



grade 4



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Introduction

Nynäshamn Nature School was founded in 1988 and we now receive pupils from grades F (preschool class) to 6 as well as grade 9. The school classes have one nature school day a year – that's when they work with research around a certain theme. We make tutorials for the teachers who come here with their classes to facilitate the preparation and follow-up work of the nature school day. We hope this tutorial will provide a joyful learning outdoors for the pupils in grade 4, especially in the subjects Mathematics, Physical Education and Health, but also in the Swedish subject.

Purpose of the day

The main purpose of the day is to create situations where the pupils get the opportunity to cooperate around concrete tasks outdoors within the Mathematics and Sports and Health subjects at the same time as the activities become the foundation for discussions about the common principles of the school. To do this in grade 4 is important since the pupils sometimes get new classmates at the same time as they get a new teacher. The assignments are created for learning based on the fundamental values and tasks of the school and the core content within the subjects Physical Education and Health and Mathematics. By leaving the classroom and go to a new neutral place, which at the same time is a relatively free outdoor environment, enforces the pupils into unaccustomed situations. Since the challenging activities are done both when they are in whole class and smaller groups, they get the opportunity to cooperate with different classmates that they usually don't work together with. Our hope is that the challenges, the area's boundlessness and the new group constellations will inspire new thoughts about social roles, knowledge about themselves and others as well as a joyful engagement with many creative solutions. The day is also about the strength of being different, having different abilities, and to utilize the differences as a resource in a joint effort.

Practical information in brief

Place: Nynäshamn Nature School, Sjöudden, Ösmo

Time: 09.00-13.30

Break: The pupils bring their own snacks for the break in the morning.

Lunch: Comes from the kitchen in Vanstaskolan. Call 3562 if pupils need special food.

Clothes: According to weather and not dressed up. Outdoor spending time: about 3,5 hours.

Phone to the Nature School: 08 520 7 3565, 520 7 3709, 520 7 3708



Agenda and content during the nature school day

Mathematics, cooperation and problem solving	
09.00 Introduction	
Cooperation block Activities where everybody solves a common assignment through communication and cooperation.	
09.45 Break around the campfire	
Problem solving block Activities where the pupils, in smaller groups, solve problems with help of maths by reasoning and constructing.	
11.30 Lunch	
<p>This track is automatically chosen if you don't actively choose the Sustainable Development track</p> <p>The Maths track Activities where the pupils solve problems using their knowledge in maths and mainly in geometry.</p>	<p>Note! Inform the Nature School if you choose this track!</p> <p>The Sustainable Development track Activities where the pupils cooperate and where the content can touch upon sustainable development in a narrow or wider perspective.</p>
13.15 Evaluation	
13.30 Conclusion	

Abilities within the Mathematics subject

The abilities within the Mathematics subject touched upon during the day are the following in *italic* font style:

Ability to

- formulate and *solve problems using mathematics and also assess selected strategies and methods,*
- *use and analyse mathematical concepts and their interrelationships,*
- choose and use appropriate mathematical methods to perform calculations and solve routine tasks,
- *apply and follow mathematical reasoning,* and
- *use mathematical forms of expression to discuss, reason and give an account of questions, calculations and conclusions.*

The *core content in mathematics* that is touched upon will be made visible at respective activity and further references to the curriculum can be found at the end of this tutorial.

