic Order. We visited the castle of Malbork, where various arms are exhibited. I liked the castle a lot. Then we went to the site where the Battle of Grunwald took place. Then a long trip home followed. I didn’t want to go home and would have continued to travel...”

**Zita Ganusauskienė**

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Illustrations: authors



# Winter Birds in Poland

Mute Swan. Photos: author, P. Nowak

Only six schools from Poland took part and sent the results in the annual wintering birds count in January 2008.

- 3-LO im. M. Kopernika from Wałbrzych,
- Szkoła Podstawowa no. 34 from Katowice,
- Specjalny Ośrodek Szkolno-Wychowawczy im. L. Braille'a from Bydgoszcz,
- Szkoła Podstawowa nr 86 from Kraków,
- 1-LO im. H. Sienkiewicza from Łańcut and
- 1-LO im. T. Kościuszki from Miechów.

The most numerous bird species were Mallards *Anas platyrhynchos*, 1060 individuals, and Mute swans *Cygnus olor*, 410. Mute swans were mostly observed in Cracow on the Vistula River. One bird had a yellow neckband with the number 66EE on it. It was a male, ringed on 23 September 2006 in its third calendar year at Sulejów Reservoir. We were also able to read five numbers on yellow rings placed on the right legs of swans.

## The numbers were:

- 69MA — female in its second calendar year, ringed on 14th July 2007 on the ponds in Borków,
- 70MA — male in its third calendar year, ringed at the same time and place,
- 76EA — male in its second calendar year, ringed on 12 July at the ponds in Psary,

- 76ET — male cygnet, ringed on 9 September 2005 at Bolmin Reservoir, and
- 96ET — male cygnet, ringed on 8 August 2006 at the ponds in Secemin.

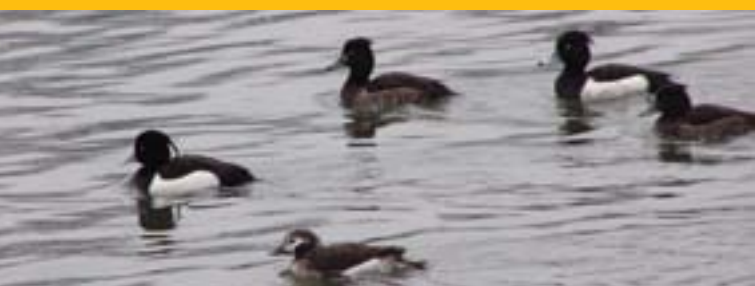
## The scientific terminology of the age of birds is presented here.

- **Bird in its first calendar year** — from hatching till the end of the year.
- **Bird in its second calendar year** — from 1 January to 31 December of the following year.

## The next years are numbered according to this rule.

All these data we have thanks to bird banding, which is an aid to studying wild birds that involves attaching a small individually numbered metal or plastic ring to their legs, wings or necks so that various aspects of the bird's life can be studied by the ability to re-find the same individual later. This can include migration, longevity, mortality, population studies, feeding behaviour, and many other aspects.

The most interesting observations were the presence of male Mandarin Duck, *Aix galericulata*, and female Long-tailed Duck *Clangula hyemalis*, both in Cracow. The Mandarin Duck probably escaped from a zoo or private breeder while the Long-tailed Duck, which predominantly winters on the Baltic Sea, was a real rarity.



Long-tail Duck



Mandarin Duck

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# School Environment helps to learn Nature's Secrets

Lichens found on trees help to evaluate the quality of air. Photo: Rasa Radžiūnaitė

Nature is magnificent, beautiful, and mysterious, but also extremely fragile and vulnerable. Humans are part of nature; therefore, they must feel the pulse of life and the related problems. However, more often than not it's strange to see that many people have turned away from the singing of birds, flowers, and sunsets. With the rapid advancement of technologies, the nature of negative environmental factors changes: the risk posed by traditional, i.e. natural, threats is decreasing, whereas the risk posed by modern, i.e. anthropogenic, threats is increasing, determined by increasing environmental pollution. Who can change all this?...

People turning away from nature, as well as their unethical behaviour in the natural environment, is shameful for everyone; therefore, the greatest burden of this shame should be assumed by family and the school where young people are educated. Acquired knowledge doesn't automatically change one's behaviour. In order for behaviour to change, one's relationship with the environment and the world must change. To achieve this goal, the conditions for the formation of proper values in young people must be created. People must love and protect what's around them and what's familiar to them; therefore, one of the key objectives of environmental science or biology teachers is to encourage pupils to learn more about the natural environment, and to value and protect it. The use of the environment closest to school as an example in the educational process is the simplest way to achieve this goal. The environment close to our school is very diverse. Here, you can see sparrows chirping in the bushes, spiders making their webs, butterflies sitting on colourful flowers, partridges hiding under spruces and in boxes made by pupils in the winter, hawks holding their prey, bacteria colonies grown by taking sample crops at various locations next

to the school, and plenty of other exciting things. The most important thing is to draw pupils' attention to the life around them. By observing and studying the environment, pupils expand their knowledge, learn more about the environmental processes, and acquire new skills. Major attention is paid to the following tasks:

- Observation and study of natural objects;
- Development and implementation of ecological and environmental projects;
- Education of the school and town communities;
- Spreading of good practice during district, national, and international conferences; and
- Participation in district, national, and international environmental projects.
- Our school has been taking part in the Baltic Sea Project since the very beginning; therefore, we have carried out numerous research and project tasks. In 2007, we took part in the following two programmes:
  - Phenological observations; and
  - Air quality.

The studies which need to be carried out in the process of implementation of the programmes were integrated in the Biology and Nature and Humans academic subjects. 5th and 6th form pupils carry out phenological observations in the spring, whereas 7th, 8th and 9th form pupils perform air quality studies using certain organisms as biological indicators. These works are performed in the autumn. 7th form pupils determine the quality of air by observing black spots on maple leaves, 8th form pupils – by observing certain indicative characteristics of lichens, and 9th form pupils – by observing conifers. Every academic year, pupils carry out various studies under the Baltic Sea Project programmes. Such activities help pupils to understand



Pupils study the spruce needles. Photo: author



The study results are computer-processed. Photo: Giedrė Lakickaitė

and value the environment and environmental problems, improve their study-related skills, and form proper values.

