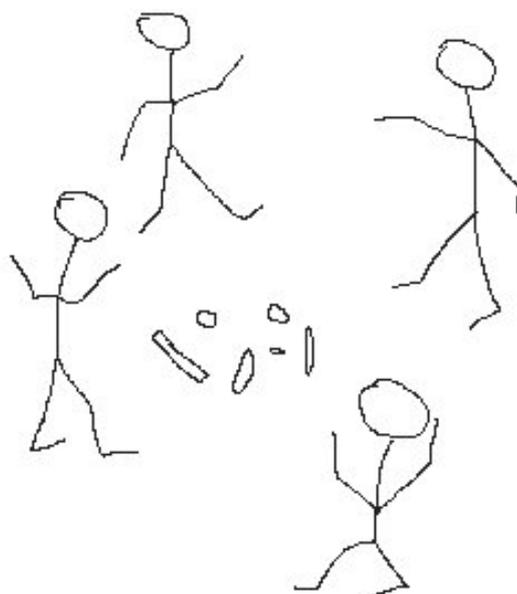


# Ecological Outdoor games



CENTRAL BALTIC  
INTERREG IV A  
PROGRAMME  
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INVESTING IN YOUR FUTURE

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## Preface

Thanks to all the Nature Schools that have contributed to this folder with outdoor games. We have not written down who contributed to which game or who invented the different games since the origin is usually unknown and the games have tendency to change dependent on the player. Some of the games can be found in books, and they are referred to at the end of this folder.

**The purpose** of this folder is to spread games with pedagogical focus on nature and environmental knowledge where the whole body and all the senses are used.

### Why should we play outdoors?

- The game is a method to achieve the goals in the national and local curriculum.
- The game is an amusing way to learn and where the endorphins contribute lust and creativity.
- The game seizes also the pupils who are not benefitting from traditional learning.
- The motion and the activated senses in the game make the whole body remembering and therefore the knowledge is becoming more profound.
- The game combines learning and activity in a time when there is lack of time for both of these parts, i.e. integrating theoretical subjects with physical activity.
- The outdoor room, either in the schoolyard or in a nature area further away, offers other exciting experiences than a classroom does.
- The outdoor room never lacks good ventilation, it rarely lacks space and the noise level is seldom disturbing.
- Ecological outdoor games contribute to a deeper understanding of ecological contexts which are the foundation for understanding our environmental problems, which in turn is a condition to creating an ecological sustainable society.
- Games about the nature become more realistic when played out in the nature.

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## Games for the youngest

### Change tree

All the children are standing close to a tree and then one child shouts: "All small trolls - change trees!" The children then run to another tree. Another child shouts the same and everybody changes tree again. The most important here is the motion and the possibility for each child's voice to be heard.

### Come here all my small trolls

This is a game that can be played on the way home from the forest when the children are getting tired. One child is standing a bit in front of the others on the road or path and shouts: "Come here all my small trolls!" The other children then reply: "How?" And the child answers: "Like birds!" Or like some other animal. All the children then flap their arms along the path. The next child walks ahead and shouts: "Come here all my small trolls!"

### Birds' life

This is a role-play where the children can imitate birds. Start by building a large nest, big enough for 15 children. Use sticks, grass, mosses, feathers and other items that are found and put them in a circle. The adult is the mother bird and the children are the eggs. Cover the eggs with jackets so that they get warm and can hatch. The eggs hatch and the baby birds start cheeping for food. The father bird then brings food. Then it is time to practise using the wings. The mother bird takes one baby for practise one time around the nest. Then the baby birds start flying further and further away from the nest. But they must pay attention to the cat and also the cars, especially if they are wagtails tripping on the road. But if they stand on stones for protection, neither cars nor cats can catch the baby birds.



### Compost charades

Let the children use their bodies to show different things that are possible to compost. If it is too difficult they can instead describe the item using words. The pupil who guesses correctly is allowed to do the charade and if the same pupil is correct several times, he/she can choose which one should do the charades instead (someone who has not had the opportunity yet).

### The toad game

The game resembles a tin of sardines. One is the toad and the others are frogs. The toad walks away and hides, the others count (to 50) and then search for the toad by jumping. The frog that finds the toad should hide beside the toad, quietly, and the game ends when everybody lies packed on the same hiding place. The game may be used as an introduction to show how some animals are hiding together while hibernating during winter. Also snakes can join and crawl to the toad's hiding place

### All the squirrels change the nests

The children stand in groups of three; one is the squirrel, the other two hold their arms like a nest. One child is for example a fox and wants to eat the squirrels that are not in a nest. On signal, all the squirrels change nests. They are not allowed to use the same nests two times in a row.

## Games about animals and plants

### The animal (or plant) in the neck

This can be used as introduction or repetition. The group should stand in a circle. Everybody gets a small note with an animal tied on their necks with a clothes peg. The assignment is to, by making yes/no questions to the classmates; find out which animal you are. Give examples of suitable questions, such as; Am I having 6 legs? Am I having fur? Am I sleeping during the winter? Both by questioning and answering, new knowledge will be gained and when you have “narrowed down” your animal, you can change to another animal or help the others to answer questions. Follow-up of the game, when everybody knows their animal, can be to discuss e.g. the appearance of the animal (the number of legs, footprints, tail/bottom), type of hibernation (move/sleep/change food and fur).



### What is in the circle?

Everybody stands in a circle. Divide the participants into groups by counting 1-2-3-4-5-6. These constitute a group. Count so that the other teams get the same numbers. Place some relevant plants or other nature items in the middle of the circle and then describe and type them. Make sure that everybody knows the names of the items. Repeat. The leader then calls out “Hawkbite, number five”. Everybody with number five should run around the circle clockwise one time and then run into the circle through their own place and get the hawkbit. The fastest pupil gets one point. If that pupil is also able to determine the species, he/she will get one more point. The leader might also call out “Looks like dandelion, five”, i.e. the pupil should describe something about the nature item.

### The species game

The purpose of this game is for two teams to compete in knowledge about species, in fastness and in having good memory. Collect parts of plants or other items in the nature while you check the environment. Divide the class in two teams. Place the teams along two rows with their faces towards each other, behind two border lines, about 10 meters from the other team. Place the items in the middle.