Preparation work before the day at the Nature School

- Divide the class in suitable groups before the nature school day. Recommended is 4-5 pupils in each group, which means 6 groups for classes of 26-30 pupils, 5 groups for 20-25 pupils and 4 groups for classes with less than 20 pupils. Consider a purpose why dividing in groups. For example, some pupils who are always together – should they be separated in different groups to challenge them to work with others? Or should the class be divided into already functioning groups? Should the class be divided so that the dominant pupils are spread out in different groups or all of them in the same group? It is up to the teacher to keep the same groups during the whole nature day or change the group constellations for each activity.
- Go through the different geometrical objects: cylinder, cuboids, cone, pyramid, sphere and prism. Most of the three-dimensional objects have corners, flat sides called faces, and edges (where the faces meet). A cube has six faces, eight corners and twelve edges.
- Go through how an equilateral triangle looks like. It has three corners, three equally long edges and all three corners have angles of 60° .
- Go through scales and how to express ratio. 1:1 (one to one) is real size, 1:2 is half the size (i.e. $\frac{1}{2} = 0,5$) and 2:1 is double the size (i.e. $2 \cdot 1 = 2$). During the nature school day, the children will work with these scales 1:2, 1:1, 2:1, 3:1, 4:1, 5:1.
- **Preparation work for those who choose the path of sustainable development track.** Before “the garbage thief” activity, the pupils should know how fossil oil has formed and that you can make plastic from it. Before the “migratory birds” and “wetland” activities, the teacher can discuss the refugee situation in Sweden, Europe and the world. And also connect the climate problem with future climate refugees and reason how to avoid making the climate worse. It is also good to inform about how it was in Sweden during the 1860s when many fled to North America to avoid starvation. It is even possible to do the activities with focus only on the group and how the pupils treat each other when they solve the problems. If so, then discussions about the school fundamental values on a personal level may be of value.

Lgr 11 Fundamental values and tasks of the school

Each and everyone working in the school should also encourage respect for the intrinsic value of each person and the environment we all share.

The inviolability of human life, individual freedom and integrity, the equal value of all people, equality between women and men, and solidarity between people are the values that the school should represent and impart.

Activities during the day at the Nature School

After each activity we reflect together on how we managed and what could have been done differently. We discuss what was required from the pupils to manage and which roles and assignments they had. Note that there are more activities described below than a class can manage for one day. The days may also differ a bit for different classes, for example depending on the size and preconditions of the class as well as weather conditions.

The teacher's task during the day is to take photos and to observe how the pupils solve their assignments, how they take responsibility and how they cooperate. There are opportunities to observe which roles they have during the day and how they use the language to communicate and argue for different solutions to their problems. If you as the teacher had a specific purpose with the group division, there's a possibility to observe the groups based on that.

Lgr 11, Swedish, aim

It means that pupils through teaching should have the opportunity to develop their language for thinking, communicating and learning.

09.00 Gathering

- Introduction
- **Circle activity (trust, respect, hearing and touch).**
Introductory activity where everybody stands in a circle (thumb against thumb). Put a cone in the middle for everybody to gather around. Do this at all gatherings (it becomes an activity and at the same time they will hear the word 'cone' several times). The risk element here is that the pupils may bump into each other. Before they start, it is recommended to tell them to show respect and be careful so that no one gets hurt.

1. Everybody walks towards the opposite side, at the same time (i.e. everybody meets in the middle).

2. Same thing again but everybody closes their eyes (in silence). Everybody opens the eyes on signal.

3. Same again but now in pairs should they decide on a sound. The pairs close their eyes and should move over to the other side and with help of their sound they should find each other and join their thumbs. Everybody opens the eyes on signal.

- **Nimble-fingered.** Extra short circle activity: everybody holds out their left hand (open hand palm) and stretches out their pointing finger on the right hand and puts

Lgr 11, Physical Education and Health, aim

Through teaching, pupils should be given the opportunity to develop their interpersonal skills and respect for others.



it on the hand (90° angle to the hand palm) on the person standing next on their left side. On signal, they should all lift their right pointing finger at the same time as they should catch a pointing finger with their left hand.

Alternative or extra activities

- **The hunter (follow, lead, attention).** Everybody walks around aimlessly on a limited area. Anyone can stop and freeze whenever they want to. If someone does, then all the others must also stop. When everybody stands still, anyone can start walking again, and the others must also start walking. They continue until the activity is stopped.

- **All-tag-all (movement).** The one being tagged should stand still and clap hands 10 times. Anyone can tag anyone.

