

# The school's surrounding as a classroom

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*The aim of this paper is to explain how in teaching science it is necessary that we (teachers) direct the children, to feel the nature with all the senses and so they will experience it as much as possible. The contact with nature and real experiences are for children the best teacher. The scientists on Faculty of Education, University of Ljubljana, endeavour to educate good teachers for Primary school and Infant school, who will take the pupils when they will finish their study, as often as possible to the nature and so that pupils will get a close contact with the nature as much as possible.*

It is difficult for biologist to imagine teaching biology without going with the pupils in nature and so attract their interest to observe the variety in differences of organisms, their significant features in structure and function of the body, their peculiarity and where and why these organisms live in specific environments.

The scientists on Faculty of Education, University of Ljubljana, endeavour to educate good teachers for Primary school and Infant school, who will take the pupils when they will finish their study, as often as possible to the nature and so that pupils will get a close contact with the nature as much as possible.

In teaching science it is necessary that we direct the children, to feel the nature with all the senses and so they will experience it as much as possible. The contact with nature and real experiences are for children the best teacher. More the children know about nature, more they love it and so they will respect it.

Let us see how it is in practice. Are the teachers of Primary school really teaching about nature outside (in nature)? Although majority of teachers know how essentially important for children is the real contact with nature we know from practice, that with some exceptions (when children have project day or field work), teachers do not take children out the classroom or very rarely, and on the other side it happens not very often or even never to bring a piece of nature in the classroom. Where are the reasons?

The teachers quote different excuses and among them there are some most frequent:

- In one hour the teacher can not teach the entire chapter. So the reason is not enough time.
- Near the school there is no forest, meadow, pond or river. To get there the pupils will spend too much time, most of the time which is intended for teaching about nature
- The teachers are afraid of undisciplined children. So the problem is how to keep discipline out the classroom.
- Teachers do not know what activities are appropriate for the children in nature, what kind of activities can children do, how to plan the practical work in nature. So the problem is that teachers have not enough ideas for working activities in nature. Working activities are time consuming and need a lot of teachers effort to prepare good and interesting activities that children would like to follow them.
- Many excuses are heard on account of bad weather. In winter teachers say that it is too cold and snow prevent work in nature and also that in winter there is not much plants and animals and so there is no much to see.

Let us see how we could soften (start to solve) the problems I just mentioned:

- Also in one hour time it is possible to do many things and sometimes we can combine two hours together. So in this case we do not plan a long excursion but the work around the school. Even there is no forest, pond or a stream around the school but there is usually some trees, bushes, hedgerows and some grass areas, which can be very interesting classroom in the nature. Even very modest surrounding around school can be of great help to teacher when children observe organisms out of the classroom.
- We can find different animals if we turn over a stone, old branch or wooden board, which is near school.
- We can observe plants and animals on stone or concrete fence.
- We can observe plants on our way to school although it is made of asphalt or made of blocks.
- If children will observe carefully they will see that plants can find for themselves different environments, some even between gaps in asphalt or blocks.
- Every corner around school the teacher can use in teaching science.
- When in surrounding of school are two or more trees, the teacher can do much more out the classroom and can activate children to do some practical work. In primary science we must activate children that they will be able to

observe and use as much as possible senses and so they will remember much better what and why they did specific activities.

Let me state some simple activities which we can do with children in school surrounding. These activities are simple and we can do two or three in one school hour. Children can:

- Measure the height of the tree, the length of branches and circumference of the tree trunk.

- Under the tree they mark 1 square meter and observe and make notes which plants grow in this marked area. How many different plants (even if they can not name the plants) is in this square meter. They observe if there is any difference in variety and number of plants growing under the tree or one meter away so that the shadow of the tree crown is not falling on the marked part (Fig. 1).



*Figura 1: Pupils observe difference in variety and number of plants growing under the tree.*

- They observe if there are any animals or nests in the tree crown

- They make the a bark print

- Children with covered eyes touch the tree bark, the

circumference and the shape of the trunk and they try to recognise the tree later with uncovered eyes.

- They observe the shape of the tree crowns, they are drawing it and compare the different crowns among them

- They observe the shape of the tree branches and the arrangement of the leaves on a branch.

- They collect leaves of one tree and compare among the leaves of other trees. Are all the leaves of the same tree equally big, of equal colour and shape?



*Figura 2: Pupils observe which animals live in the grass and which in the soil.*

- They observe the arrangement of leaves veins.

- They observe if there are any animals or plants on bark of a tree?