Our work includes not only studies under the Baltic Sea Project programmes, but also other environmental activities such as various projects, study of the immediate environment, surveys, promotions, activities aimed at educating the school and town communities, etc. In May of 2007, our school received the Green Flag international award for our environmental activities.

#### **Pupil work carried out in 2007 and 2008:**

##### **1. Projects:**

- The impact of cars on the environment;
- Biochemical studies of water in bodies of water in Kaunas District;
- Beware of nitrates;
- Our air;
- Food and pollution;
- Bacteria around us.

##### **2. Surveys:**

- Sorting of waste;
- The journey to school.

##### **3. Promotions:**

- Waste paper collection means forest protection;
- Sort your waste.

##### **4. Leaflets:**

- Our waste is our problem;
- The impact of cars on the environment;
- The water from my well.
- Biology teachers carried out the following pupil surveys and statistical analysis:
  - Teaching methods at school;
  - Pupils' ecological and environmental activity.
  - The objective of these works was to establish how pupils' active work during lessons and after-school activity helps them to acquire the required knowledge, and to establish the extent to which pupils are interested in environmental issues. 373 5th-8th form pupils took part in the surveys.

#### **Conclusions:**

More than one half of the surveyed 5th-8th form pupils like environmental studies.

Pupils prefer active learning methods during their classes.

Traditional and active educational methods are equally important for knowledge acquisition.

Pupils learn about environmental changes during lessons and through various sources of information.

Most pupils at least sometimes contribute to environmental activities, and the number of 8th form pupils constantly undertaking environmental activities (sorting of waste, cleaning of the environment, use of non-traditional energy sourced at home, etc.) is increasing.

Most pupils want to study and learn about the environment, and are aware of why they should take care of the environment.

We can see not only that pupils like to actively participate in the educational process, but also that this active participation brings evident results. Thanks to the specific tasks that they perform and their contacts with the environment, pupils learn to feel their duty in relation to nature and want to maintain a positive relationship with the environment even after finishing school.



The mysterious world of spiders. Photo: author

#### **Rasa Salemonienė**

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Photos: authors

# The first Research of Nature

I am a teacher of primary classes, and I am always searching for new ways and methods of teaching my students various subjects. I want to make my lessons more interesting and attractive. Last year I was offered the opportunity to join to the BSP programme. Because I work with primary classes, I decided to choose Phenological studies. Last spring our class enjoyed doing the BSP programme in Phenological studies.

The primary goals were to promote love for nature, to make lessons untraditional and more interesting, and to improve knowledge not only of nature but also of English. I was quite pleased with the results. My students enjoyed observing nature. They found learning more interesting and it increased their motivation to learn. It was also very useful for me. I had a possibility to integrate a lot of subjects and to attract my students to learning.

We live in the territory of the Rambynas Regional Park. There are 703 different species of plants and 206 species of birds registered in the park. There is a large colony of white storks that has settled in a small pinewood forest near the Nemunas River. Some white storks made their nest on the roof of our school. It was therefore not very difficult for us to see the first white storks. We are waiting for them this spring too.

The BSP was a great opportunity for us to become acquainted with many species of plants and birds known only from TV and handbooks. We searched and found out about the appearance, manner and behaviour of the birds of Lithuania. This project gave us the opportunity to have a lot of interesting lessons and walks in nature. We became closer to it.

The students are improving their English too; they keep notes in which the results of their observations are recorded. Some English words are interesting and funny for students, for example, cuckoo, snowdrop, etc.

My students have already felt the excitement of researching nature, and I am sure that what they learn now will remain in their hearts forever.



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City parade in Mwanza, Tanzania. Photos: Susanne Mellvig

## The Baltic Sea and Lake Victoria – learning from each other

Lake Victoria and the Baltic Sea are both examples of endangered water resources that are shared by a number of countries. However, the two regions represent different stages in the development of cooperation between countries with common interests in natural resources. While the countries bordering the Baltic Sea have interacted for a long time in order to promote sustainable development in the region the same process has just started around Lake Victoria. Thus, there are reasons to transfer the experiences from the Baltic Sea cooperation to the Lake Victoria region.

A group consisting of people from schools and environmental organisations in Sweden, Kenya, Uganda, and Tanzania responded to this challenge. The Swedish part of the group, teachers from Nacka gymnasium, together with young environmentalists from Fältbiologerna, are active in BSP, with experience to engage students and young people around the Baltic Sea in environmental studies and educational programs, meetings, and actions. The East African project group consists of teachers and Wildlife Club patrons from the three countries. The purpose of the project is to demonstrate “the good example” and “the best practice” of BSP activities to youth environmental organisations and upper secondary schools in Kenya, Tanzania, and Uganda and to inspire them to replicate this in their own region, towards their own fellows and with focus on their own environmental problems, resulting in the formation of a Lake Victoria network for schools and environmental clubs. The network is named Lake Victoria Youth Cooperation (LVYCo).

The formation of LVYCo has been ongoing for three years and is funded by the Swedish International Development Cooperation Agency (Sida). During the first year there was a conference on web based information in Kisumu for teachers, Wildlife Club patrons, and young student environmentalists from Kenya, Uganda, Tanzania, and Sweden. The link to BSP was also established by inviting the same people from LVYCo to the conference on sustainable fish-

ery in Nacka, Sweden where they could meet BSP delegations from all around the Baltic Sea (see BSP Newsletter No. 2, 2004). This conference was officially opened by the Swedish Minister for the Environment Lena Sommerstad who pointed out the importance of meeting and working together and learning from each other.

During the second project year there were a lot of LVYCo activities in each country in order to involve more schools in the project from one per country to ten per country in East Africa, thus making 30 schools in the project to date. This work was crowned with two big LVYCo conferences, one in Mwanza, Tanzania in February 2006, and another in Entebbe, Uganda in May 2007.

