

The Exploding Mailbox



A PRACTICAL GUIDE FOR direct mail, paper, trees and forest PRIMARY AND SECONDARY SCHOOLS



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Extra Material

Attached to this guide is a class sized set of stickers carrying the text “No Direct Mail. Thank You!”. These can be put on mailboxes or on doors above the mail drop. For those pupils with mailboxes, a piece of self-adhesive plastic, to protect against the wear and tear of the elements, is included. On page 18 further tips on how to avoid direct mail can be found.



Mats Wejdmark and Robert Lättman

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Translation: Marcus Dover

Preface

In Sweden, we often express our concern for the rain forest. In particular we worry about it being chopped down and numerous species becoming extinct in the process. We do not worry about our Swedish forests in the same way. For the last 30 or 40 years we have believed that it does not matter how many trees we cut down, because we are continuously planting new trees to replace them. Due to more efficient agriculture some fields are no longer used by farmers. These fields become overgrown creating a situation of net forest growth.



We seldom stop to think about the fact that there are hardly any virgin forests left in Sweden. There are a few areas of primeval forest near the mountains in the Swedish districts of Norrbotten and Dalarna. Nowadays, those concerned with environmental protection more often speak of natural forests than primeval forest.

All plants and animals dependent on primeval forests for their survival, are no longer welcome in the Swedish woods, at least not while we continue to cut down trees at their most profitable age (about 80 years). It is true that more forest is planted than felled, but quantity cannot substitute quality. If we would let large forest areas develop undisturbed, we might regain some of the flora and fauna that has been lost. In order to do this we must, among other things, reduce our paper consumption. Sweden has the largest consumption of paper per person and year in the world and this figure keeps rising, despite promises of the paperless office. One way to reduce paper consumption is to reject direct mail, addressed or unaddressed, posted in your mailbox.



Purpose

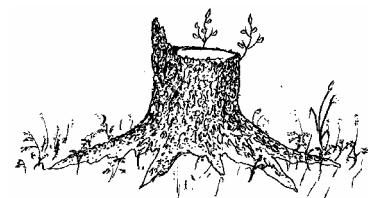
The purpose of this guide is to stimulate discussion on paper consumption and the Swedish forests. Greater awareness of direct mail and how producing it strains our environment can help households take the active decision to post “No Direct Mail” stickers on their mailboxes. If a sufficient number of recipients reject direct mail, maybe this form of advertising will cease completely in the ecological municipal area of Nynäshamn. Paper consumption would thus decrease enabling larger areas of forest to be left undisturbed, increasing biological diversity. This guide will introduce different methods of working with subjects like direct mail, paper, timber and forests. Both indoor and outdoor activities are described.

What are the characteristics of a primeval forest?

- Trees of varying age.
- Mixed variety of trees.
- Many dead trees.
- Old trees.
- Forest shaped by fires, floods and storms.

Questions in the Keel Water of Advertising

Using advertising as a basis for discussion, teachers and pupils can work with questions concerning paper, forests and biological diversity. Developing an emotional attachment to trees and the forest is important in order to be able to take sides and argue for the preservation of the biological diversity of the forest. Many traditional school subjects can be merged into the quest to answer pupils' questions and thoughts. How much money is spent on advertising each year? (see pages 4 and 12). How many trees must we fell if all households worldwide were to receive the amount of direct mail we do in Sweden? Do we need advertising? How does regular felling affect the forest? Should we try to preserve the diversity of species in the forest or is this unnecessary? What arguments can be put forth in the case of preserving a beetle, a lichen or specific type of bird? (see page 14).



Direct Mail

Direct Mail and Energy Consumption

According to branch estimates, Sweden produces 70 000 tons of direct mail yearly. In lumber consumption that equates to 300 000 cubic meters of forest, which means that 1.2 – 1.5 million trees are used as raw material for direct mail every year. The energy used to create direct mail, i.e. energy used for wood production, paper pulp production and making the actual letters, adds up to 0.41 TWh (Terra Watt Hours). That is roughly the amount of energy the nuclear power plant Ringhals produces during two winter months. The calculation model is simplified and energy used for printing colours and distribution have not been included. The figure 70 000 tons can be questioned if the students do their own research. A survey done by Holmen Paper in 2001 showed that 2413 g of direct mail was distributed per household and month which would render the result 120 000 tons per year.