Introduce the items, 6-10 pieces depending on level of difficulty. Tell something interesting about each item. Give all the pupils a number. Try out the game first: the teacher says “Glittering wood-moss, number 3”. Both number 3 run towards each other. The pupil who picks up the moss first is the winner. Put back the moss. Continue until the participants recognise the items in the middle.

### Hug a tree

Tell the children that this exercise requires them to trust their friend and to do it slowly. Divide into pairs. One is blindfolded and led astray by the friend towards a tree. The blindfolded child then hugs the tree, feels it and smells it and is thereafter led back in different directions to the origin place. Take off the blindfold and the child should now try to find the right tree by walking around and hugging the trees nearby. Then let the children change places.



### The snake sheds the skin

Divide into groups. Number one should be the snake's head. The others are standing behind, astride and holding their hands on the shoulders of the one in front of them. At the signal "now", the number one crawls in between the other pupils' legs and at the end of the line stands up and claps the last pupil on the back. That pupil then claps the one in front and everyone continues like that until the first one in the line gets the clap and then starts crawling through the line, and so on. The snake has shed the skin when the original number one is standing first in the line again.

### Foxes and rabbits

The rabbits should try to get from one side of the field (the burrow) to the other side where two piles of sticks (food) are placed, without getting caught by the fox. The rabbits are only allowed to take one stick each time and are safe when they have returned to the burrow. The rabbits that are caught will become foxes, or alternatively being kicked out of the game. The game can be stopped every time the rabbits have made a "food-pickup" and be started again when the fox/foxes shout something, such as – "I want food!"



### The millipede

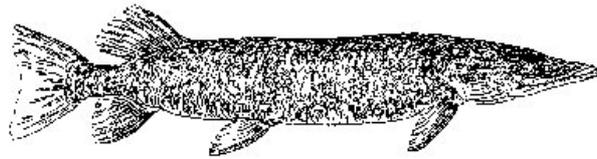
The purpose of this exercise is to train cooperation and to trust your friends. Divide the pupils in two groups. The exercise should be done within a limited area. Now everybody should stand in a line with their hands on the shoulders of the one in front of them. When the exercise starts everybody must be silent and they should all, except the last one, close their eyes. It is the last one who leads the millipede in front by using different signs. The signs should be determined before the exercise starts; e.g. a light clap on the right shoulder signifies right turn, a light push forward signifies move forward, etc. Decide a target for the millipedes, e.g. the big tree stump.

### Lizard relay

Divide the class in four teams, e.g. the common lizards, the sand lizards, the monitor lizards and the agamids. Decide a distance that the lizards should run before they hand over to the next lizard. Each lizard consists of two pupils. One is standing behind the other, holding the hands on the other's shoulders or the waist. They both have a stick, about 50 cm long, between their shinlegs. When one takes a step with its left foot the other takes a step with its right foot, i.e. this is how a lizard walks. The movement is similar to the swimming technique of a fish. If they lose the stick, they just put it back again. When one couple has finished the distance, the next couple in the team takes the sticks and continues.

### The fishing net

Divide the pupils into two groups. One group should be the fishing net and the other one is fish. The fish are swimming around in a cluster, "bubbling". The children being the fishing net agree on a number that the children being the fish cannot hear. The fishing net-children should stand in a circle, holding each other's hands and lifting the arms for the fish to come into the circle. The fish are swimming in and out while the fishing net counts loudly until they reach the number that they agreed on. Then they take down the arms so that the fish left inside the circle are caught in the net. These fish then become part of the net. The game continues until there is only one fish left. The game can also be done on skates or skis.



### The forester

Let the pupils line up in 4 rows with 6 pupils in each row (or any even numbers). One pupil in each row is the forester and stands turned towards the other five pupils. The five pupils choose a tree located a bit behind the forester. Each group has chosen a tree, and each pupil should walk, one by one, to the forester. The forester asks a question about the tree, such as “are the leaves’ edges spiny?” The pupil then runs to the tree to check and comes back and informs the forester. They are only allowed to answer yes or no. When all the five pupils have answered, the forester is allowed to search for the tree. The forester gets one guess. If the tree is the wrong one, then he or she asks more questions until finding the tree. Alternatively, this could be done on time. The groups have five minutes to help the forester finding the tree. Sometimes it is good to put a blindfold on the forester because the other pupils have a tendency to look at the tree they are talking about and then the forester can simply guess in which direction the tree is.

### The hugging trees game

This game includes both motion and knowledge about trees and plants. The teacher says the name of a tree, e.g. birch. The pupils should then walk to and stand beside a birch. The teacher checks that everybody finds the correct tree. More than one pupil may stand beside the same tree. Then gather everybody and say another tree or another plant, or discuss what they have found and to take a closer look at the plant. It is recommended to repeat the species several times.

### The creating game

This game works if you divide the pupils into small groups. The children should collect cones and then create/build an animal, an insect or something else. But first the group must agree on what to create and then they must cooperate. The teacher helps the group if necessary. The group should not reveal to the other groups what they have created. When all the groups are ready, they show their creation and the others should guess what it resembles. This is a good opportunity to discuss about that animal or whatever they have created. It is also a good game for cooperation and creativity.



## Games using all the senses

### Nature trail

This is an alternative to a quiz walk. Put up question signs along a trail.

#### **Examples of texts on the signs:**

- Can you see a sign of the respective season in the nature? Can you see the next year's buds?
- Listen to the stream!
- The forest has been cut down here. Imagine walking in the forest before it was cut down. Which are the similarities and differences?
- The absorbency of peat moss is good – in former times it was used as primitive menstrual product and diapers!
- Who is using the road we are walking on and why?
- The field fence shows that something has been locked up – or out? What is your opinion?
- This is spiraea, also named meadowsweet.
- Which scents can you smell?
- Stand here and tread the ground. What can you hear?
- How does the moss feel?
- Sit down and close your eyes. Which different sounds can you hear? Which sounds are part of the nature? Do you recognise any bird or any animal?
- Find two items beginning with the letter G!
- Write your name in the sand!
- How far do you have to jump to get over the ditch?
- How many green pine needles do you think this pine tree consists of?
- How tall do you think the pine tree is? How tall are you yourself?
- Find out as many adjectives as possible about the place where you are standing right now!
- What is the weather like today?
- How many colours do you see in the nature?
- Find items that begin with L!



