

Outdoor learning

- documentation and inspiration for network of nature schools in the Baltic region and Sweden 2010



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1. Preface

The course has received funding in Nordplus Horizontal, which is funded by the Nordic Council of Ministers of the five Nordic countries and the three Baltic states. Funds were granted to establish a network of nature schools in the Baltic region and Sweden, and to create courses and course material for teachers in these countries.

At the UBC (Union of Baltic Cities), commission on education meeting in Tallinn April 3, 2009 the board decided to start working in a way of creating a network of nature schools in the Baltic region. To establish the network we plan to arrange three, one week long, pedagogical courses for teachers during three years. In connection to the courses, course material, in the shape of a pedagogical handbook, will be constructed and also distributed to the different partner institutions and participants. The courses and the material will be on three different themes:

- a) Outdoor learning
- b) Humans and nature, where nature is represented by three different biotopes
 - i) water, ii) the forest and iii) acre land
- c) Pedagogies in teaching climatic effects.

The Erken Laboratory has a broad experience in arranging courses, especially with participants from the Baltic region. Recent years the field station has focused on pedagogical courses and especially on outdoor teaching. Färsna Farm is a newly established Nature School, situated 7 km from the Erken Laboratory. The courses 2010 were held both at the Erken Laboratory and the Färsna Farm. The course material had different editors depending on focus of the course. This year the theme was “Outdoor teaching”.

Each partner will select and send three teachers from their country, school or region to attend each course module. They will also provide one lecturer during the three year period (depending on focus and applicability for the different modules) and the lecturer will send in the written material from the course to the editor for that pedagogical handbook.

Outdoor learning is a complement to the often too simplistic and literary learning environment of the classroom. Outdoor education will be a support, since text and language will meet other inspiring learning environments in a constant pedagogic process. After the course in August 2010 at Färsna farm and Erken laboratory in Sweden, we will make this pedagogical handbook. It's a documentation for the partners and we hope that it will inspire all participants to develop learning processes outdoors.

Anna Westerlund (Norrtälje Nature Conservation Foundation, Sweden) has written the major parts. Karin Beronius (Erken laboratory, Sweden) has written chapter 3.1 and Milvi Talts (Pärnu Nature House, Estonia) has written chapter 3.3. The purpose of the course and with this handbook is also to inspire other teachers in Sweden, Estonia, Lithuania and Latvia, to go outdoors with the pupils and see all possibilities.

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Norrtälje Nature Conservation Foundation, Färsna naturcentrum, Sweden



The authors will use both terms "student" and "pupil", depending on the age the exercises are suited for.

2. Outdoor learning



Who cares about an environment he is not bound to? Outdoor learning as an alternative pedagogy and method gives us an opportunity to establish a kind of silent knowledge, a sensory experience where words are not enough.

Anders Szczepanski¹

Outdoor learning is about learning in authentic environments. A new world will open up when we leave the four walls, the limited traditional classroom. We learn in the forest, in the garden, by the lake and at the farm. It's a fascinating thought that student's classroom doesn't have any limits. Their ability to find knowledge today and in the future are unlimited. Outdoor environments are a knowledge of source. We are working with the past, present and future. Nature offers excitement in form of environments, varying weather and fascination of nature's mysterious.

Learning will take place in interaction with indoor and outdoor environments. Outdoor learning and discoveries should always be supplemented by work indoor with documentations, reading in books, reflection and analyzes. Reflection is central in the process of learning. Why was this so? Why was it different in different places? What have we learned? Reflection is necessary to transform experiences into knowledge.

Outdoor learning isn't just about nature and outdoor life, it's also about history, culture, geography, language and so on. Outdoor education want to show connections. Thematic interdisciplinary studies and activities in the outdoor life are important. The participants are in this way, understanding the abstract concepts by feeling, hearing, listening, tasting and doing-using all senses and "the whole body".

The key is experiences and activities, in which pupils are "learning with the whole body" and all senses. It's an exploratory way of working and experiential learning. Questions and curiosity appears and will be captured by active teachers. Learning is a process.