- **The A (cooperation, organization, strategy, communication, respect, problem solving).** Cooperation for the whole class. Move the A from A to B (put a cone at B): Let one child stand on the A. This activity takes at least 20 minutes and many children usually want to stand on the A. Since the class is divided on each side of the A it is good to turn around when they have reached the cone and go back to change roles. For the class to succeed, it is sometimes needed that one or several leaders step forward and start organizing. In some classes the cooperation works smoothly whilst other classes can experience irritation and frustration. Note! The exercise contains a real risk where the A can fall and hurt someone holding the rope. It is also a risk for the child standing on the A. The risk is very small for classes that cooperate well and methodically tries to move the A. Highest risk is for those classes where the children move randomly, irregularly with fast movements back and forth. If the ropes are tangled the risk increases. In cases where the children seem to lose control we step in and calm them down and reflect on how they managed and how they can think afresh. At imminence that the A will fall, we step in and hold the A. We give clear instructions before the activity starts about the risks so that everybody is aware of them.

Lgr 11 PE and health, years 4-6

Games and other physical activities in changing natural and outdoor environments during different seasons of the year.



In the A-activity, the whole class cooperates to move the A from one point to another by pulling the ropes that are attached on the top of the A.

- **The skis (cooperation, organization, strategy, communication, respect, movement).** The class is divided into groups of 4-5 pupils standing in line, with their backs against the house. The first two in each line fetch the skis which are outside the basement, and at the end of the activity they also put them back there. The groups walk away from the house towards the oak tree and then turn around. They can continue for a while if they want to improve their skills. The teachers can study the groups' strategies. The pupil at the far end of the ski often gets the important role to guide the others. It is recommended to let them change places with each other, so they can try different roles. This is a good activity when it is cold outside, and it takes at least 20 minutes to do. The risk elements are limited; what can happen is that the children fall. At the end, we hand over to the teacher for a while when we fix the camp fire if we want to have the break outdoors.

2.1 Norms and values

All who work in the school should

- contribute to developing the pupils' sense of togetherness and solidarity, and responsibility for people outside the immediate group,



Five children can fit on the skis and the assignment is to move from A to B and then back. By changing places, they can try different roles.

09.45 Break (depending on weather; indoors Or outdoors at the campfire)

10.0 Activities

- **The cubic meter (maths, geometry, problem solving, cooperation).** The purpose with this activity is for the children to get an idea and feeling for how much a cubic meter is and the names of the cube parts. The children are divided into groups of 4-5 and each group builds a cube using sticks and ropes. The sticks will be the *edges* and they are tied together, to make the *corners*. The empty areas between the edges are the *sides (faces)*. The construction must be stable so that it can be moved. Each group tries if they can all fit inside their cubes and then all groups gather with their cubes for a group photo. The groups tell us how they were thinking and if they succeeded with the assignment. We also discuss how many liters of air that fit in the cube and how much it weighs. How much would water weigh if the cube was filled with water?

Lgr 11 Mathematics, years 4-6
Construction of geometrical objects.