### Trail blazed with pupils

When the exercise starts everything should be done in silence. Everybody should be placed on their own separate place in the forest and sit there quietly until they will be fetched. Then they walk towards the next person who has been left in the forest. After all have been fetched, they should gather, still in silence.

Everybody should stand in a line, perhaps holding a sitting pad. The first one is holding a watch and is told a time when to start fetching the classmates, e.g. after 20-30 minutes. Being the leader you walk first and point out places to the others, it is recommended that everybody is out of eyesight of each other. When all have gathered again, the exercise can be followed-up in different ways. Discuss for example how they felt being alone in the forest –

was it nice or scary? Do we have a need for solitude and silence? Are there differences between former times and now?

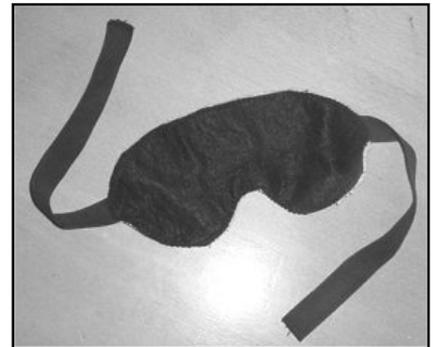
Let the children write down what they were thinking while alone in the forest. Then write a Haiku poem for example; i.e. row 1 five syllables, row 2 seven syllables, row 3 five syllables and preferably with an unexpected twist.

### The secret game

Sit down in a circle and close your eyes. A secret item is sent around (behind the backs). Each one should describe one feeling that they experience through their senses when touching this item, but they are not allowed to say the name of the item. When everybody has touched the item and said something about it, the group can definitely guess what it is!

### Blind walk

This game should be done in pairs and it requires the children to be mature enough to be leaders/guides to the blind man's buff. Choose a road for the walk and let the blind man's buff feel, smell and listen to sounds. Walk carefully!



### Duplicates

The teacher collects about 10 nature items and puts the items on a cloth and covers them with another cloth. The group gathers around the cloth which the teacher removes and shows the items for about 30 seconds. The pupils should look carefully and try to remember the items. Thereafter they should search for the same items in the nature for about 5 minutes. Gather the pupils again and present the items on the cloth by telling something interesting about each one of them. Let the children show their items. Did they find the duplicate?

### The colour and the sound games

The purpose of these two games is to collect colours and sounds respectively on a place where you sit or lie down comfortably. In the colour game the children should calculate which and how many different colours and nuances they can differentiate without moving from their place. In the sound game they should use their fingers to count sounds: animal sounds, silent nature sounds, all types of sounds except birds, etc. Use your imagination to diversify!

## Games about ecology and lifecycles

### The sparrow game

Divide the children as seeds, sparrows, sparrow hawks and hunters, according to the number of participants. The sparrows (waving with "short" arms) chase the seeds that will also turn into sparrows if they are caught. The sparrow hawks (with "long" arms) chase the sparrows that will turn into sparrow hawks. The hunter shoots the sparrow hawks by poking at them with a finger – then they become seeds (having their arms close to their bodies and jumping on one spot). The game can be modified depending on the theme. If you are working with water, the lifecycle could consist of green algae, common roach, northern pike and osprey. How is it possible to change the game to achieve balance? In Sweden, sparrow hawks are not shot by hunters, but they probably die a natural death, such as aging. Maybe the hunter can be illustrated by death itself.

## The elks

Half of the class is elks, the other half is the forest (the life environment). The pupils who are the forest choose by being food, shelter or water. The elks show what they want by putting their hands on the stomach if they want food, by putting the thumb in the mouth when they want water and by putting the hands like a roof above the head if they want shelter. The forest makes the same signs since it has food, water and shelter to offer the elks.



The elks should stand at one side of the field and the forest should stand at the other side, with their backs against each other. The elks decide what they need (food, etc) and show with a sign. The forest chooses to be food, water or shelter and also shows with a sign. On signal, the elks turn and run to the child with the correct sign for their need, i.e. the forest remains still. The elks that will not be able to satisfy their needs, must remain at the forest side while the elks finding their supply takes it back to their side and will thus increase the elk population. The forest that is not taken by any elk should continue to be forest until it is taken by an elk. Discuss how the three environmental factors can regulate the elk population.

The game can also be added by e.g. a hunter who tries to catch the elks while they are searching for their “needs”. The hunter runs from the side and when the elks get caught they also become hunters. A wolf may come from the other side and chase the elks. The hunter is not allowed to shoot the wolf since it is protected, but if it happens anyway, the hunter will end up in jail, i.e. must leave the field.



## The bird game (alternative to the elks)

Instead of being elks the children are birds seeking shelter/nests or food or water. The process is the same as in the elk game. If a bird has found water, the “water person” follows and will become a bird next year (next round). After some years/rounds it is possible to see how the population fluctuates around carrying capacity, i.e. the population size of the species that the environment can sustain. This is a good introduction to discussion, e.g. how changes of our landscape may affect the birds’ breeding possibility.

### The parachute

In most schools there is a parachute that can be used for cooperation exercises. This exercise can be used as an introduction or a review of thematic work about the ocean.

Everybody stands in a circle and holds the parachute. Start by letting the parachute become a waving ocean. Give all the pupils in the circle a number, 1-5. The pupils with number 1 are stones, number 2 are bladderwracks, number 3 are amphipods, number 4 are perch and number 5 are northern pikes. A story is told in which the stones are covered with one year old algae; then all who are stones should let go of the parachute and the story then continues. The bladderwracks let go when all the eggs cannot attach to the stones any longer, the amphipods when they cannot find shelter in the bladderwracks any longer and the perch when they cannot find food anymore. At the end, when only the northern pikes are left, the situation is very strained and it will be very hard to even hold the parachute. At this point you can choose to end the exercise and discuss what went wrong or maybe everybody suddenly turns into marine biologists with the assignment to rescue the ocean.

### The expedition

The expedition's compass is showing wrong directions and therefore the experts have been directed to a totally unknown place. While waiting for rescue it is natural for them to investigate the place and shortly they start exploring. Divide the children into smaller groups (about 3 per group) and give them background facts and an expert role, such as

#### Geographer

They are experts on how the country has been evolved and they know the characteristics, the origin and the age of rocks. They can for example describe why the area looks the way it does.