The conferences were attended by approximately 220 participants; 195 from the Lake Victoria region (65 from Kenya, Uganda, and Tanzania, respectively) and 25 from Sweden. Among these participants, the majority were students and young people. The conferences were also attended by a number of NGOs and Governmental organizations in the region. Mr Peter. Toima, Regional Commissioner of Mwanza, opened the first conference by noting the importance of involving young people against the pollution in Lake Victoria.

The guiding theme of the Mwanza conference was “Save Lake Victoria – Stop Pollution” indicating the thematic frames for the meeting sessions. The conference covered ten themes focusing on the pollution of the lake and one teacher was assigned to take the overall responsibility for each theme, and one student involved in the project from the pioneer schools acted as study leader within the group. Each theme and workshop consisted of 20 participants. Each group among the ten groups (themes) presented its finding with posters, drama, songs, etc. with facts and conclusions. Additionally, three experienced facilitators, one from each country (Kenya, Uganda, and Tanzania), made presentations on related topics.



Lunch break with entertainment

During the conference, the participants had the opportunity to visit fish landing sites, fishermen camps, an international fish market, wetlands, a dumping site, and a waste water treatment plant. In these areas, the participants gained a clear picture on the extent of pollution in Lake Victoria, the over fishing of the Nile perch, the problem of plastic bags, which are out of control in the dumping site, the re-use of fish waste in chicken feed, the overcrowding of people in fishermen camps, which has resulted in the spread of HIV/AIDS in the area. The situation that the participants faced in this study visit in Mwanza was said to be similar to Kenya and Uganda. Thus, the study visit challenged the participants to deal with the situation in a better way in the better future.

The next conference, one year later in Entebbe, was opened by Mr. Patrick Ssembele from the Uganda Ministry of Education who stressed the importance of a new educational policy in the East African region, especially in the fields of environmental sciences, which should promote practical research and learning by doing. This vision became the guiding theme of the conference "Lake



City parade in Entebbe

Victoria - Our Concern" focusing on the development of a common program for investigations and activities in order to strengthen the common goals of the network and empowering its young members. This time, seminars and workshops were to a much greater extent prepared and led by students and young environmentalists.

The students were trained in measuring chlorophyll in order to assess the grade of eutrophication, to take and handle tissue samples for analysis of heavy metals, and to watch and identify birds and use bird inventories for environmental mapping. The student delegates also spent their time producing their own handbook for young environmentalists and debating on how to correctly practice their democratic rights in order to protect the environment. For example, DDT against malaria will be allowed in Uganda, and students learnt to evaluate the risk of toxic biomagnification and discussed optional antimalaria methods and ways to stop the use of DDT.

The three scientific programs, chlorophyll measurements, heavy metal sampling, and bird inventory will be run parallel in all schools all around the lake and provide the students with a common foundation for data, discussions, and analysis. Newsletters, policy handbooks, learner guides, national gatherings, and regional conferences will be arenas for making joint conclusions and future plans.

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City parade in Entebbe.



Model of Ecological House. Photo: authors

## The Concept of an Ecological House of the New Generation

At present, ecological houses are not popular in Lithuania, and usually only individual ecological solutions are implemented. Therefore, our goal is to develop a comprehensive and feasible system. In the search for the best solutions, the process of improvement of the project, drawing preparation, layout production, comparative calculations, and information analysis lasted for three years. The third house model features a comprehensive energy-saving system reducing pollution emission: passive ventilation, hybrid power-based and natural waste water removal systems, and an original house structure.

We designed an original passive ventilation system, inspired by nature (Australian termite mounds) and considering the experience of eastern nations. The operation of the system is based on the principle of gas convection and Bernoulli's law. The ventilation operates only thanks to its structural peculiarities. The circulation of air takes place due to the temperature difference that occurs when using solar energy to heat the air, the volume of air increases as it is heated in the "solar chimney", which results in natural air flow convection and formation of vacuum in the model ( $\approx -6$  Pa), which makes fresh air enter the house. The system ensures constant circulation of the inside and

environmental air equal  $\approx 0,0015$  m<sup>3</sup>/s (1,9 L/s). During the summer, fresh air is supplied through underground ventilation channels ("Canadian wells"), where it is cooled and then supplied to the house, whereas the house's atrium is cooled using "wind catchers", which ensure air conditioning in the building during the warm season. In the winter, a combined ventilation system is used. Fresh air is heated by a waste heat exchanger or "pneumatic collector" – a solar collector intended for air heating. The collector assembled in the model is able to produce much more than just the amount of heat required for ventilation – it can also produce the heat required for heating. Thus upon installation of our system, heating of the building is possible as well, because the capacity of our "pneumatic collector" reached 250 W, which is the equivalent of 5000 W in a real building.

Furthermore, a hybrid power system was used to heat the building. The system comprises solar energy collectors, a biofuel boiler, and a heat pump. Solar energy is efficiently used in solar collectors (where both air and water are heated), and thanks to the "water collectors" hot water is supplied where needed. An additional amount of heat to ensure constant temperature during the cold season is



Kostas and Ignas - authors of the house model. Photo: authors

obtained by burning biofuel using heat pumps (geothermic energy). Plans were to install a heat pump in the house model, yet due to technical problems only an imitation was assembled in the model, and a biofuel boiler model was chosen for the purpose of conducting experiments. The usefulness coefficient of the designed boiler reaches 90 percent. Centralised heating was connected via copper pipes, and a floor heating system was installed instead of radiators. Study results demonstrated that the system stops the uninterrupted circulation (convection) flow, which occurs when using regular radiators. In this manner, the floor in the model was heated uniformly to reach the temperature of approximately 35°C and to reduce the variable relative humidity to 60 percent.