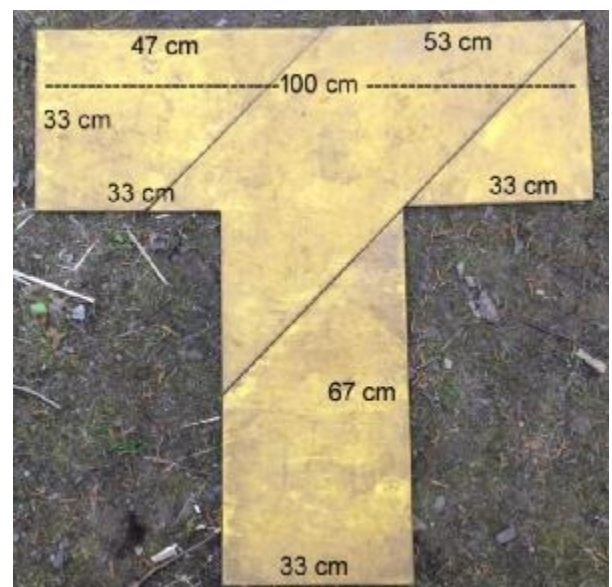
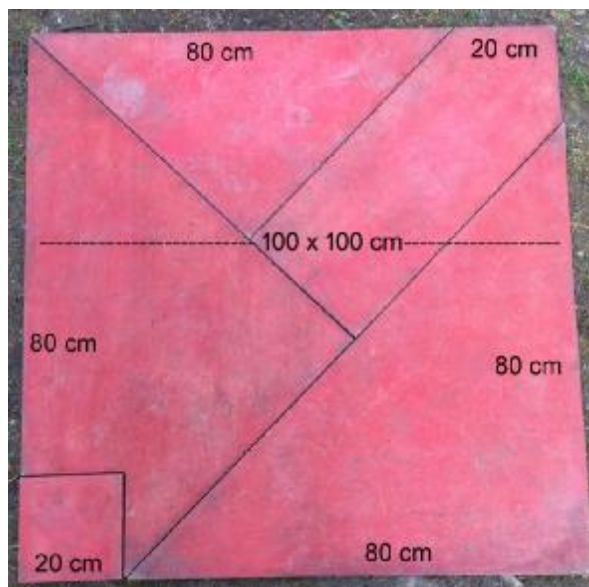


The pupils build a cube with a volume of one cubic meter using sticks and ropes. Each group must agree on how many sticks and ropes they need and we give them that number to work with. They can fetch more later if they need.

- **Giant jigsaw puzzle (maths, geometry, problem solving, cooperation).** Those who finish first can get an extra challenge. We have two types of jigsaw puzzles: A T and a square. The groups can rotate to try both puzzles (the puzzles are built on the ground around the house, with the same kind of puzzle on both sides of the house, for rotation). Clue for the T: the angle on the big piece is the armpit of the T. Clue 1 for the square: the small square should be in a corner. Clue 2: the point of the rectangular piece of the puzzle should be another corner.

Lgr 11 mathematics years 4-6
Construction of geometrical objects.

A difficult challenge during the day is to assemble the two giant jigsaw puzzles. One should form a square and the other should form the letter T.



This is our jigsaw puzzles. They are made of thick plywood with 5 and 4 pieces respectively. The area of the square is one m^2 , which is suitable for the groups that previously created a cube where the sides were one m^2 .

- **Equilateral triangle (mathematics, geometry, concentration, distance judgement).** All pupils stand in a circle and each of them secretly picks two classmates who have some similarity to them, such as the same color of the shoes. These two children should be part of the triangle that the children should try to form by moving so that all three children end up with the same distance between each other. Everybody tries to form their triangles at the same time. The equilateral triangle has three sides with the same length (compared to the isosceles triangle with two sides with the same length). We draw the triangle in the sand so that everybody can see and with help of two children we show how to do this activity. The activity can never be finished but we break at a certain point and the children then often want to tell us about who was part of their triangle.

Lgr 11 Mathematics, years 4-6
Construction of geometrical objects.

Alternative or extra activities

- **Multiplication (three different ways) (multiplication table, drill exercise, motor activity)**. The activities are done in pairs, clapping tables, cross-wise clapping or hit the mark. Up to table 5.

Lgr 11 mathematics, years 4-6
• mental arithmetic

- **Hanging stone (cooperation, problem solving, communication, listen and tell)**. In groups the children should hang up a gold stone in the forest without the 'gold thieves' being able to reach it. The gold marten that snatches gold in branch crotches and on branches, the gold magpie that snatches gold on twigs, the gold fox that snatches gold on the ground and the gold badger that snatches gold that has been hidden on the ground, and of course the gold fish that snatches gold stones in the lake. The only way is to let the stone hang freely for example from a tree branch. The construction must be of natural material (camouflage), otherwise the gold thieves will find the stone immediately. We show the children how the stone should not be lying but hanging freely as it is hovering. The children must follow the rules of the Right of Public Access when they solve this task. The activity is finished when the groups are ready, and they then show how they solved the problem. The activity takes at least 30 minutes.