#### Archaeologists

They are experts on human relics and traces of former cultures. They can for example describe how long time the country has been inhabited by people.

#### Botanists

They are experts on plants and how they have adapted to different places. They can for example describe how the first plants colonised the fields in the area.

#### Zoologists

They are experts on the animals in different areas and how they have adapted there. They can for example describe how to recognise traces of some animals.

#### Artists

They are experts on which rules that regulate the formation of the nature for attracting the aesthetical sense. They can for example describe why different colours and forms have been formed.

#### Chefs

They are experts on survival. They can for example describe how to find food and drinks for the members of the expedition.

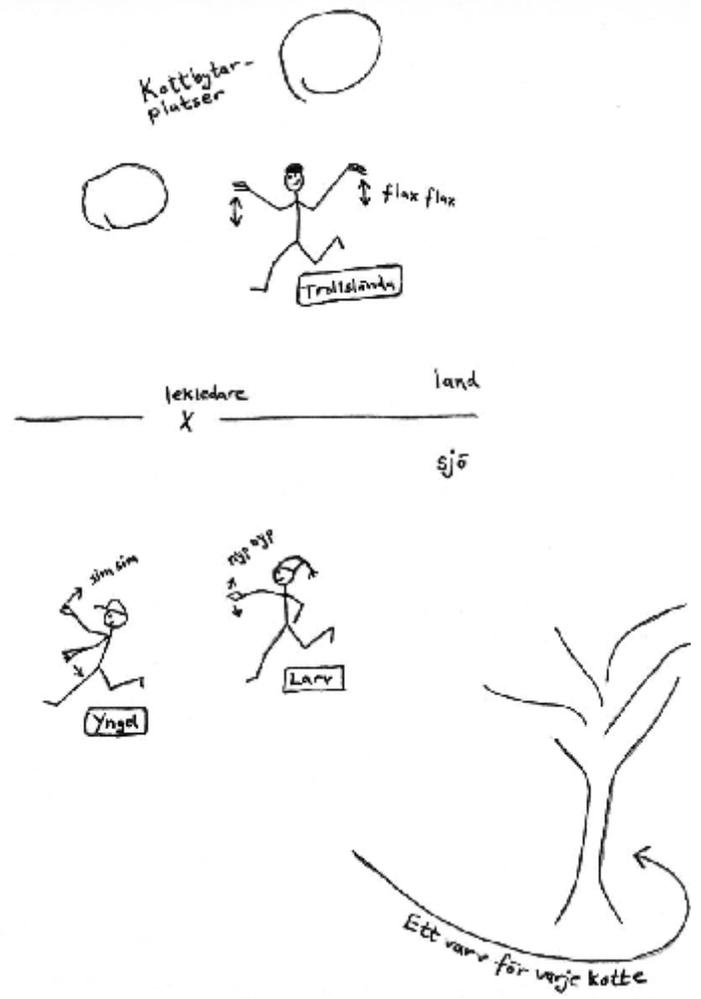
The groups should get time to receive a study visit by the other expedition members. The group shows the place they have chosen and tells about their theories. You, as being the leader, decide the seriousness of the exercise, i.e. if the presentation should be based on facts or fantasy.

## The dragonfly game

Divide the field into a lake and land. Make a border or put out a string where the water surface is. The class stands in the lake and is divided into two groups. One group is fish larvae and the other one is dragonfly larvae (or nymphs). The fish larvae should hold 4 cones in their hands while the dragonflies do not hold anything. Each cone symbolises one year of the larva's growth. The fish larvae show what they represent by making swimming movements with their arms. The dragonfly nymphs hold their arms straight ahead and make a pinch movement with their hands (to illustrate a catching mask with a jaw under their chin).

The larvae should now chase the fish larvae and catch or tag them. The fish larvae must then hand over a cone, and the nymph must run a certain distance with the cone in the hand, for example to a tree and back, before it can catch the next one. When a dragonfly nymph has caught 4 cones it climbs out of the water and up on land (four years have passed). The nymph must then pass the border that represents the water surface and show the cones to the teamleader.

While on land the dragonfly starts to flap the wings (illustrating the transformation from nymph to adult). The dragonfly must now run around and flap the arms until another dragonfly arrives. When they meet they exchange cones (illustrating copulation and laying egg). Choose a place where the exchange can take place. Then they return to the lake and become fish larvae (illustrating dying after fertilization). A fish larva that has lost its cones becomes a dragonfly nymph. You may try different proportions between dragonfly nymphs and fish larvae.



## The heaven's gate

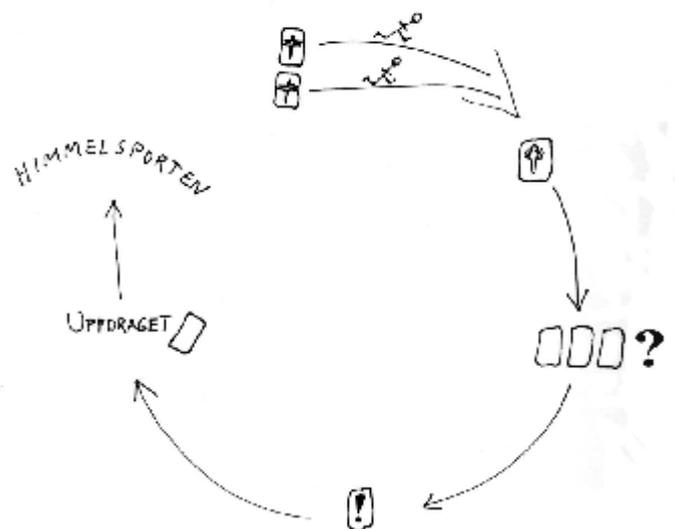
The purpose of this exercise is to learn about aquatic animals' different stages of life and at the same time there is an opportunity for the teacher to add different practical problems into the exercise. For a group of 30 pupils you need 2 x 15 cards of adult animals, 15 cards of larva stages, 15 reply cards and 30 clothes pegs.