- They observe which animals live in the grass, which in the soil (Fig. 2.)
- They observe the spider webs and they can put a web on a piece of paper to take in the classroom

If we are planning the work out the classroom it is not necessary, the children observe only organisms which are alive but we can direct children's attention somewhere else and we still direct children to accurate (exact) observation. Children can observe how many different colours is in the surrounding, they seek for objects of different shapes, they look for objects which are different in structure and are different in touch (smooth, rough, mucous, cold, ..) different in size, different in weight, of different smell.

So there is a lot of possibilities, we must be only inventive and we need to have enough different ideas.

Before we leave the classroom we must give the children the exact instructions, what we shall do in nature and why, what we need for our work in nature and what we shall report when we shall come back to the classroom. We must give the children different working activities, which will be interesting and attractive for children. Maybe we shall bring some organisms for a short time in the classroom, that we shall observe them under a magnifying binoculars or microscopes. After the observation we must return the organisms there where we collect them. If the children will be motivated and they will get the exact instructions, what they have to do outside, there will be no problems with the discipline. It is very important that the children are working independently, by themselves or in pairs, and the teacher is only direct there work if the children need some assistance. Independent work develop children creativity and such work will reach the aim we planed (Fig. 3).

Of course such kind of work demand from the teacher a lot of effort and preparations because the teacher has to plan in advance the work in nature and has to prepare the working sheets. With a little inventive faculty we can make with the help of children a garden-bed and we plant different plants which we shall need during the year when we shall teach different chapters in science or biology. Children will take care by themselves for the garden-bed because they know it is their own property and they will water the plants and do all necessary work on a garden through the whole year.



*Fig. 3. Pupils work in pairs out of the classroom, observing the animals and following the instructions on a working sheet.*

Some schools in Slovenia did with the help of enthusiastic teachers the teaching paths around the schools. Some schools arrange a pond near the school. So these children can observe the dynamics of this ecosystem through the whole year, they learn about plants and animals, there living habits and their needs and so they learn a lot about legitimacy of life.

Pond is a small, but complete ecosystem. This ecosystem is self-sustaining and here as in each ecosystem we can find producers, consumers and decomposers. Each plant and animal has an important place in food-chain, at cycling the matter and passing the energy from producers to consumers. More the children will have opportunity to observe different organisms very close and in their natural environment, more they will be informed about the features of living creatures, how they are connected in food chains, they will learn about reproduction, development of different species, how organisms breath, excrete, move, grow and how they react on specific irritation. Children can be acquainted with variability of the species, how they accommodate on different environments and with evolution of the species (Fig. 4.).



*Figura 4: Pond dipping and observing the pond as a complete ecosystem.*

*Figura 5: Observing pond animals and using a simplified key for identifying pond animals.*

Observing the pond as a complete ecosystem, the children will get the basic knowledge of ecology and how the animals and plants are interconnected and how they depend on each other and on specific environment. Although we can observe one species in ecosystem we must know that one species is a part of bigger community of different organisms and nonliving environment. The whole ecosystem is self-sustained equilibrium, which can be demolish very easily because of the influence of man or other natural catastrophe (fig. 5).

Some schools in Slovenia had build a classroom at the open air. Near the school they build the tables and benches. The children attend the classes of biology, science and also mathematics and art. There the children feel much more free than in a small classroom and teachers said that work with children is much more efficient. Children are much more calm and disciplined than in the classroom, so the result of teaching is better.

In Slovene curriculum is also compulsory that twice in a year children have a whole day for observing and researching nature (project day, field work). So teacher can take the children somewhere more far from the school (in the mountings to the sae shore, into the forest).

But one day can not replace the whole, continuos work in the nature no matter if this is only one hour per week or month. One project day demands from the teacher much more preparation and if this is the only chance for children to go out in

nature, the teacher will have much more problems with the discipline than with the children which are used to go to nature more frequently. If the teacher will make a good plan for the work on a project day and if the children will be active and busy with the practical work and observation, greater satisfaction the teacher will have.

Some teachers have a problems which activities to choose, how to occupy the children that they will work by themselves and be productive and learn as much as possible.

In our Faculty of Education professors which are teaching science endeavour that students for primary and infant school teachers will be well trained for the field work. We also provide students with working sheets for practical work. We also organise the seminars and write the teaching materials and books for practical work in nature. I wrote the book for pond dipping, for practical work at the sea shore (Bajd, 1995, Bajd, 1997) and 5 simplified keys for identifying organisms (sea shells, winter twigs, ferns, freshwater animals and animals living in the soil) (Bajd, 1996, Bajd 1997, Bajd, 1998a, Bajd 1998 b, Bajd 1999).