A local sewerage system was installed for removal of waste water. It is a passive waste water treatment system operating without any additional energy. A horizontal macrophyte filter was installed in the system, in which waste water treatment is based on the biological decomposition processes. Due to the insufficient dimensions of the model, a fake horizontal macrophyte filter was installed; however, to conduct tests a separate treatment device of this type was produced from organic glass. Macrophyte plants were used in the filter: rushes and other small-height marsh flora. During the tests, the efficiency of the filter was observed, and physical characteristics of water such as colour, transparency, odour, and nitrate quantity were studied. During the experiment it was established that the coefficient of cleaning water reaches 60 to 70 percent, i.e. it is 20 percent lower than the recommended norms. This error could occur due to the insufficiently large area of the filter, which is 0.5 m<sup>2</sup>. The recommended area is 10 m<sup>2</sup>.

It goes without saying that the building structure has a great impact on energy saving. In our previous project models, more regular systems were used, and the projects themselves were oriented only towards individual residential houses. In this project we took into consideration both

individual residential houses and administrative (office) buildings, because they are some of the main energy consumers. The house structure resembles a "dug-out"; when looking from a distance it looks like a mountain. The 0.5 m<sup>2</sup> building (real size – approximately 350 m<sup>2</sup>) has two storeys, and an internal yard – atrium, which ensures a sufficient quantity of natural light in the entire house. The structure of this house is oriented considering the cardinal directions, and the greatest number of windows is found in the south, ensuring that the maximum solar energy amount is used. Plans are to use ecological construction materials (clay, wood, lime, glass, non-ferrous metals) for the project, and to grow plants on the roof.

This project was presented to our school community during ecology classes.

Upon completing all tests and comparative calculations, we established that our project is promising and offers numerous advantages. Compared to a normal building of the same area, our house consumes 50 to 60 percent less energy, produces lower quantities of harmful substances, and the project itself complies with the aesthetic standards of modern architecture. However, our project has some disadvantages, too. Construction of such a building costs twice as much compared to construction of an ordinary structure house, and a rather large plot of land is needed. We also developed a scheme under which the state and accreditation entities could partially finance construction of these houses, which would certainly increase their popularity and help to reduce the number of environmental problems.

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*Thomisus**Nymphalis antiopia**Rutpela maculata**Rbaqium mordax*. Photos: author

# Insects around us

Insects are the biggest systematic group. The enormous variety of morphologic forms as well as the biological diversity of insects allows them to exist in all biological niches and land biocoenosis and to some extent sweet water biocoenosis.

This aspect inspired me to analyse entomofauna of a mountain belonging to the Kamienne range. The spot of my research was Stożek Mountain in the Suche Mountains in the Sudety Wałbrzyskie Landscape Park. The Suche Mountains are the highest, the biggest, and the most diverse part of the Kamienne Mountains. Stożek Wielki together with Stożek Mały, which are to the south, form an isolated group in the northwestern part of the mountain range. The name 'stożek' is strictly connected with the shape of a regular cone. Stożek Wielki is built of Permian melaphyre. The soil in the area is mainly acid, brown soil often connected with beechwood and spruce trees of anthropogenic origin. The highest parts of the mountains are covered with spruce trees. Spruce and beech forest covers the vast surface of Stożek. Young beech trees and herbaceous plants grow near the summit whereas the top itself is covered with spruce trees monoculture. On part of the north slope of Stożek Wielki there's a wet valley with numerous herbaceous plants like nettle (*Urtica sp.*), ragwort (*Senecio sp.*), butterbur (*Petasites sp.*), and touch-me-not (*Impatiens sp.*). The foothills of Stożek from the Unisław Śląski side are covered with xerothermic meadows. In addition the nearest area you can find damp meadows, xerotherms, and the mixed forest of Dzikowiec Mountain. The Ścinawka River flows at the foot of Stożek.

The objective of my work is to show the variety of interesting and rare protected insects that appear in the area

of Stożek Massif and neighbouring ecosystems. I started catching the insects at the end of April 2006 and continued until the end of September. The research and documentation methods I applied were:

Digital photographing – crucial in the case of protected species as well as big and easily identifiable ones;

Catching with entomological scoop and net; poisoning and preparation were done in accordance with entomological norms. Protected insects were marked on the spot or they were set free (bumble-bees, some beetles).

Trap method - jars hidden underground with some bait inside (meat, carrion, cheese, fruit).

I identified the specimens with the help of illustrated guides and the Internet.

In conclusion, considering my studies and after analyzing the species of entomofauna from the chosen area, it was easy to characterize the insects. The connection of the insects and the plants is unquestionable. The review of habitats shows how entomofauna biodiversity changes with the increasing number of plant species. Moreover, it seems obligatory to care for these habitats, which provide protection to entomologically priceless species or even whole families (like *Lycaenidae*).

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# Floods at the Seaside

We've almost forgotten what snow looks like. Is it just Mother Nature's trick or a sign of global warming? For several years in a row now, winters in Lithuania have hardly resembled the winters that our parents remember. The warming trends are evidenced by various natural disasters occurring around the world. In Lithuania, this means floods.

Spring floods cause numerous problems for the people living by the delta of River Nemunas. Floods occur due to excess ice blocking Nemunas riverbed, whereupon an abundance of water spreads to meadows and forests and covers vast areas. The spreading water and ice damage riverbanks, flood villages, and destroy roads. Most residents in these areas are able to reach land only by boat or special transport. The floods cause serious damage every year.

In early February this year, the water level on the Šilutė–Rusnė road reached 37 cm. Rescue teams lift vehicles using tractors along the 400 metres of flooded road. Curious sightseers from numerous Lithuanian cities and villages come here to see the terrible flood, yet the locals will certainly say that the flood is fine and expected.

Old local residents know how to prepare for floods. A boat is tied next to each farmstead. Food stock and fodder are stored in a safe place. Cattle are kept in special mounted sheds.

Šilutė fire protection rescue service is very busy during floods. It undertakes extraordinary measures in order to save people and their property. An amphibious vehicle is used to evacuate people from their flooded homes. Where needed, the rescue service ensures urgent delivery of doctors to the flooded area.