Choose places to be land, water and the heaven's gate. Everybody gathers at the land area and gets an animal card tied on their neck with a clothes peg. Nobody is allowed to see their own card. By looking at each other's cards and describing the animal with words, they should all try to find their partner (with the same animal). In pairs they should then run to the next level, the water area, where 15 cards of larvae are spread out. Each couple should now find their larva and when they have done that they should look at the back of their cards (adult, adult, and larva). The texts on all the three cards combine a question, a word puzzle or a riddle to be solved.

The couples now run further to the heaven's gate where 15 reply cards are placed. They search for the right answers among the cards. At the back of the card with the right answer there is an assignment, a practical problem, which is the entrance test to the heaven's gate. When the assignment is accomplished the couples gather again at the land area.

The exercise can either be done as an introduction to work around a watercourse or as a sum up of the exercise. Give leads or use books available at the water area for help if the exercise is done as an introduction. There are e.g. pictures of larva and adult stages in the book; what can be found in lakes and rivers.

Examples of practical problems and assignments can be found in the book "Learning Mathematics Outdoors".



### The marsh tit game

This is a game that is usually very popular and that reflects how hard life can be for the birds that stay here during winter. Some birds store seeds to be able to survive the winter, e.g. the marsh tit. The birds remember where they have hidden their seeds and can retrieve them during rougher times.

The pupils are marsh tits coming to retrieve sun flower seeds, which they should hide. They can however only take one seed at a time since their bill is so small. They hide the seeds a bit over the ground so they will not be covered by snow.

In the forest there are however not only marsh tits but also some great tits that take the marsh tits' hidden seeds. Sometimes also the sparrow hawk appears and catches a great tit or a marsh tit. The sparrow hawk eats the small bird. By letting the bird that has been caught run 10 times around a tree, it will be free to join the game again. The sparrow hawk will soon be hungry again though, and will catch a new bird.



Play the game two to four rounds and then pause the game. The pupils should now find their hidden seeds and count them. The teacher walks around checking how many seeds the pupils have found and informs that the winter has been very hard. Only those who have 5 seeds or more will survive this winter. After next round more birds may survive due to a mild winter. Make a review and discuss strategies. Is it better to put the seeds far away in different places or to put all seeds in one place and nearby?

Organise it as a mathematics problem and/or tell about the marsh tits' various struggles during one year. It is recommended to line up the pupils to visualise different arithmetic examples. Let them illustrate the male, female, eggs and baby birds respectively and wander forward in time. Then remove the eggs and baby birds that happened to die for some reason.

This game allows many things to be brought up that reflect the birds' real struggles. Different strategies for survival are one of the major parts within biology and therefore the game can be used both with six years old children as well as with students who study behavioural ecology at the university.

### Predator and prey

Let the pupils stand in a circle. Select two pupils who will be predator and prey respectively. Both are blindfolded and the predator's task is to catch the prey. If they get too close to the borders of the circle then clap their shoulders lightly two times so that they know where the limit is, e.g. it illustrates the end of the forest. The pupils who are composing the circle will be able to watch the different strategies used by predator and prey. Sometimes they are sneaking, or standing still and listening or suddenly charging, etc.

Increase the preys by blindfolding 1-3 more pupils. Put jingles on their legs, close to their feet. Various sizes of jingles will create different sounds from different preys and the largest jingle/bell should be put on the predator. Let the predator catch the preys until there is none left. Make it more difficult for the predator by just approving catching a specific prey. Make it easier by narrowing the circle. Let the pupils decide which animals should be part of the game or make the decision before starting the game. Examples are fox, deer, rabbit, field mouse, etc. It is important that the children standing in the circle are silent so that the different sounds from the jingles will be heard (although it is difficult not to laugh).



The fox is listening to the field mouse standing silently behind.



The fox charges but the field mouse slips away in the last second and then stands silently and awaits.

### The muskox

Divide the class into wolves, bulls, cows and calves. The number of calves should be at least twice as many as the number of bulls. Altogether the number of muskoxen should be 4 times the number of wolves. A possible division may be 5 wolves, 4 bulls, 8 cows and 8 calves. The playing area should be quite large. Provide each wolf and calf with coloured ribbons, to be put in their back pockets or on the belt behind so that it is hanging freely and is easy to catch. Different colours for wolves and calves respectively.

In the beginning the muskoxen herd should “graze peacefully on the open land”. Each calf is grazing beside its mother. One cow is guarding and will be mooing in a certain way if a threat is getting closer. If discovering wolves the animals quickly create a defence circle. The bulls are standing in the outer circle and the calves trust the cows totally. The calves hold their hands around the cows’ waists and follow their mother’s movements. The bulls that are moving at the outmost, in front of the cows, are **only allowed to move clockwise**, according to the rules of the game. They can kill a wolf if they manage to catch the wolf’s ribbon. The wolves, which are getting closer but are not in sight, can decide a strategy to get to the calves. They cannot kill grown up animals. A calf is killed when the wolf catches the calf’s ribbon.



When a calf or wolf is killed, the game is paused and the killed ones must leave the game. They sit down beside and watch the continuing game. It is recommended to use sound effects as communication between the animals, such as mooing and howling. The game continues until there is a natural ending. Either a number of wolves have been killed and the rest gives up attacking and runs away, or the wolf-pack is lucky and all the calves have been killed.

If you repeat the game, the number of bulls and wolves can be varied to be able to see when a good balance is achieved. If the game is played several times with the same group, you will be able to see how the tactics are improving. More calves may be killed in the initiation phase when the wolves sneaking chase is effective. Pay attention, the calves that are close to their mothers are the best survivors.

### Discussion

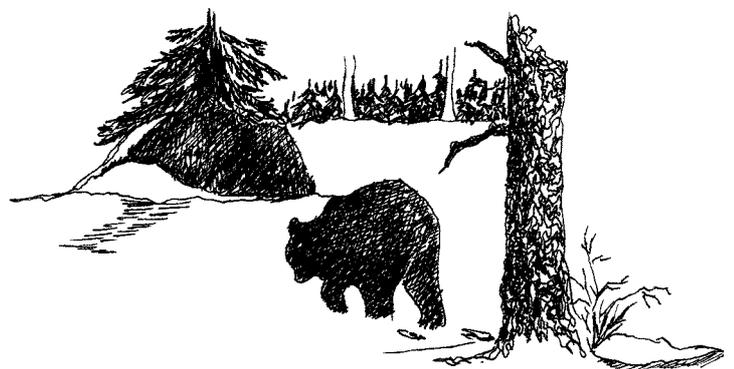
- What would happen if the wolves could not kill any calf – if the muskoxen’s defence was perfect?
- What would happen if the wolf-packs figured out a totally outstanding hunting method to kill the calves?
- The wolves also hunt other prey, which could be easier to catch. Which are these?
- Ask the pupils to discuss the balance between for example goshawk and squirrel or fox and field mouse.
- Compare with the game “The elks” to highlighten the changes of the population dynamics.