It's also very important to get to know the pupils previous knowledge and experiences. After that, we know where to begin.

The group is very central in outdoor learning. It is important to succeed together. The teacher is also a part of the group and we learn together.

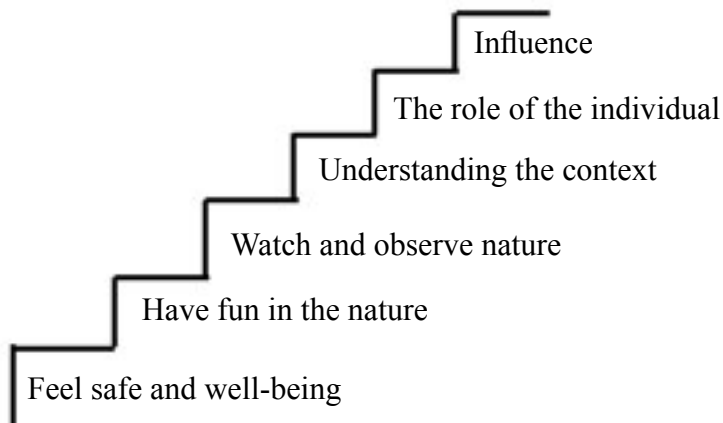
¹Szczepanski Anders, Outdoor education-literary education and sensory experience, Linköping University, 2005

Outdoor learning is a way to work towards sustainable development!

In the work at Norrtälje Nature Conservation Foundation at Färsna farm, it is important to give the participants positive experiences of the nature.

In outdoor learning and learning in all, start at the accurate knowledge level of the participants. What does he/she know from before and what are his/her experiences? As teachers, we need to get the participants to feel safe and content in the wild. We must respect all fears. We wish for everyone to feel how great nature is and a place for:

- tension/ excitement
- recreation
- learning/knowledge
- experiences
- health/ well-being



Living knowledge is not found in books, statements, or verbalized theories. Thus we cannot find it in the brain nor in the soul. Living knowledge only exists in the sharp of living people in their activities. Theory becomes knowledge only when its verbal message is put into living practice.

B. Molander²

²Molander, B. Kunskap i handling (Knowledge in Action), Daidalos, 1995

3. Inspiring examples and methods

3.1. Waterday Erken laboratory

Karin Beronius, Erken laboratory



What is a Waterday?

The waterdays offer school classes an insight in how it would be like to work as a researcher in limnology. The students will collect material/animals/samples, perform analyzes and draw conclusions about plants and animals and how they adapt to different environments.

The aim is to make the students connect to their environment and create a relationship with it and the animals that live there. We believe that this will induce a will for sustainable living and a sense of responsibility towards nature. At the same time, the students are trained in cooperating as a group, communication and the scientific method.

How do I start?

A waterday is introduced to the students with a lecture in basic Limnology (science of the Lake), which you can find on the course web site (<http://www.ebc.uu.se/norr.malma/nature%20school.html>). The class is divided into an appropriate amount of groups (depending on how many projects you can use and number of students in the class) and preferably each group does not contain more than four students. The groups can also be divided before you start the lecture.

What do I need?

The list of material can be adapted to what you have at your school, but here is a suggestion:

- Secchi disk
- Plankton net
- Plankton bottles (any bottle will do)
- Ekman grabber
- Ekman strainer
- Sorting tray
- Larger plastic bowls (for Ekman samples)
- Crayfish nets
- Floats (to mark nets for fish and crayfish)
- Plastic jars (for animals and plants)
- Tweezers
- Strainers
- Landing nets (strainer on a stick)
- Wading pants (fishing pants)
- Larger plastic bowls (used when you search for small animals in the field)
- A boat
- Fishing nets

How should the students work?

Each group is then provided with a handout which explains their task (see print outs). The handout also includes instruction for how the students are to present their work. Note that you can use as much or as little information as you wish from the written material. You may also let the students present their work as a written report or you can make a written test to see what they have learned.