Photos: author

The only solution that would help to reduce the damage incurred by residents from the floods to Rusnė Island is an overpass above the road range that is so often flooded. The overpass would help to solve the problem of communication with Rusnė.

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*Dicranella heteromalla*. Photo: <http://www.kuleuven-kortrijk.be>



*Mnium hornum*. Photo: <http://www.kuleuven-kortrijk.be>

# The Moss of Książ Landscape Park

*The objective of my research was the moss in the Pełcznica River gorge.*



*Atrichum undulatum*. Photo: <http://www.gymnosperms.org>

Moss (*Musci, Bryopsida*) is widespread and a very old group of plants. They existed even in the Palaeozoic era. In Poland there are 670 species, which can be divided into:

- Peatmoss (*Sphagnidae*),
- Andreaiedae (*Andreaiedae*),
- The Bryidae (*Bryidae*),
- The Buxbaumiidae (*Buxbaumiidae*),
- Haircap moss (*Polytrichidae*).

They are tiny, green land plants. Some of them have adapted to living in water. I would like to present the different species of moss which appear in the area of the Pełcznica River gorge near Książ Castle.

In the protected area there are 73 classifications of moss, which can be divided into the following groups:

- ground species a part of forest groupings

- mountain species of the Pełcznica River gorge
- calciphilous moss in regard to the altitude group (lowland, upland, subalpine)

The species I have observed in this area are described by the varieties that we can notice most often while walking along the routes. The number and diversity of the species here is influenced by the forest groups in the area.

Alder Forest (*Alnetum incanae*) The Sudety Mountains type appears in the lowest part of the gorge along the Pełcznica River on both banks at 100-150 meters above sea level. It grows on alluvial, rocky soil that occasionally floods (every few years).

The moss layer consists of: *Dicranella heteromalla*, *Poblia nutans*, *Mnium hornum*.

Dry ground forest grows in higher parts of the gorge at 150-300 m above sea level on clay, sandy, and rocky soil.

The moss layer consists mainly of: *Atrichum undulatum*, *Plagiomnium affine*, *Hypnum cupressiforme*.

Beechwood grows on poor, acid soil. The soil is shallow and very rocky, temporarily dry. The wood grows on the sides in the highest parts of the gorge at 200-400 m above sea level.

The rich moss layer consists mainly of: *Poblia nutans*, *Dicranella heteromalla*, or *Dicranum scoparium*.

*Bartek Czajka*

Student

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Photos: authors

## School in Gdynia

**X Secondary School in Gdynia** has existed since 1992 – this year our school is celebrating its 15th anniversary. Our school was established as a result of the transformation of the pedagogical school for teachers. It inherited the traditions and the name of patriotic teachers, which clearly refers to the school's history. The building itself housed pedagogical schools for over 50 years. All of them were very respected and popular among students. Today, our school has earned respect as a well-organized institution, one of Gdynia's top secondary schools. It has numerous didactic and educational achievements on its scorecard, as well as a special ambience. We are proud of the fact that 100% of our graduates have continued their studies in various universities and colleges.

### What do we do as part of BSP?

Since we joined the Baltic Sea Project two years ago, participation in the programme has become one of the most important environment-friendly activities that take place in our school. What is more, it plays a significant part in international cooperation and among schools within the Polish borders.

We have been trying to take advantage of the location of our school - the coastline of the Baltic Sea. The majority of our activities are connected to learning about the sea ecosystem, a place of extraordinary flora and fauna, as well as an area exposed to the influence of anthropological activities. We act under the school name: **The Club of Baltic Researchers**.

We have monitored the seacoast systematically – observing the condition of the beaches and organisms dwelling in selected sections of the coastline. We have cooperated with the Sea Station in Hel, along with students and doctors from the oceanography faculty of Gdańsk University. We have realized projects on the biodiversity of the maritime belt area. We have organized classes in the Hel sealarium, where our students work as volunteers. For the last two years we have taken part in the students' field workshop at the mouth of the Rewa River, where we recognized various species and observed the migration of ichthyofauna. We have reached the local fishermen and gathered information about the condition of the water in the gulf from them. We also asked for the presence of endangered, rare or even new, invasive species.

Not only do we actively participate in scientific conferences

concerning sea matters, such as "Sea mammals and man in a coastal ecosystem - is coexistence possible?", but also in films and activities that were held as a part of the Baltic Festival, as well as in lectures related to the biology and ecology or even chemistry of the waters held by Gdańsk University. Each year we run an interdisciplinary contest, "The Baltic Sea - the sweetest sea in the world", which draws great interest from the students. Teachers of all subjects are involved in this undertaking and the questions concern almost every subject. There are many winners. The contest appoints specialists in different areas: biology of the sea, chemistry and physics of the sea, history of the Baltic countries and their languages. Our other activities cover taking part in scientific cruises, inviting guests whose work is linked with the Baltic Sea, organizing lectures and even a qualified course in order to obtain a fishing license (with the cooperation of the appropriate local authority centre). Students need to assimilate knowledge of species dwelling in Polish waters, their times, conservation times and limits, as well as information about the dangers of individual organisms.

Some of our activities have been described in BSP newsletters:

- "Cassubia - yesterday, today and tomorrow" (2006/2)
- "Visiting the Hel marine station" (2006/1)
- "Educational cruise across the Gulf of Gdańsk" (2006/1)

Representatives from our school successfully took part in the international conference BSP "Diversity & Sustainability" (2006), where our project about Cassubia was presented. We participated in the workshop "Sustainable fishery" in Bornholm (2006) as well, and this year, in September, we also went to Katowice to participate in a workshop for teachers entitled "Biological diversity on the industrial areas of Upper Silesia and sustainable development in the Baltic Sea region".

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Do you know what maple leaves should look like in autumn?



Older pupils teach nursery school pupils

New members are invited to the Small Stork Club.  
Photos: author

# Our Goal is to protect the Environment

Environmental protection is one of the main priorities at Kaunas District Lapių Basic School. This work can be grouped into the following three categories: research, raising public awareness, and environmental improvement.