### The muskox

The muskox is a big shaggy herbivore, called e.g. “Oomingmak” (=the animal with a skin like a beard) by the Eskimos. When grown up a bull may weigh more than 300 kg and a cow about 175 kg. A newly born calf only weighs 10 kg. The muskoxen live in Alaska, Canada and Greenland. A small number of animals have been re-imported to Norway and a herd has been seen in the areas nearby the mountains of Härjedalen, Sweden. They usually live in herds of 20-30 animals. Both parents defend their calves diligently. They usually get into a circle with the calves in the middle and facing outwards towards possible threatening wolf-packs. The herd usually grazes the treeless tundra where natural protection is lacking. In these depopulated areas the muskoxen’s only enemy is the wolf. Almost the same number of wolves and muskoxen has lived in these environments for thousands of years.

### The bear game

The pupils should resemble bears, searching for food in the surroundings. The game is based upon several basic conditions for life. The pupils will get an understanding for the different limiting factors in the nature; food, water, shelter and space. Bears need big areas to roam across, food, places to hibernate, places to raise the cubs, etc. If the space is too small, then big bears will kill smaller bears or push them out from the area. Climate changes may disturb the food supply. If the animals are too thin they might not survive the winter.



### Material

Paper in 5 different colours, black marker pen, a box to each pupil, pens, a blindfold, and 5 extra pieces of blue paper (if the exercise will be extended). A card template and record are appendices to this folder.

Make a set of 30 cards (5 x 6 pieces on an A4-paper) of each colour making up of the food according to the table. A total of 150 cards. Also write the following “codes” on the cards.

Orange = Nuts (N)	5 pcs N20	25 pcs N10
Blue = Berries, fruits (B)	5 pcs B20	25 pcs B10
Yellow=Insects (I)	5 pcs I12	25 pcs I6
Red=Meat (M)	5 pcs M8	25 pcs M4
Green=Plants (P)	5 pcs P20	25 pcs P10

### Food for bears

A judgement of a bear’s necessary distribution of food is supposed to be 25% each of N B P, 15% of I and 10% of M. These figures represent values for the average bear. In Sweden there are no hazelnuts, beechnuts or acorns north of Dalälven. Wherever the bears are living, their diet is mainly vegetables. A bear in the mountain region during spring definitely eats more meat while a bear in the forest land during autumn eats more berries. During spring when the bears come out from their den, they eat a lot of ants and plants by the cold springs. When the plants start growing, the bears start eating grass, sedge, horsetail and then the herbs. In June, the newly born elk calves are on their menu for a couple of weeks. During summer and autumn, they eat mainly berries. Preferably they eat blueberries, followed by raspberries, cowberries and crowberries. During autumn, the berries make up of 85% of the food intake. Cloudberries are not prioritised since the amount of sugar is too little, and neither are mushrooms and roots. Sometimes the bears eat beaver and carcass but not deer or rodents.

### Procedure

1. Spread the paper cards on an area of 50x50 m in the terrain. To visualise the struggle for existence you should put out cards so that not all the bears get enough food.
2. Let everybody write their name on their box (a jar of glass, an envelope or similar). This box should be put on a place that is the bear’s den. The pupils should be placed at the edges of the catching area and each one puts their box on that place.
3. Give the following instruction:  
You are all bears, but everybody is different from each other. One is a young male, which avoids bigger males, another young male was fighting with a bigger male last week and is now hurt = jumping on one leg. Another one is almost blind (tie a thin blindfold around the eyes). A female bear has given birth to twins: she is both delayed by the food collection to the cubs and by having to get double as much food as those females with only one cub. Distribute the roles to the participants.
4. Just tell that the cards illustrate some kind of food. Since the bears are omnivores they like a mixture of food. Therefore they should eat little of each type. Do not tell them what the colours, letters and numbers stand for on the cards that they should collect.
5. The pupils must shamle into the food area. Bears do not run over their food, but collect it by roaming slowly. After finding a note, they should return to the den and put it there. Then they are allowed to search for more food (of course the bears do not behave like this in real life).

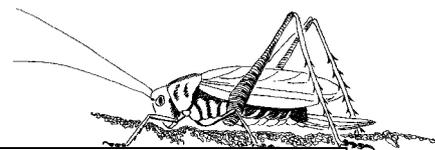
6. When all the notes are collected the pupils should sort and count their notes. On a drawing pad, etc, they write down the points they got for each letter. Out of these numbers the teacher says a number they must have in order to survive (note: choose number so that some of them die). Study the numbers of the hurt bear, the blind bear and the mother of the twins. Discuss the role of the female bear – does she eat first or does she give the babies food first? How do they survive in respective case?
7. Check if each one has achieved food that is all-round? Let the pupils speak about how they would probably feel according to the food they have eaten. Are there bears that have fattened and will be overweight when they start hibernating?
8. The exercise can be done again and by placing blue cards illustrating water: 50 notes of which 10 each are marked with R=River, L=Lake, C=Creek, S=Swamp, P=Pool. To feel as good as possible; preferably each water source should be used.

K8	K8	K8	K8	K8
K4	K4	K4	K4	K4
K4	K4	K4	K4	K4
K4	K4	K4	K4	K4
K4	K4	K4	K4	K4
K4	K4	K4	K4	K4

**"Meat cards" with codes**

## Toxin in the food chain

The pupils are hawks, shrewmice and grasshoppers to show how pesticides infiltrate the food chains and their consequences.



### **Pesticides**

Pesticides are supposed to stop breeding and spreading of unwanted organisms. Many toxic chemicals may stay in the environment and are often concentrated in unexpected and inappropriate places, such as in food, drinking water, wild animals and humans.