Lgr 11 PE and health, grade 4-6
• Rights and obligations in nature as set out in the Right of Public Access.

- **Rain cover (cooperation, problem solving, communication, listen and tell)**. The children are divided in groups. Each group gets a tealight. Their task is to build a cover for the tealight so that it doesn't go out because of rain. The leader tests the solutions by spraying water with a spray bottle. Both activities above are described in the book *Hantverk, estetik och slöjd (Handicrafts and aesthetics)*.



Lgr 11 technology, years 4-6

Different phases of technical development: identification of needs, investigating, proposing solutions, designing and testing.

- **Sun screen (variant of the above, using a line instead of triangle)**. Each child secretly decides for one classmate to be the sun and another one to be the sun screen. Then they must place themselves in between the sun and the sun screen, at the same time as the others are moving around doing the same.

11.30 Lunch

- Maybe we present an animal we have indoors during lunch break.

12.15 Activities

Math track (the class is divided in two groups)

- **Little finger (mathematics, geometry, scale, problem solving, cooperation, communication, creativity).** The pupils are divided in groups. Each child in each group gets a stick resembling a little finger. The sticks are of different lengths so that the groups should build figures in different scales. The group should build a model (stick figure) of one child in correct scale based on the length of the stick in relation to the child's little finger. If the stick is half as long as the little finger, then the model should be 1:2, i.e. all parts of the figure should be half the size. If the stick length is double to the little finger, then the figure will be scale 2:1, and all parts double the size. The tools they get to use are rulers and possibly measuring tape. Afterwards, the group present their work and tell which scale they have used when building their figure. We show them different scale definitions before the activity. The activity takes approximately 30 minutes.

Lgr 11 mathematics, years 4-6
Scale and its use in everyday situations.



In the Little finger activity each child in each group gets a stick resembling a little finger. The little finger is part of a model the build on the ground. The groups then present how they thought and which scale they have used.

- **Team fishing geometrical figures (mathematics, geometry, cooperation, motor activity, communication).** Half of the class gathers around a white cloth. Geometrical wooden figures (three-dimensional objects) with eye bolts are put out on the cloths. Notes with the names of all objects are spread out around the cloth. Using a hook with ropes attached to a wire ring, the children should hold a 2 m long rope each that is hooked to the wire ring, and they should catch the objects and put them on the note with the object's name. The children must hold the rope outside the mark on the rope. Two A4 papers with pictures of all objects are put out on the ground upside down but can be turned if the children need to. Advance the activity by doing the same but without the children talking to each other. Approximately 20 minutes.

Lgr 11 mathematics, years 4-6

Basic geometrical objects including polygons, circles, spheres, cones, cylinders, pyramids and cuboids, and their relationships.



In the team fishing activity, the children's cooperation skills and knowledge about three-dimensional geometrical objects are challenged. They should lift each object to the correct nameplate using ropes that converge in a wire ring in the middle.

Alternative or extra activities

- **Problem solving with water (mathematics, problem solving, cooperation, measuring, volume).** In groups the children should measure as many volumes as possible using only two measurements (volumes). This is done indoors in connection to the lunch break.
- **Big bang (mathematics, patterns, movement).** Everybody gathers randomly like prima materia. On signal, Big bang happens and everybody scatters aimlessly and runs around. On signal, everybody must follow someone (is drawn to, gravitation). Two children cannot follow the same. A pattern is created in the chaos. The children must move around all the time. If two children choose to follow each other, then they will just be revolving on the same spot. Try out by deciding before which person to follow, then more will follow the same person.
- **36-game (mathematical assignment, movement, cooperation).** The class is divided in groups. 36 mathematics assignments are posted in the surroundings. Each group throws a dice and runs to the assignment number that the dice shows. On signal, the whole group gathers and performs the assignment. Next time, the dice number is added with the previous number. When reaching assignment 36, the group has succeeded.