We like to carry out environmental research at our school. However, carrying out such tasks has one disadvantage – only 3-5 pupils can be involved at a time, whereas the number of those who would like to participate is much higher. Thus, when teaching about the environment, its laws and environmental protection, diverse work methods must be applied.

One such task is awareness raising. Let me tell you about my work with young children. The Black Stork Club of young forest friends was founded at our school 12 years ago. Together with members of the club we joined the national Society of Young Forest Friends (SYFF). With vast experience in working with children, we came to the conclusion that we must start teaching them at a much younger age. In the spring of 2006, we founded the Little Stork Club at Lapių kindergarten, attended by the youngest, i.e. pre-school class, children.

Thus, in their free time, the members of the Black Stork Club work with six-year-olds. The first meeting was held during the pupil's autumn break. In the beginning, we introduced the SYFF, and its objectives and tasks. We taught six-year-old children how to recognise various trees. Our young learners already know that autumn maple leaves have to be drawn with black spots (*Rhytisma acerinum*) on them, which show that the air around us is clean. Last autumn, we took part in the national lesson called Mushrooms for the Forest Rather Than for Our Table. The children were impressed by the variety of mushrooms found around the world, as well as the colours (e.g. bright blue) of some of the mushrooms. They were happy to play various active games dedicated to the topic of mushrooms, and to take part in contests.

During the pupils' winter breaks we always decorate a

Christmas tree at the kindergarten, and our Christmas tree is a special one... We teach the children how to decorate the tree at home and tell them that Christmas trees should be purchased only at special places rather than cut in their own forest. During Christmas celebrations at the kindergarten we invite new members to our Small Stork Club.

In the spring, we organise phenological exhibitions. We tell about the Baltic Sea Project, which our school joined some years ago, and demonstrate our phenological research protocol. We instruct on how to fill in the document. The phenological exhibition at the kindergarten is open for one week, and the children themselves, as well as their parents and teachers, contribute to it. Furthermore, children learn about the plants flowering in the spring (and there are so many of these in our area!)

At the beginning of summer, events dedicated to environmental protection are attended by the school's 1st-4th form pupils and kindergarteners. We wrote about the Fox Path in BSP Newsletter No. 1-2 (28), and we are planning to hold a Paper Day this year.

We also undertake awareness-raising campaigns aimed at older pupils and at the Lapių Seniūnija (administrative unit) community. Positive results can be achieved only thanks to the cooperation of all members of the community and a variety of implemented tasks.

Another type of activity – good works for the environment – is carried out as well. These are dedicated to tree planting, cleaning the environment, taking care of historical sites and architectural monuments, seed collection, and nesting-box building. We'll tell more about this in our next Newsletter.

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Photos: authors. Stock photos: Image DJ, PhotoDisc

## *What can we do?*



For thousands of years man has fished to eat and trade. Alongside the development of the technology surrounding fishing, we have started to fish larger and larger quantities, never considering what consequences this might bring to the marine ecosystem; never thinking for a moment that the resources of the sea might not be infinite. Now, however, we can no longer ignore the fact that the cod in the Baltic Sea are being overfished and very rapidly moving closer and closer to extinction.

According to the EU-commission the fishing of cod must be reduced by at least 80% in the near future, otherwise they will be completely extinct in the Baltic Sea.

To prevent this from happening, a number of protection measures, besides lowering the allowed fishing quota, are necessary. The most important steps are: to start using fishing nets with larger meshes, give more funding for research, create reserves where fishing is forbidden, and stop the pollution of the Baltic Sea. We also have to make sure that rules that have been approved are being followed by stricter supervision and distinct consequences. To make this possible, it's essential that politicians and society, as well as the individual, become properly informed of the situation and take responsibility. The individual can for example boycott cod from exposed areas such as the Baltic Sea in order to make a change.

As mentioned earlier, one important step towards a more sustainable fish population is lowering the maximum

allowed quota. If we continue fishing the large amount that we are today, there won't be any cod left in the very near future. The best thing would be to stop fishing it entirely, but since many refuse to do so, lowering the quota is the next best thing we can do.

Along with this we also must ensure that more of the young cod survive and that they live long enough to produce offspring. To do this, we must: introduce a total ban when the cod are mating, create reserves, and use nets with larger meshes.



Today the consequences of breaking the rules are not severe enough to stop fishermen from ignoring them from time to time. The lack of supervision doesn't help the matter either. So if we're serious about saving the cod we have to see to it that the rules are obeyed, and make the punishments harsher if they are not.



Fishermen who fish more than allowed don't do so because they're violent criminals; they do it because they don't know any better. Either that or they don't see any other way to survive economically. What we (our governments) need to do is to increase people's knowledge on the matter so that they know how bad the situation in the Baltic Sea is and understand that if they keep on fishing like they are today, they're only postponing the problem. If the quotas are lowered, a large number of fishermen will be out of work. To prevent unemployment, we need to give them the opportunity for new education so they can begin new (cod friendly) careers.

An essential threat to a sustainable cod population is the overload of nutrient substances in the Baltic Sea. Many different kinds of algae (e.g. planktonic algae and filamentous algae) thrive in this overload, which makes it possible for them to flourish, divide, and grow much more rapidly than before. When these algae eventually die, they fall down to the bottom of the sea where bacteria and other organisms break them down. The issue is that these organisms, which will increase in number as a consequence of the extra feeding, consume oxygen. In many parts of the Baltic Sea the population of oxygen-consuming organisms have grown so large that they've entirely deleted the oxygen from the bottoms. The cod's eggs need a rather high content of salt in the water in order to survive and to develop. In the Baltic Sea, only the deepest bottoms are salty enough for the cod to spawn, and it's exactly these areas which now have become mostly oxygen-free. This has strongly restrained the cod's reproduction. To change this and give the cod stock a chance to recover we must stop polluting and eutropifying the Baltic Sea. Thus, an important measure is to make the industries and big cities clean their sewage, wastewater, and outflow before letting it back into the sea.