A pesticide against insects (insecticide), called DDT, was used before as regular crop-spraying. It was later discovered that DDT infiltrated the food chain with damaging effects. For example, fish ate insects that had been sprayed with the compound. Ospreys, eagles and other birds of prey ate the fish. The toxin was concentrated in the birds – and sometimes it was weakening and even deadly. But most of all, the offspring was affected by the eggshells becoming so thin that the eggs could not hatch. The shells were crushed by the weight of the parents during the incubation or were dried when the shell could not keep the humidity.

The use of DDT is now prohibited in Sweden, but unfortunately not everywhere in the world. Therefore DDT keeps on entering the food chain. Mercury mordant is also prohibited, but a lot of mercury is circulating in our environment.

Damaging pesticides are used by many farmers. The compound is spread as powder on the crops. The pesticide stays in the ground or on the crop until the rain rinses it off or through irrigation. It pours down to the ground water, lakes, streams, rivers and oceans.

### **Material**

Required for the exercise are white and coloured clothes pegs (or some other material that is easy to pick up). Avoid material that can blow away or get destroyed by moisture. 30 pieces per each pupil are recommended. Of which 20 are white and 10 are coloured. Required are also a jar per each grasshopper (about 18-20).



### **Procedure**

1. Tell the pupils that this is an exercise about “food chains”. If they are not familiar with the term, make sure they will know how to describe it. A food chain is a “chain” of living creatures in a food pyramid. The chain is based on a “lower” member being eaten by a “higher” member. For example, a grasshopper eats plants, a shrewmouse eats grasshoppers and hawks eat shrewmice.
2. Divide the pupils in three groups. In a class of 26 pupils there should be 2 hawks, 6 shrewmice and 18 grasshoppers. They should be three times more in the level underneath. Give the different types of animal some kind of marking, e.g. different colours of sports ribbons, armllets or similar.
3. Each grasshopper gets a small jar that represents the stomach.
4. Without letting the pupils see, you should spread out the ”food” on a big open place, i.e. the white and coloured clothes pegs or what you are using.
5. Give the pupils their instructions. The grasshoppers are the first ones searching for food. The hawks and the shrewmice are sitting silently at the fringe, watching the grasshoppers. After all, hawks and shrewmice are predators watching their prey! On a given signal the grasshoppers enter the area to collect food in their “stomachs”. They must be fast because after 30 seconds the time is up for their “meal”.

6. Now the shrewmice are allowed to chase the grasshoppers. The hawks are still on the outside, watching. The duration of the chasing depends on the size of the area. On a big playground maybe you need 60 seconds. Each shrewmouse should catch one or several grasshoppers. Each grasshopper that becomes shrewmouse-food, i.e. is "taken", must give away its jar to the eating shrewmouse, and then sit down outside the area.
7. The next step is when the hawks start hunting. The same rules apply. The shrewmice that are still alive are chasing grasshoppers, and these are eating plants. "Eaten" animals must give away the jar or the content to their predator and then leave the area. When the time is up, everybody takes the jars with them and sits in a circle.
8. Ask the pupils which ones are "dead" or "eaten up" and you will realise which animal species they belong to and which animals ate them. (If they are marked it shows immediately). Then ask the hawks to empty their food jars in a place where they can count the total number of white and coloured "food pieces". Then write down how many grasshoppers are left and how many white respectively coloured food pieces each one has. Then write down the number of shrewmice and their food pieces. Finally write down the number of white and coloured food pieces that each hawk has.
9. Inform the pupils about pesticides in our environment. This pesticide was sprayed on the crop that was eaten by the grasshoppers to stop them from damaging the plants. Otherwise there would be less harvest for the farmers to sell. Some people and pets would get less food to eat or people would have to pay more because of the shortage of this crop. This specific pesticide is toxic and it concentrates in food chains and stays in the environment for a very long time. In this exercise the coloured food pieces represent the pesticide.  
The grasshoppers that have not been eaten are considered dead, **if they have coloured food pieces in their jar**. All the shrewmice with half the amount of food that is coloured are also considered dead. The hawk with the biggest amount of coloured food will not die this time, but it has got so much pesticide in its body so that next year's eggshells will become so thin that they cannot be incubated. The other hawks are not visibly affected this time.
10. Talk with the pupils about their recent experience. Ask them how they think the food chain works and how toxic components can infiltrate the food chains with different results. Maybe the pupils can give examples besides the ones you have got through this exercise.

### **Follow-up**

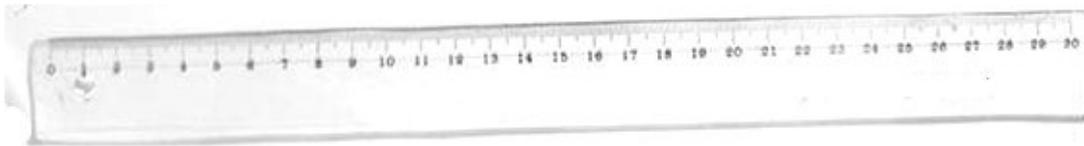
1. Consider and discuss possible reasons of using such chemicals. Which components can be bought? Which are their consequences?
2. Discuss possible alternatives for usage of such chemicals, where their negative consequences are dominating. How does organic farming work, which is not using chemical pesticides?
3. Change the animals in the game to plankton, mussels, humans, etc.

## The community planners

In this exercise the pupils will get an idea and understanding what consequences people's plans in theory can cause in real life. The pupils will also achieve knowledge of maps, scales and geometry. The exercise thus includes Social Sciences, Mathematics and Natural Sciences.

### **Material:**

- Paper (A4 = 30 x 21 cm), pens, rules and compasses to draw maps.
- Measuring tape for pace, cones or similar that marks the fringes of the area.
- Ropes and sticks of some sizes for defining exploited areas.
- Animal cards (preferably pictures of A4-size), food cards i.e. green and blue laminated sheets of paper or similar that will symbolise plants and water.