After they have read through the instruction, the students should create their own hypotheses (one is enough, but it is better if they have several short rather than one complicated). Make sure that the hypotheses are testable and help the students to formulate a suitable method for testing it.

After this, the students gather their material and are sent into the field for sampling. You need to adapt the time depending on how far away the sights are and what expectations you have on the students result. Make sure all students are clear on where to go and what they should do when they arrive at the site. Try to visit every group (or send an assistant) once during the fieldwork.

All gathered material is collected at the site where you had the introduction and that is where you start the session of analyzes.

How do we analyze the result?

All groups will analyze their own material and you should provide them with the material you keep at your school. You can use hand lenses, loupes or microscopes for species definition and a simple guide for water animals and plants in your language. If you have trouble finding literature, please contact Karin Beronius (karin.beronius@ebc.uu.se) who can provide some simple literature in English as a PDF.

Many hypotheses that the students create does not include species definition and if this is difficult for you, you can also tell the students this in advance. Good examples of hypothesis that does not include specific species definitions are:

- a. There are more animals at a sheltered beach than at an exposed
- b. At exposed beaches animals are good at attaching to rocks
- c. There is life at the bottom of the lake/stream/beach

At the end of this session, the students should also try to draw some conclusions to their results and here you should try to guide them by making them think about connections and how life works.

How do I evaluate the students?

I prefer to give feedback directly when the students present their work, but as I wrote in the beginning, you can also let the students write a report or a test which you can evaluate.

Print outs for the students are presented on the following five pages.

Good luck!



Open water, fish

Who has not sat in a boat a warm summer night and fished for perch? Some have perhaps even tried to fish from the ice during winter? But to put out fishing nets to study how the lakes fish life looks like, is perhaps not something that everyone has done?

In this project, it is just that you are going to try. What is the fish life like in Lake Erken? What differences are there in different places in the lake? Are there variations in the surrounding environment and what impact do the variations have? If you choose two different locations in the lake, will you find any differences?

After you have created a hypothesis, the foundation of scientific work, you should formulate a research plan for how to answer it/them. Think about that a hypothesis should not be wide, but preferably answered by a yes or a no. Before starting your field work, you also need to make a list of all the equipment you are going to use.

After conducting your research plan, you will have result (expected or unexpected). What remains now, is to try and evaluate and analyze your result and to try and come to a conclusion. The entire project work will at the end of the second day be presented for your classmates and teachers. Prepare your presentation with OH-pictures or power point.

Suggestion on material to use

- Fishing nets, 1 or 2
- Floats, 2 or 4
- A boat
- A large bucket for the bringing the nets out and in



Presentation (about 10 minutes)

Should include:

Introduction – tell about where you have been, describe the area and explain your hypothesis and why you chose it/them.

Method – describe how you reasoned when you decided on the method for falsifying your hypothesis. Show how you did it in practice, and do not be afraid to bring the equipment into the classroom. What the students see and notice, they will remember!

Result – present the results that your investigation led up to. You can, for example, use a table on how different factors varied in different sites.

Discussion – Now you should try to explain your results. This is the biggest part of your presentation and the time when you describe your thoughts and analyses. Motivate your statements with literature and words from your teachers.

Conclusion – tie everything together by returning to the introduction and repeat, in short, your result and analyzes. Thereby you will answer the questions you started off with and the reason for your work will be clear to everyone.

Before you end, have a few questions prepared for your classmates. This is a learning activity, and it is your responsibility to make sure they bring new knowledge home!

Open water, plankton

Who has not sat in a boat a warm summer night and fished for perch? Some have perhaps even tried to tipple during winter? But how many are there who have continued to look for the smallest life in the open water?

That is what you will do in this project. You will examine plankton, both phyto- and zooplankton, in various places in the lake. Where in the lake will you find plankton? Deep down? At the surface? Near the beach? And what are the different types of plankton you will find in Lake Erken?