Sustainable Development-track (Note! You must contact the Nature School before the nature school day if you want this track)

Migratory birds

The purpose of this activity is to start a discussion on how we treat people in our surroundings and in a wider perspective. You can create different stories around this activity depending on what you want the pupils to discuss. But no matter the content, the activity will be done in the same way. The class is divided in 5-6 groups and each group has a hula-hoop on the ground where they gather. The groups imagine they are a bird family in a bird's nest high up in a tree. During the day they fly around looking for food and then gather again in the evening. Suddenly one day during a big storm one of the trees fall (one hula-hoop is removed). On signal, it becomes night and the bird family must find another nest to rest overnight. During the day another nest is damaged when hit by the lightning (a hula-hoop is removed). It becomes more and more crowded in the remaining hula-hoops. (Whenever you want you can stop the activity to let the children reflect about the situation.) Once again, the birds fly out during the day and one bird family is hit hard when a harvester cuts down their tree (the third hula-hoop is removed). The following night is very hard for all the birds. A variant of this activity is described in the book *Outdoor learning for sustainable development*, under the title *All hands on deck*.

Lgr 11 Norms and values

All who work in the school should

- contribute to developing the pupils' sense of togetherness and solidarity, and responsibility for people outside the immediate group

Wetlands

This is a cooperation activity to be filled with different content and the framework story is adjusted to the precondition of the class. We mark an area resembling deep wetland. The pupils are divided in groups and each group should cross the wetland to the other side. To not sink they use expensive swim boards, three to five pads per group, which they must transfer by moving over the wetland to the other side. The assignment is for all children in the group to reach the other side together with all their swim boards. The activity is described in the book *Outdoors – make it work*.

Example of a framework story for this activity can be found in the book *Outdoor Learning for Sustainable Development*, where the activity is called 'swamp fever' and focus is on the environmental impact on sensitive natural areas and people's vulnerability.

Garbage thief

This activity emphasizes the importance of recycling. We put up posters on the surrounding trees, with pictures of: phytoplankton and zooplankton, fossil oil, plastic package, dustbin and one recycling station. Copy material for the posters is found in the book *Outdoor Learning for Sustainable Development*.

Lgr 11 Fundamental values and task of the school

- has obtained knowledge about the prerequisites for a good environment and sustainable development,
- has obtained knowledge about and an understanding of the importance of the individual's own lifestyle and its impact on health, the environment and society

We start by showing a plastic package and discuss with the children what it is made of and how the raw material developed.

When the activity starts all children are gathered around the poster with plankton. They should resemble phytoplankton and zooplankton during the time of dinosaurs, so they move around aimlessly like plankton do and they say the word “plankton” all the time. When plankton bumps into each other, they play the game *rock-paper-scissors*. The winner goes to the next poster with fossil oil, where they play the same game with the other winners. The losers stay and continue playing with the other plankton. The winners of fossil oils continue to the plastic package poster, where the *garbage thief* will challenge them. If the garbage thief wins the game, then the plastic package goes to the dustbin and stays there. If the garbage thief loses, then the plastic package goes to the recycling station. The winners at the recycling station go back to the plastic package poster. The leader joins and play with the children who are still at the plankton posters, so they can also move on to the other posters.

Gradually, more and more children end up at the dustbin poster and then it is time to discuss what will happen with the material that has not been recycled.

Alternative or extra activities

- **Relay of public access rights (the right of public access, movement)**. The pupils are divided into groups. The groups stand beside each other. The pupils stand in line in each group. There is a pile of notes with short statements about the rights of public access some meters in front of each group line. Beside each group there is one wrong-note and one right-note. The first child runs to get a note in front of the line, runs back to the group and together the group should decide if the note should be put on the ‘wrong’ or ‘right’ note. At the same time the next child has already run to get the next note. The relay is finished when all notes have been sorted. Then the groups present how they sorted and why.