This could be done through stricter environmental regulation and more and improved sewage treatment works.

In addition to the measures mentioned earlier, a boycott could be an effective solution to the cod situation in the Baltic Sea. If no one bought cod products, the shops wouldn't gain anything from including them in their stock. Consequently cod fishermen wouldn't be able to earn a living on fishing. Theoretically this should be a very good way for common citizens to use their power as consumers in order to improve the cod situation. But would a boycott really provide the desired results?

Professional fisherman Rolf Petterson doesn't consider a boycott to be a solution. "It won't help, it won't help; the fish will just be exported instead. We fishermen, we are not affected at all by boycotts. For a boycott to help, the entire world would have to participate, and that's not very likely."

"However fishermen from Eastern European states don't care about quotas or regulations. They don't think the same way as we do. People who've experienced great poverty don't care about measures that long-term could save the cod. If they need the fish today in order to make their living, they simply catch it."

Rolf doesn't think that a total fishing prohibition in the Baltic Sea would help. "No, the Eastern European fishermen would continue anyway..." he finishes with a deep sigh.

In conclusion there are several ways in which the cod could be saved from extinction. However, with the continuing rate at which the cod population is now decreasing, in the near future these measures might no longer be enough.

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Photos: Rūta Jociūtė-Žolynienė

## *What can be done to reduce the Amount of Waste left in the Environment?*

Once I was walking in a park and drinking a bottle of lemonade. When I finished the bottle, I threw it down and went on. Suddenly, I heard someone calling me:

"Hey, please don't leave me here, keep the environment clean," the voice said. "Protect the environment." I turned around and saw that the empty waste bottle was talking to me.

"I have more exciting things to do than collecting waste and putting it in the waste bin," I said in a sarcastic manner.

"There are so many people like you who don't care about the environment, about the world, and about themselves. People want to destroy the world as soon as possible..."

"Leave me alone, waste bottle!" I said and wanted to go.

"Whenever people can go on foot, they will surely use their car; and whenever they can throw waste in special places intended for that, they will certainly not do it..."

"I don't care at all! I'll leave waste wherever I want. I'll use my car if I want to, even though I'm only going a hundred metres!" I shouted, as no one can tell me what to do, let alone a waste bottle!

"You are wrong to say that. You cause damage not only to yourself and others, but to the environment as well," the waste bottle said.

"But I only threw down one bottle..."

"Don't you care at all about what's going on around you? If everyone left a bottle in the environment every day, all we'd see around us just a few days later would be waste."

"Well, we have waste collection vehicles and street cleaners who collect waste," I said.

"And what would happen if no one cared about that? What would we do, if no one collected waste? Would we live with waste around, as if nothing had happened?"

"I don't know. Leave me alone, I don't care!" I shouted.

"Well, you should care, because this can happen in just a few years. You'll go to a park and see waste around you, go down the street and see waste around you, and there

will be plenty of waste next to your home, too! Have you ever thought where all that waste goes? Do you know that waste damages not only the environment, but you, too?"

"It only takes up space at waste dumps. Well, it also stinks as it decomposes. That's all the damage..."

"As waste decomposes, it not only stinks, but also has a negative impact on people's health. As much as 90 percent of waste is next to forests and spreads toxic substances."

"So what, I don't live next to a forest! So waste isn't dangerous for me."

"Have you ever thought that you're not the only one living on earth, and that there are three billion other people? Don't you care about them? Don't you care that waste might be dangerous for your children or grandchildren, as the amounts of waste continue to increase?"

"So what should I do? Should I work as a street cleaner, go after people and collect waste?" I asked sarcastically. "Let those who suffer from waste take care of it."

"Why don't you, people, see what's around you? You're a human being, but you think in a primitive manner. You don't care what's going on around you!"

"I do care about what's going on around me, but I don't care about some waste. And I'm not going to change. There must be a ministry of waste or something like that responsible for waste, right?"

"Would you like to know who's responsible for waste? For the time being, we all are. In other words – nobody. Many people think exactly the way you do. They believe that waste is not their business and that it should be collected by someone else."

"Let the authorities take care of waste. It's not our business!" I said decisively.

"Yet the authorities don't care either. Sure, there are some people who do care, but as soon as they see that it's a difficult duty, they abandon it. Therefore, you should care about what to do with waste, for your own well-being. Do you know that each resident in Lithuania throws away



approximately 275 kilograms of waste a year? And this quantity is increasing..."

It was the first time in my life that I thought about waste. Perhaps waste really has a negative impact on us, people? Perhaps we should deal with it somehow?

"I don't understand why waste can't stay at the dump until it decomposes? It shouldn't take long, right?"

"You should know that different amounts of time are required for different types of waste to decompose. For instance, paper decomposes in two years, whereas up to 200 years are needed for decomposition of plastic containers. It takes glass bottles 1000 years to decompose. Do you still think these are short periods of time?"

"Well, these are very long periods of time. So it will take you about 200 years to decompose."

"That's right. And it isn't only you that throws waste everywhere."

"I never thought it took so long for waste to decompose," I said, disgusted with myself. "I promise not to throw any waste around anymore..."

"You don't have to promise anything," the waste bottle interrupted me. "All we need is some effort, dedication, and results."

"Wait, but does it make any difference if I stop leaving waste around? Can the situation change if only I do so? Everybody has to do so!" – I said decisively.

"You're quite right. But you should always remember that even one person can make a difference."

"But I'm not a magician..."

"You don't need to be a magician. All you have to do is spread the word, because words are powerful tools. As soon as you see someone throwing down waste, you should ask them not to do it..."

"I don't think this will help. Nowadays people don't understand the power of words. And I'm one of those people myself. We have to act."

"Sure, we do have to act, yet the first thing to do is educate people on the topic of waste management."

"We need advertising! Well, no, we won't be able to change what's inherent in people. Parents should teach their children about waste processing. Small children do what they see others doing. When children see that their parents recycle waste at home, they'll also do it. We don't need any advertising; we should hold lectures for adults and make them aware of the problem!" I said, happy with my plan. "Waste bottle, I promise you that from now on I will try to educate not only my friends and family members, but other people as well. I stand for a clean and beautiful life and future!"