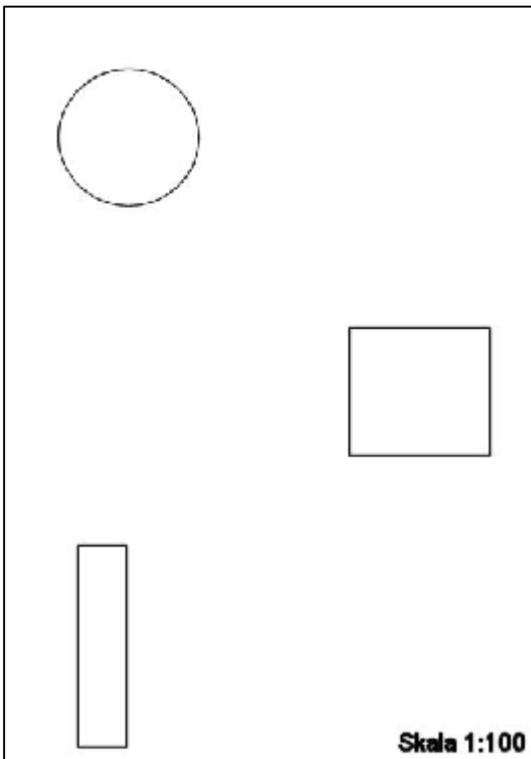


### **Organisation and procedure:**

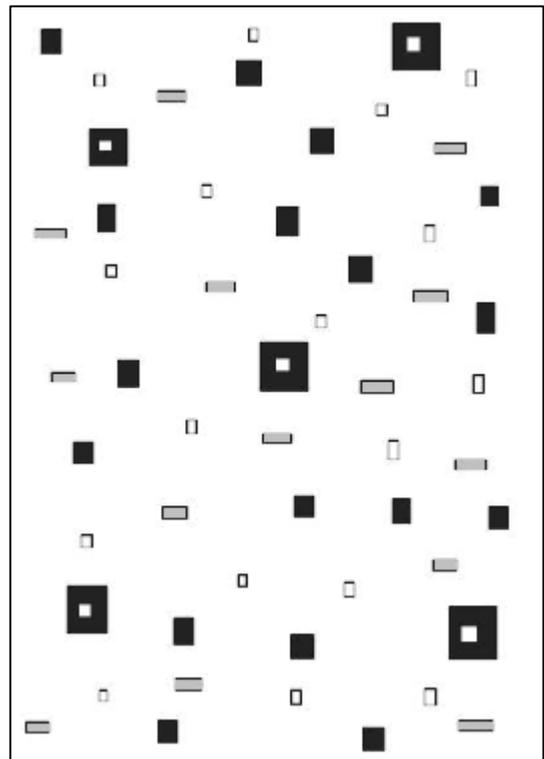
1. Divide the pupils in 6 groups. Each group should represent a workteam of landscape architects and community planners.
2. Mark an even area outdoors, for example the same proportions as an A4-size paper sheet (30 x 21m, which is a scale of 1:100). The area should resemble an untouched nature area of a size that the participants have decided themselves (e.g. 3 x 2,1 km).
3. During the initiation phase of the exercise each group should place a number of symbols (pictures) on the marked area according to the following: 1 predator, 3 herbivores, 9 green plant cards, 7 blue water cards (altogether 6 predators, 18 herbivores, 54 green, 42 blue). In a class of 24 pupils this means that each pupil will get their own animal to place it somewhere. The point with this is for the pupils to feel connection to an animal, which might be affected by the consequences of the plans.
4. Each group gets an exploitation assignment, e.g. a final felling of a forest, building houses or a hydroelectric installation, building a slalom slope or golf track, building a petrol station or a new road, or whatever the pupils wish to build. The number of interferences that are allowed to be made in the landscape depends on the size of the area which was decided before.
5. Now the groups should plan their projects and draw it on their map using a ruler and compasses. The exploited areas are shown as circles, squares and rectangular (depending on level of difficulty). Each group is allowed to use a maximum of 10% of the area. A circle on the field will make up of a rope and each square makes up of four sticks or similar.
6. When all the groups have completed their maps, it is time to interpret the scales on the map to the field outdoors. Make circles using ropes and squares using sticks. While doing this, it is natural that conflicts will arise between different exploitation interests. Advice: Solve the conflict by letting some pupils play a role-play acting local politicians who are going to decide what to invest in for the best of the municipality's inhabitants. Make a decision or hold a referendum.
7. The green and blue symbols that are within the exploitation areas are no longer available as food for the herbivores and the predators. Remove these from the field. Each herbivore will need 3 green and 2 blue cards for survival. How many herbivores will be able to survive? Each predator will need 1 blue card and 1 herbivore for

survival. To be able to breed, the predators will need 2 herbivores. What effect did the plans have on the animal life within the area?

8. Discussion: Why did it become like this? How big area does wild animals need in real life to be able to survive? Who in the society is speaking on behalf of the animals during exploitation and what are the laws saying? Which interests have precedence in your municipality? Who are making the decisions in your municipality?
9. Do the procedure again but let the planners first make an inventory of the area's plant and animal life.



Example on how a group's A4-map may look. How many percent of the area does the group claim?



Example of distributed symbols on a field 30 x 21m. (Predator, herbivores, water cards and plant cards).

### Development and follow-up

Certainly this exercise has unlimited development possibilities depending on the teacher's and the pupil's ambition. Some examples are:

- Visit the Planning Section at the Department of Community Planning.
- Develop a role-play and debate pros and cons about some exploitation. The exercise may open up to the politics and the democratic processes on local level.
- Inquire how much space an elk, a deer or rabbit would need to be able to survive. How much space would a fox need? A wolf? A lynx?
- To increase the self-contained work, let each pupil get familiar with its animal and find out facts. The pupils should be able to autonomously make their own maps and then, within the group, decide which idea is the best from exploitation point of view.
- When it appears that 60% of the area is to be exploited (10% per group), then the next assignment may be for each group to reduce its claim with e.g. 30%.

**Some games or alternatives can be found in the following books:**

*Sharing nature with children*, Joseph Cornell, 1979

*Naturdetektiver*, Svenska Scoutförbundet 1998

*För det vilda*, Umeå Universitet, 2003

*Naturpedagogik*, Germund Sellgren, 2003

*Naturskola med liv och lust*, Germund Sellgren, 1996

*Att lära in ute året runt*, Robert Lättman-Masch och Mats Wejdmark, 2007

## Template of Food Cards to Write the Codes on (the Bear Game)