(Source: *Energibehov vid direktreklamproduktion*, Niklas Wallenius, 2002)



What Happens to Direct Mail?

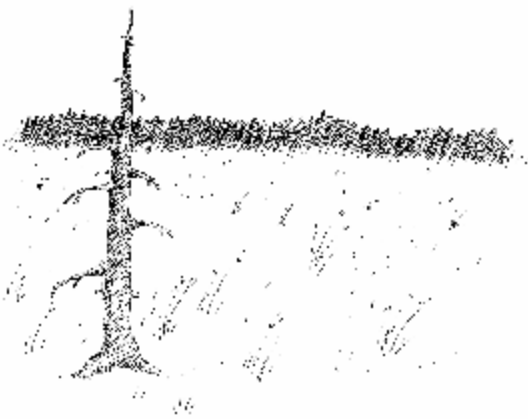
A survey done by Sifo in the early nineties showed that 16% of all households throw direct mail in the bin without ever reading it, 69% skim through it and 9% save it to read later. If all those who throw away their direct mail would post a “No Direct Mail” sticker on their mailboxes, 200 000 trees could be spared yearly.

The Post supplies companies distributing direct mail with information on how much mail is needed for complete coverage of an area. This means that “No Direct Mail” stickers will reduce the amount of direct mail produced and distributed.

Do We Need Direct Mail?

The title poses a question that has been the basis of a lengthily discussion. The purpose of direct mail is to inform consumers of the existence of different kinds of products, their prices and temporary rebates or offers. Direct mail is costly in energy consumption (see above) but also in cash. Apart from producing the actual mail there are costs for photographing products, writing text, lay-outing and campaign planning. All of these costs are added to the products shelf price. In 1998, in Sweden, the total cost for direct mail was 500 SEK per person and year (source: Sifo).

Would products be cheaper without direct mail or would they become more expensive because companies would sell less and be forced to raise prices? Who decides what you're eating tonight – you or the supermarket's special offers? When did you last use a coupon without checking the actual price of the product? Can needs and wants be created through advertising and how does direct mail effect children? Do they become more aware of consumer opportunities or are they fed a feeling that something is lacking in their lives? Are there alternatives to direct mail?



A Circle of Life

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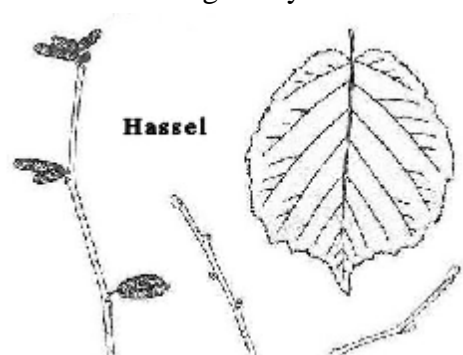
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Outdoor Activities

Help a Hazel

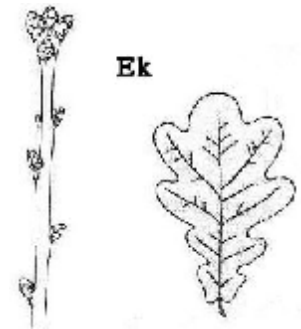
Choose a part of the forest where there are a number of hazels. They often grow on hillsides together with oaks. Hazel flowers are difficult to find, they are very small and red and look a little like sea-acorns. The pistils shoot out of the bud and are fertilized in March or April. The flowers are so small that no insects take any interest in them. They must therefore rely solely on the wind for their fertilization. The hazel is often self sterile and must be fertilized by another bush. The male parts are easier to find, they are the long catkins full of pollen.

Divide the class into groups if there aren't enough shrubs for everyone. Let the pupils search for red hazel flowers until each has found one. Tie a ribbon or something easily visible on the branch carrying the flower. Let the students carefully shake the catkins of another hazel against a flat, A4 sized paper. When the paper has become coloured by the pollen, roll it into a thin tube. Blow the pollen at the chosen flower (not recommended for pupils with allergic reactions to pollen of course). Also mark the shrub in some way so that the pupil can find his or her hazel on a later occasion. Revisit after the summer vacation to see if the pollination was successful. The hazelnuts ripen in August or September. How many nuts grew? What happens to the nuts?