13.15 Evaluation.

During the oral evaluation with the children, we let them say their opinion about the day, answering these questions: What was good during the day? Is it something you think we should have done in another way? What did you learn today that you didn't know yesterday?

13.30 The day ends, departure from the Nature School.

Follow-up work

- Watch the photos from the day together with the children and reflect about the day. Photo album can be found at the Nynäshamn Nature School [here](#).
- Let the children reflect about the day based on their experiences. Find examples of questions below.
- If you as a teacher had a certain purpose for the group division, how did the groups function based on the purpose you had?
- Do more cooperation activities if needed. Adjust according to needs. Maybe you need whole class activities, half class, groups or pairs. You can find more activities in the books in the literature list below.
- Continue the work with scales. For example, the children can draw or build the school building in a scale they decide themselves. They can also build an ant and a needle where the ant is as big as themselves. When they have decided the scale of the ant, they can also build the pine tree needle in the same scale, to get an understanding of how large the needles are that the ants are carrying. Alternatively, they take a randomly picked stick as being the pine tree needle, and then they calculate the scale of the needle to build the ant using the same scale.
- Repeat the three-dimensional objects that they worked with during the nature school day.
- For those who chose the **Sustainable Development track**: You can let the children reflect around the 'migratory birds' activity. The discussion can be hold in different levels: For example, about how they treated each other during the activity, where different terms such as empathy, respect, cooperation and helpfulness are part of the discussion. Or if the teacher wants to make comparisons with the refugee situation in the world, then terms such as humanity, empathy, solidarity, rights and obligations can be part of the discussions.

Questions for the discussion during follow-up work

Mathematics, cooperation and problem solving

How did you manage to talk about and discuss different solutions to the day's challenges?

Did everybody in the group get the chance to speak their views or ideas?

How did you solve assignments in those cases where you did not agree how to solve them?

Did you and your classmates show respect to each other in the different activities?

Did you take responsibility during the day?

Are you satisfied with the role you had during the day?

Which role would you have liked to have during the day?

Were the assignments during the day enough challenging for you?

Did you do anything extraordinary some time during the day?

Did you do anything you regret during the day?

Did you discover anything new about a classmate that you didn't know before?

What was your best experience during the day?

Did you anytime feel insecure during the day?

Have you discovered anything new about yourself that you didn't know before?

Lgr 11 Fundamental values and task of the school

Tasks of the school

In partnership with the home, the school should promote the all-round personal development of pupils into active, creative, competent and responsible individuals and citizens.

The school should also strive to provide all pupils with daily physical activity within the framework of the entire school day.

The school should stimulate pupils' creativity, curiosity and self-confidence, as well as their desire to translate ideas into action and solve problems.

The school should focus not only on intellectual but also practical, sensual and aesthetic aspects.

The school should strive to be a living social community that provides security and generates the will and desire to learn.

2.1 Norms and values

All who work in the school should

- contribute to developing the pupils' sense of togetherness and solidarity, and responsibility for people outside the immediate group.

2.2 Knowledge

Goals

The school is responsible for ensuring that each pupil on completing compulsory school

- can solve problems and transform ideas into action in a creative and responsible way,
- can learn, explore and work both independently and together with others, and feel confident in their own ability,
- has obtained knowledge about the prerequisites for a good environment and sustainable development (Sustainable development track),
- has obtained knowledge about and an understanding of the importance of the individual's own lifestyle and its impact on health, the environment and society (Sustainable development track).

Physical Education and Health

Aim

Through teaching, pupils should be given the opportunity to develop their interpersonal skills and respect for others.

Core content in years 4-6

- Games and other physical activities in changing natural and outdoor environments during different seasons of the year.
- Rights and obligations in nature as set out in the public right of access to land.
- Safety and consideration to others in training, playing, games, sports, nature and time spent outdoors.

Swedish

Aim

This means that pupils through teaching should have the opportunity to develop their language for thinking, communicating and learning ../.. Teaching should also help to ensure that pupils obtain an understanding that the way in which we communicate can have consequences for the individual and for other people.