After you have created a hypothesis, the foundation of scientific work, you should formulate a research plan for how to answer it/them. Think about that a hypothesis should not be wide, but preferably answered by a yes or a no. Before starting your field work, you also need to make a list of all the equipment you are going to use.

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Suggestion on material to use

- Secchi disk
- Plankton net
- Plankton bottles
- A boat

Presentation (about 10 minutes)

Should include:

Introduction – tell about where you have been, describe the area and explain your hypothesis and why you chose it/them.

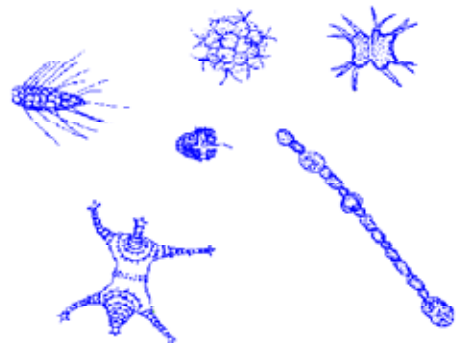
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Benthic fauna / crayfish

The vast majority have fished for perch or walked along the beach and looked at snails and clams and found plants that extend above the surface of the water. But how many of you have gone down, under the surface, right down to the bottom of the lake? In this project will you create a hypothesis that concern to the benthic zone and the life that exists there. What you will find? What adjustments are needed for a life on the bottom? What are conditions?

After you have created a hypothesis, the foundation of scientific work, you should formulate a research plan for how to answer it/them. Think about that a hypothesis should not be wide, but preferably answered by a yes or a no. Before starting your field work, you also need to make a list of all the equipment you are going to use.

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Suggestion on material to use

- Ekman grabber
- Larger plastic bowls
- Crayfish nets
- Floats
- A boat
- Ekman strainer
- Plastic jars
- Sorting tray
- Tweezer



Presentation (about 10 minutes)

Should include:

Introduction – tell about where you have been, describe the area and explain your hypothesis and why you chose it/them.

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Before you end, have a few questions prepared for your classmates. This is a learning activity, and it is your responsibility to make sure they bring new knowledge home!

Wind sheltered/wind exposed

Surely you have sometime walked and bathed on a beach? Preferably long, golden, sandy beaches with clear water and waves to play in. But do all beaches look the same? And if not so, then why? What differences in the environment can you find and what affect does it have on the animal life in the water? Do you find the same kind of animals on a beach that is exposed to the wind, as on one that is sheltered?

After you have created a hypothesis, the foundation of scientific work, you should formulate a research plan for how to answer it/them. Think about that a hypothesis should not be wide, but preferably answered by a yes or a no. Before starting your field work, you also need to make a list of all the equipment you are going to use.

After conducting your research plan, you will have result (expected or unexpected). What remains now, is to try and evaluate and analyze your result and to try and come to a conclusion. The entire project work will at the end of the second day be presented for your classmates and teachers. Prepare your presentation with OH-pictures or power point.

Suggestion on material to use

- Strainer, 3 per group
- Landing net
- Wading pants (fishing pants), 1 per group member
- Small plastic jars with lids, 20 per group
- Rain clothes
- Larger plastic bowls
- Tweezers



Presentation (about 10 minutes)

Should include:

Introduction – tell about where you have been, describe the area and explain your hypothesis and why you chose it/them.

Method – describe how you reasoned when you decided on the method for falsifying your hypothesis. Show how you did it in practice, and do not be afraid to bring the equipment into the classroom. What the students see and notice, they will remember!

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Before you end, have a few questions prepared for your classmates. This is a learning activity, and it is your responsibility to make sure they bring new knowledge home!

Streaming and still water

Who has not seen the picture of Astrid Lindgren's Emil and Alfred in the creek catching crayfish? But in addition to crayfish, what can be found in the water that flows? Will you find the same things as in water that is still? And why do crayfish thrive so well in streaming water? How big are the animals you can find in all the different locations? Are there differences between the streaming and the still water?