In Slovenia we also have some journals for teachers and pupils, where they can get some ideas for practical work.

It is very important that we take children out of the classroom in all seasons, also in winter. We can observe the branches and twigs of the tree and bushes and the buds on the twigs, their colour, size, shape, structure and position. Near the school we can build the bird cage and observe which part of the day birds are coming to feed, are they coming everyday at the same day (in the morning, afternoon), what kind of birds are coming, which are the most numerous, which are less numerous, how big they are, what colour is their feather, what is the shape of the beak, how is the shape of the beak connected with the food they consume, what kind of sound they produce, which kind of the food they prefer.

We must endeavour to go out with the children as often as possible in every season and in every weather.

On the other side we must bring in the classroom as much as possible alive (real-fresh) material, but only limited quantity (as we really need and no more) We must be very careful not to harm or damage organisms or even kill them. We can bring in the classroom animals, which we collected at pond dipping or on a meadow or in the surroundings of the school. We can observe the organisms accurately (exactly) under the microscope or binocular microscope. After the examination we must return the organisms on the same place where we collected them.

In the classroom we can also bring the animals living in the soil or under stones. We must know, that these animals are very sensitive on intensive light and they live in a moist environment. If we do not want to harm them we must provide the conditions the animals are used to live also for the time we observe them. We direct the children attention in observation how big are the animals, is there body segmented or not, how many legs they have, do they have wings or not, what colour they are, how they move, etc.

Specially in autumn we can collect leaves of different trees and we can classify them in the classroom on different criteria: size, shape, colour, the arrangements of the veins, the size of the stem, etc.

In autumn, when the leaves fall off the trees, we can bring twigs of trees and bushes into the classroom, and direct the children attention on differences of different trees. We can use a simplified key for identifying twigs. We can also observe the shells of the sea organisms which we collected during summer holidays. The collection can grow from year to year when children are bringing the shells from their holidays every year. There is no danger to harm these organisms, because the shell is only the rest of the organisms we usually find on the sea shore. We also have a simplified key for identifying the shells. Since now we have only 5 published simplified keys, but the teacher can also prepare there own key for different organisms or objects.

Every time of the year we can observe the germination of different seeds, what are the best condition for germination and we can also observe the grow of some plants.

Children can take care for the plant which they cultivated from the seed, water the plant and observe the plant and keep the diary about changes on a plant during a year.

We can make a collection of seeds and match the seeds with the picture of the plant or its leaf.

We can make different collections during the whole year: seeds, birds feathers, shells of the sea animals, freshwater animals and land animals, rocks, etc.

In winter we can bring a twig without leaves. We put it in a water and every day observe the changes and make a note when buds started to open, did they all open at the same time, what is in a bud (leaf or flower), how the buds are opening? Children can draw different stages.

If we find a caterpillar, we can bring it in a classroom. We put it in a jar with leaves, cover the jar and make small holes for the air. We observe every day, how much it eat and what is happening with the caterpillar after a certain mount of time.

Many schools in Slovenia have a living corner. Some schools have only plants and children are taking care for them. We can keep some animals in the classroom, which are easy to keep alive. Such animals are Daphnia, woodlouse, meal worm, snails, paramecia, wooden stick.

Some schools have aquarium or terrarium, which can be of great use in teaching biology if we know how to use it in teaching hours. Of course, at least at the beginning, working with aquarium or terrarium is very time consuming for the teacher and need a lot of knowledge to provide animals a right conditions. But this knowledge teacher can transfer to children and they will be very soon skilled to take care for the animals and they will be very proud that the teacher trusts them to take care for the living creatures. Through active work with animals children will get a lot of knowledge

about animals (what they eat, how they behave, which are the best conditions to feel comfortable, how they move, reproduce, etc).

With my considerations about school surrounding as a classroom and using real material in teaching science and biology, I would like to encourage the teachers to teach about the nature in the natural environment, out of the classroom and when we are with children in a classroom we have to bring alive material. Of course we must be very careful not to harm or damage the organisms. We now that learning on a concrete material is much more effective and the knowledge the children get through their own experience is deeper (permanent). Through different activities children will learn to observe the nature and they will get fond of nature. If they will love the nature they will also protect it for the future generations.



*Figura 6: The contact with nature and real experience are for children the best teacher. If children will love the nature and they will also protect it for the future generations.*

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