"Your words surprise me. I didn't think I'd ever manage to convince you. I'd like to wish you the best in implementing your plan and making as many people as possible aware of the necessity of keeping the environment clean. The environment will be very grateful!"

"I acknowledge my previous mistake. I promise that I'll change." Upon saying these words, I picked up the plastic bottle that taught me so many things. I learned that waste may not be thrown wherever we like. We must throw it in special containers, depending on the type of waste. So my plastic bottle had to go to the plastic waste container. Along my way I collected some other waste, too. I was feeling so good. I understood that even though I might be alone, I can still make a difference. I was sure of that.

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## BSP meetings and conferences in 2008

April, 1 <sup>st</sup>	Competition "Tales and legends in Baltic Countries"	Hosted by Poland. All BSP countries can participate. E-mail: jolanta.mol@pro.onet.pl
April, 9 <sup>th</sup> -12 <sup>th</sup>	International conference for teachers and students "Evolution of environment" in Vilnius	Hosted by Lithuania. All countries can participate. E-mails: rastine@zemynosgimnazija.vilnius.lm.lt ruta.jociute@b-s-p.org
May, 8 <sup>th</sup>	"Agenda 21 NOW!" internet conference	Hosted by Germany. All counties can participate E-mail: martin.jarrath@agenda21now.org
May, 25 <sup>th</sup> -30 <sup>th</sup>	International Environmental camp school in Pori	Hosted by Finland E-mail: simo.korpela@satabaana.net
September, 22 <sup>nd</sup> -24 <sup>th</sup>	International workshop with Poland for students "Fishery course no. 4"	Denmark and Poland. E-mails: soren.levring@sonderborg.dk jolanta.mol@pro.onet.pl
November, 6 <sup>th</sup> -8 <sup>th</sup>	Meeting for BSP National and BSP Programmes coordinators	Hosted by Lithuania. E-mail: ruta.jociute@b-s-p.org

## Contributions:

*Would you like to contribute to our Newsletter?  
You are very welcome!*

We are looking forward to receiving and publishing your contributions, such as:

- accounts of your work
- art works for the covers (size: 42x24 cm)
- letters to the editor, in which you are welcome to express your opinion on various environmental issues and articles published in the Newsletter
- newspaper and magazine clips presenting environmental issues in your country (the original article must be included)
- activity pictures presenting you and your students performing the BSP activities

There are, however, a few rules which you HAVE TO observe if you want your article to be published in the BSP Newsletter. There are:

1. Keep your articles short, precise and interesting
2. All contributions are to be e-mailed to

*ruta.jociute@b-s-p.org*

or sent by post (on CD) to:

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*Lithuanian Young Naturalists' Centre*

*Džiaugsmo St. 44*

*LT-11302 Vilnius, Lithuania*

3. No article is to exceed two A4 pages (text plus pictures)

4. All articles are to be composed as **WORD** documents

5. Please **DO NOT** include any photos, pictures, illustrations or any other scanned materials directly **IN** the Word document; they are to be enclosed as **SEPARATE** attachments

6. All photos and illustrations are to be saved in **JPEG** format (more than 1 Mb size)

The next issue will be published in December 2008.

[www.bspinfo.lt](http://www.bspinfo.lt)

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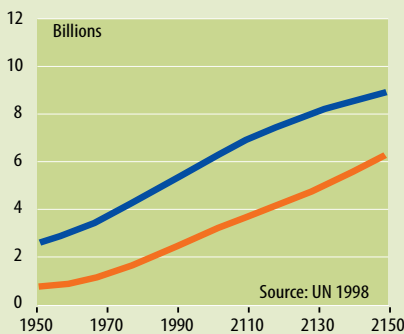


# BSP teacher, *help your pupils change future city life!*

WRITE A CHAPTER FOR THE NEXT BSP LEARNERS' GUIDE  
ON "URBAN ECOLOGY"!

On a global scale, there are now more than six billion people on Earth and of them three billion in towns and cities. By 2050, the UN expects there to be nine billion on Earth and of them six billion in urban areas. All growth in population will appear in towns and cities.

Thus, in the next 40 years, cities must be extended to double their present size — i.e. new towns must be built for three billion people in 40 years.



## Big cities as part of the total World population 1950-2050

Due to the expected climate changes, the arable land in many semi-arid countries will dry and undergo desertification. People will be forced to flee from these areas — to neighbouring urban areas and cities or to towns in other countries.

Most of these cities are located on the coast, and the centre is often a very low "downtown", which will be flooded by an increase in the sea level. This further increases the need for newly built urban districts "uptown".

Hence the earth will need new towns for probably four billion people or more within 40 years. How will this happen?

Cities are the most consuming regional installations: Nearly all resources must be transported to town: water, food, goods, building materials, and energy. And most of the production and waste must be sent far away if the city is to avoid poisoning. A demanding arrangement. Unsustainable. Energy-wasting.

This is why we need a handbook, the Learner's Guide, to point out the most promising solutions for our pupils to avoid this future scenario of would-be suicide for cities. Sustainable solutions may be better town planning for less traffic; recycling of resources, water household and cleaning; better insulation and heat technology for less energy consumption; sustainable energy technology (geothermal heat, wind, sun and wave power, fuel cells, nuclear power[?], biomass); new transport technology; and a changed urban lifestyle.

### How?

This is a question for all of us. The Learners Guide No. 8 should build on the same tradition as the former seven guides for describing the real state of the problem and deliver plans for interdisciplinary teaching of our pupils and students in order to make them aware and competent actors in their future (urban) life as citizens.

Do contact your national coordinator about your ideas and educational outlines, and you will be welcomed to the editorial group as a contributor to the guide. The editorial work will be followed by a teacher training course during week nine in 2009 at a site in one of the BSP countries in which promising new solutions for urban ecology are at hand. The Learners Guide should be printed by 1 June 2009.

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