Ability to

- express themselves and communicate in speech and writing.

Core content in years 4-6

Speaking, listening and talking

- Using arguments in different discussion situations and decision processes.

Literature

Outdoor learning for sustainable development, Behrenfeldt m.fl. 2015

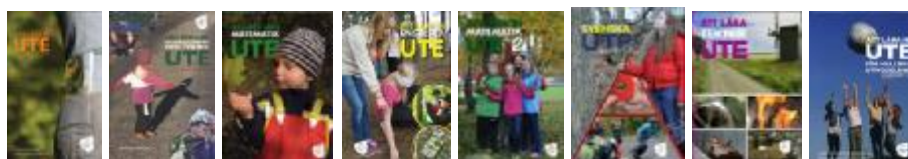
Learning mathematics outdoors 2, Molander et al. 2012

Outdoor learning – exercises in the backpack, Molander et al. 2013

Hantverk, estetik och slöjd – med utemiljön som inspiration (Handicrafts and aesthetics – with inspiration from the outdoor environment), Nyman. 2015

Utomhus – få det att fungera (Outdoors – Make it work), Osswald. 2016

Nynäshamn Nature School provides **courses** based on the books in the series Outdoor Learning. See [here](#).



Tel 08 520 735 65

Scales

Scale	Pronunciation	Description
1:1	One to one	Real size
1:2	One to two	Half the size (Think $\frac{1}{2}$)
2:1	Two to one	Double the size (Think $2 \cdot 1$)
3:1	Three to one	Three times the size
4:1	Four to one	Four times the size
5:1	Five to one	Five times the size

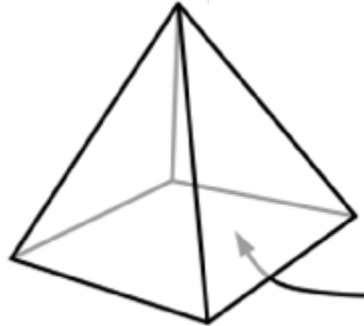
Geometrical three-dimensional objects

From Clip Art

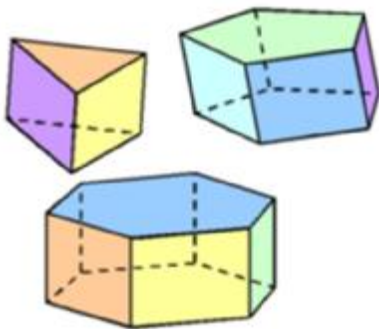
SPHERE



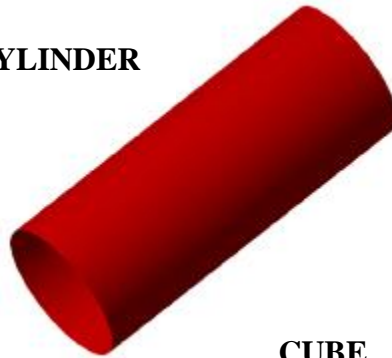
PYRAMID



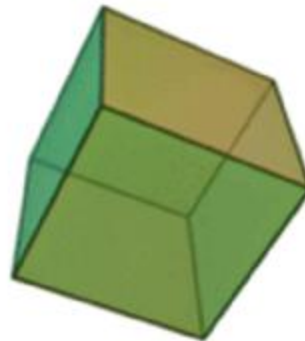
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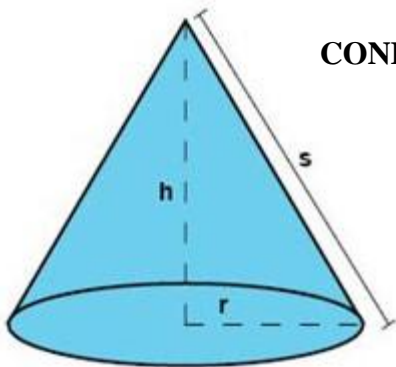
CYLINDER



CUBE



CONE



RECTANGULAR CUBOID