After you have created a hypothesis, the foundation of scientific work, you should formulate a research plan for how to answer it/them. Think about that a hypothesis should not be wide, but preferably answered by a yes or a no. Before starting your field work, you also need to make a list of all the equipment you are going to use.

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Suggestion on material to use

- Strainer, 3 per group
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Before you end, have a few questions prepared for your classmates. This is a learning activity, and it is your responsibility to make sure they bring new knowledge home!

3.2. Natureday Färsna farm, Norrtälje Naturvårdsstiftelse

Anna Westerlund, Norrtälje Nature Conservation Foundation

At Färsna farm and the surroundings we offer groups naturedays. We want to inspire them to learn and study in nature. We are a complement to preschools and schools, but even to other groups. We teach the pupils and students to learn in authentic environments- we learn together in the forests, in the fields, in the garden and in the farm.

3.2.1 Our unlimited classroom- Surrounding environments

The nature and the surrounding environments are a gift to us. We can learn so much from the landscape about our history, we can learn chemistry and physics when we look at the seasons and the different phenomenon in nature. The environments and the nature will inspire us to learn more, write, read, paint, analyze and draw conclusions.

- **The garden**-a place for learning, recreation, accountability and cooperation. It's fantastic to follow the garden through the year - in autumn, in winter, in spring and in summer. The pupils can count how many packets of seeds they need, solve problems, take care of the plants, bake a cake of carrots, paint a picture or read about different species. For example, students from high school in Norrtälje have built a hot-bed (horse dung, soil - covered with windows) this spring. The experiment was a practical laboratory for our students in their Ecology course at Färsna farm. The thermometer in the hot bed showed 30 degrees quickly. The surrounding garden soil was only 8 degrees at the same time. That's a good base for reflection, analyzes and learning.



- **A big spruce** - a fantastic place for storytelling or important meeting in the class.
- **The brook or a beach**- a perfect place for students to work with mathematic (volume).

- **The anthill-** here we can be studying the ants closely. What are they eating? How strong are they? How can they survive the winter?



- **Forest-** the pupils can study mushrooms in autumn, buds on trees in winter, bugs in the old stump. It's also a fantastic place as a playground. Children play different games in the wild spirits. Girls are becoming more robust. The games are more creative. In the nature children found out their own challenges. Many leaders say that nature is gender neutral, and Eva Änggård (Mälardalens university, Sweden) is researching children's play in nature. Her research confirm this.

3.2.2 Language

When we are going out in the wild with the pupils, they are training their language. Named species will increase children's vocabulary. The discussions and the investigations are developing the communications. The outdoor environments are also valuable how to learn foreign languages. The pupils talk much freely and they try to communicate in different ways.

3.2.2.1 Letter-hunt

This is a practical exercise for small children from 5-8 years.

Preparation:

The teacher is hanging up the signs with clothespins, in trees and bushes in the nature or the schoolyard.

Method:

When the teacher says: -Ready, steady, go!...the hunting will start. The pupils are going to find one sign at a time, run to the teacher and put it on the ground. Then they continue to find another and so on, until they have found everyone.

Now you can sit down in a circle. Is there anyone who can jump on your first letter in your name? Is there anyone who can jump your name?

After this the children can try to "write" words and hanging up letters on the rope (use the signs and clothespins). For an example A-N-N-A. After the student have read the word, everybody read together.

It is possible to play with the letters and their sounds for a long time. You can do the same exercise many times.

Reflection:

What have we learned? Maybe that some of our names are short and some of them are very long. "A" is a common letter, but "X" isn't used so very often in our language.

This moment is very important for the children's way of learning reading and writing. The letter hunt can also make some of the children interested in letters, if they haven't been that before.

Suggestion on material to use:

- Signs with letters (laminated)
- Clothespin
- Rope



3.2.2.2 Verses

An exercise where the pupils try to match things in nature with a description.

Preparing:

Write verses on cards and laminate them.

Method:

The pupils are going to work in small groups. They are now going to bring the different things that they can read on the card and put the things on the cloth.

Reflection:

The pupils read from the card and show what they had chosen. What was difficult? What was easy?

Suggestion on material to use:

- Cards with verses (laminated)
- White cloths

*Can you fetch something green
and something that feels nice.
A little funny thing,
and something you want
to give to me.
A stick that looks like Y
and a flower that is new.
Something that is from last year
and something that will
grow next year.
And at last something that is a little yellow.*

3.2.2.3 Opposites

In this exercise the pupils learn opposites.

Preparing:

Write card with opposites in your own language or in another language.

Light	Dark
-------	------

New	Old
-----	-----

Soft	Hard
------	------

Bring boxes for eggs.

Method:

The pupils are going to work two and two. The pupils take a box for eggs and a card with opposites. Now they have to walk around in the nature and find things that are soft and other things that are hard. When they are finished they are going to have a presentation for another group or teacher.

Reflection:

- *Is this hard?*

- *Yes, this stone is hard!*

Suggestion on material to use:

- Cards whit opposites (laminated)
- Boxes for eggs



3.2.2.4 Story-telling

The narrative is important and something we should take care of and develop. We can all become a good storyteller if we are practicing. Nature and environment provides us with good conditions. If we are connecting the surroundings to the story. "A long time ago, a boy was sitting on a rock like that...". When we are weaving wild blur into the story, the boundary between truth and story disappears. The story is real and now!

The forests creatures are important in Swedish culture and history. There are many stories about elves, trolls and giants. This story-telling will inspire the pupils to tell, listen, read and wrote.



3.2.3 Mathematics

There is mathematic everywhere outdoors. You can practice different concepts with small children, when we are climbing on the stone, beside the tree and under the bridge. We can also discover geometry in flowers, bugs, leaves, snow and so on. Here you can see a triangle that a boy found outdoors!



3.2.3.1 Mathematic-track

Calculate with nature

Preparing:

Tie up a rope in the forest in between some trees. Put up signs with mathematical tasks. Examples:

- Find something small
- Find something big
- Give the fox as many stones that he has legs
- Bring a stick that is as long as your hand

Write the tasks on paper and laminate them.

Method:

Let the pupils walk in small groups. They can solve the tasks together or alone. They have to tell how they thought to each other.

Reflection:

We are thinking in different ways and we can learn more mathematic when we talk to others. The discussions are very important in the process of learning. It's also very important for the teacher to hear the pupil's thoughts and theories.

Suggestion on material to use:

- Rope
- Cloth pins
- Signs with tasks



3.2.4 Ecological connections

The aim is to understand the various environmental factors that influence the number of individuals within an area. Here is an exercise of moose.

3.2.4.1 The moose

Preparation:

You need a white cloth and a good place to make the activity.

Method:

Begin by asking students what environmental factors moose need to survive. They need food, water and shelter and other things. Take the three proposals, which you illustrate with characters.

Food - Keep your hands on your stomach

Water - Keep your hands close to your mouth

Protecting - Hold your hands like a shelter

Try to ensure that all participants have understood the characters.



Divide the class into two parts. Each part forms a line and set up against each other at about 15 meters away. The first stage is the moose and the other, is what the moose needs-food, water or shelter.

The “moose” and “environment” turn away from each other.

Random may each choose proposals for what you want-if you are a moose, or what you want to be - if you belong to the environment.

When the teacher then shouts: ”Turn”, the ”moose” start running and try to find their needs. If the moose find what he needs, he survives and it is now two moose. If he fail ”the moose” die and become ”environment”.

Try another time at the same way and start keeping statistics, through the cones. A pine cone for each moose on the white cloth. Show the participants statistics for the first year and continue to play in four years.

Reflection:

What are happening to the moose? Are there other factors that affect moose? The pupils can propose traffic, hunting and environmental degradation. Playing on again and let the participant be a hunter, which may also take moose. Is it possible to hunt every year?

An amazing exercise in which participants in a playful way, get ecological understanding! This activity can be further developed in many ways with the pupils.

3.2.5 Historically project

An example of a nature day at Färsna farm is to work about history. The pupils should be cooking outdoors, making historical handicraft, making fires in different ways, “hunting” and gathering and so on. Can we see tracks from people living here before us when we are studying the landscape?

Here are some inspiring activities for pupils to give them their own first-hand experiences. Inspiring activities are key factors in learning about natural and cultural phenomena in an authentic environments. When the pupils are affected- they get curious, interested and want to learn more. Their own experiences are a base for documentation, reflection and analyzes.

3.2.5.1 Fox walk

It's important how we enter the nature. Children often talks very loudly and it's difficult for them to discover and see nature. One way to enter nature is to walk like the Indians, fox walk. I will try to describe in words...

Stand in a circle, lift the right leg and put down the smallest toes, roll over on all toes. Place the pad on the ground and then the whole sole of the feet. Does it feel stable? If so, add the weight of your body on the front foot and then lift up the left leg. Repeat. Put the smallest toes, roll over on all toes. Place the arch of the foot and then the whole...

3.2.5.2 Fire

The fire has been important for people for a very, very long time. We want all children and youth to learn to light fire - a knowledge for life. We are testing how different types of woods are burning. What exactly is fire?

The fire is also a place for community. Sitting around the fire is maybe the best place for conversation and it's also a place for reflection.



3.2.5.3 Handicraft

The knife is an amazing tool. Norrtälje Nature Conservation Foundation, Sweden, lets pupils take a knife certificate, so that they can handle a knife in a safe way. Being able to handle a knife safely is useful knowledge for life.



More handicraft...

It is exciting to make braids of various natural materials and with different techniques. Historically people used the whole animal for different purposes. For examples they also used tendons from the animals to make ropes and strings. On the photo you can see a historically way of making a braid.



3.2.5.4 Forestry

The forest is a great resource in different ways. Students can study the forest's diversity. What do we have the forest for? How do we care for forests? Does forest owners have different purposes with their forests? How old is a tree? What does it cost? When are we bringing plants?



3.2.5.5 Reflection, discussion, analyzes and documentation

The experiences are going to become knowledge. Pupils should reflect and analyze, read facts and work in different ways- outdoors and indoors. The experience-based learning provide lasting knowledge.

3.3. Freshwater molluscs project

Milvi Talts, Pärnu Nature House

Advice to the teacher for conducting "Freshwater Molluscs" observation.

Fauna is very diversified in the lake: some species live deep at the bottom, others do move around actively or float in the water. For that reason it is recommended to choose a specific species for observation, for example snails and shells or just shells. It is important to consider how much time will be spent for the observation.

Survey at the lake or river offers lots of delight for the pupils, giving also practical experience and helping to transfer theoretical knowledge into practice.

Tips for the teacher:

1. Informing pupils

Regardless the study method we are planning it is always important to notify pupils prior about the process explaining also the purpose:

- To get to know the species
- Methodology to conduct the observation
- Use of encyclopedia
- Forming a collection
- To get to know the species of your local lake etc

2. Choosing the place

It is recommended that a teacher would observe the place before the actual observation, getting the map, transportation etc.

3. Safety requirements

The site where observation will be performed should be easily accessed and safe. Also children must be warned and instructed repeatedly about safety rules and any possible danger.

The worksheets on following three pages have been compiled for the medium- and higher-grade pupils.

Size of the group: 4 pupils, so that everyone would be involved in the activity. As it is a group study each pupil has a specific task. NB! Observation will be performed in different areas at the lake - one group at the lakeside, one in the place where flora is rich, others on the lake with a boat (life vest is a must) etc

Tools for every group:

- clothing according to weather conditions, waterproof boots and lifewests
- work instruction
- writing instruments for making notes and drawings
- water- and air thermometers
- indicator papers to determine pH level
- camera
- vessels for transporting species
- boxes for empty shells
- ruler
- tags to mark down the names of species
- encyclopedia of freshwater molluscs

WORK INSTRUCTION
GROUP STUDY
FRESHWATER MOLLUSCS

Observers:
School
Grade

PLACE OF OBSERVATION:

DESCRIPTION OF THE OBSERVATION PLACE:

.....
.....
.....

OBJECTS OF OBSERVATION: snails/ shells

1. TASK

Data of observation:

Date time

Temperature

In air in water

Transparency of water: clear/ turbid

pH

Notes (possible pollution)

.....

2. TASK

Write down (or take picture and enclose to the observation sheet) the plants growing in the water or at waterfront:

.....
.....
.....

3. TASK

Collect the objects observed as many as possible, both alive species on site and empty shells collected for further collection. (Please use specific tools and vessels).

Attention! Be cautious while collecting live species not to harm them!

4. TASK

Write down the species collected:

1.
2.
3.
4.
5.
6.
7.
8.
9.

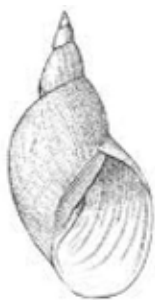
As a result of the observation fill in Table no 1 snails, Table no 2 shells- separately for each species.

Note! In case it is not possible to determine the object based on visual observation a photo could be attached.

5. TASK

OBSERVATION OF SNAIL'S

5.1. Find on a drawing: highest point, aperture, outer lip, coil, spire. Specify the coiling direction of a shell, is it left or right.



5.2. Compare the shells of snails and find one species from each - with a short, medium and long spire. Write their names on the observation sheet:

1.
2.
3.

5.3. Analyse the appearance, size and diversity of pigmentation of snail shells:

.....
.....
.....

6. TASK

OBSERVATION OF BIVALVE'S SHELL

6.1. Observe shells of different species of bivalve. Acquaint yourself with the morphology of shell's valves. Find umbo, ligament, teeth, pallial line and growth lines.



6.2. Compare outer and inner shell structures of river and lake bivalve. Describe the features that distinguish them (shape, color etc).

.....
.....

7. TASK

Choose and draw one of the species (snail/ shell) as accurately as possible.

TABLE 1

SNAILS/GASTROPODA

SPECIES

No	Lenght	Height	Color	Age	Mutation
1					
2					
3					
4					
5					
...					

TABLE 2

SHELLS/BIVALVIA

SPECIES

No	Lenght	Height	Color	Age	Mutation
1					
2					
3					
4					
5					
...					

4. How to be a fantastic leader outdoors?

It is very important to develop your leadership and remember that you are a part of the group- we discover, learn and reflect together outdoors and indoors. On the courses in august 2010 at Färsna, the partners of the project were having a discussion about our leadership. Read this sometimes and remember that it is a hard job to be a great leader- but it's so exciting and we are very important for many children and their learning-processes!

We are having a really important job, now and in the future!

Voices from the participants:

- Flexibility(season, weather, group...).You must have a back-up plan.
- Creative.
- Has to be open for new ideas.
- Good knowledge about nature and outdoor life will raise the safety of the leadership.
- Know the place well, where the pupils are working.
- Leader must be enthusiastic in his/hers deal (love nature, love teaching, love to be outdoors etc.). Tell the student that you like to be there with them!
- The leader has to see all the good qualities in children and has to tell them out loudly.
- Leader's role is to guide students in their learning and get them to learn more.
- The leader must have the control of the learning process, and move the group or the student in right direction.



- A good leader does a little work-students do a lot! You have to lead children's work in nature and allow them to do a lot of things by themselves.
- Think about others –there well-being.
- Can solve problems fast and together with others.
- Allow for children to decide what to do and in same time to keep rules- Give the children responsibility by them own.
- Be well prepared.
- The group is important. The leader should know the good qualities of a team member and use them for the benefit of the team. Children and adults are learning from each others.
- The games and activities should be such that all children feel successful. Cooperation must be promoted.
- The safety should always come first. It's important to have plans in case of an accident.

To take care of the pupils discoveries, it's best to be more than one teacher if possible!



5. Addresses of the partner “Nature schools of network”

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