Plant an Oak or a Hazel

In autumn, when hazel nuts and acorns fall to the ground, you can plant these in flowerpots. You can help the germination on its way by grinding the shell slightly or selecting nuts where the shoot has already pushed through the shell. When spring arrives, the hazels or oaks can be replanted in the forest or in the school yard. If every pupil or class plants a tree when starting school, they can follow the development of their own tree throughout all their school years. Hazel nuts and acorns are not covered by the Swedish right of common access, like for example mushrooms. To follow the law strictly you must therefore ask the landowners permission before you pluck them. This law is outdated and is a remnant of the times when pigs were an important commodity and the forests were grazed by swine eating the acorns.

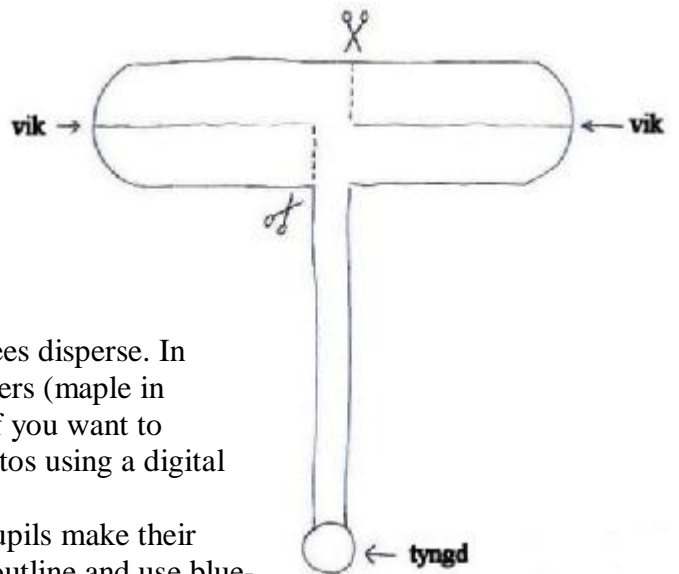


Helicopter Seeds

Animals help the oak and hazel to disperse their fruit. Without this help the fruit would simply fall directly under its tree and wouldn't be able to grow because of lack of light and water. The maple and the lime tree use a different method of transport to move fruit away from the tree. They fly like a helicopter.

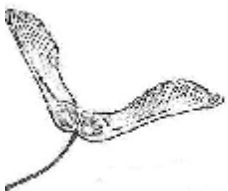
Have a class discussion on how the pupils think trees disperse. In springtime, find a maple or lime tree and look at its flowers (maple in May, lime tree in June). Use a ribbon to mark a branch if you want to follow its development over a longer time (also take photos using a digital camera).

In autumn you can introduce the topic by letting pupils make their own paper helicopters (see figure). Cut along T-shaped outline and use blue-tak or a paper clip as a weight. Test how well the helicopters work. Whose helicopter flies the farthest? Write the pupils' names on the helicopters and release them from a school window or some other elevated position.



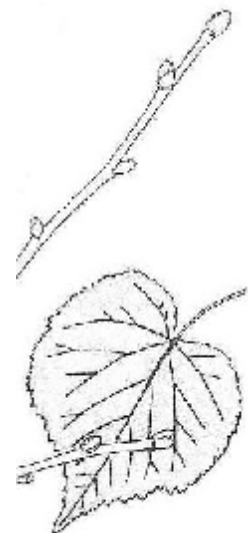
Now go outside to see if it is really true that there are helicopter seeds. Test which helicopters work the best, the pupils or nature's. If there are no seeds left on the tree, there will surely be some on the ground. Are there other trees with seeds that fly? How do other plants disperse? Is it possible to get different seeds to grow?

(Figure and idea from: *175 amazing nature experiments*, 1991)



Left: Leaves and buds of the maple. The nose shaped maple seeds will stick to your own nose. They fly pretty well too!

Right: Leaves and buds of the lime tree. The rotor blade of the lime tree seed gives it great speed. In botanical language it is called a bracteole.

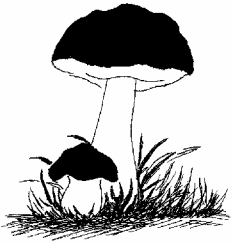


A Day in the Forest 1

During this day, the children are not to take anything from the forest. The purpose of this is to show the pupils that the forest can be used without being taxed (a kind of ecotourism). At the end of the day, students will take photos, drawing, poems, memories, etc, home with them.

Use a digital camera to capture the changing of the seasons. Follow a bud developing by photographing it regularly in springtime. Take pictures of a flower and follow its development into fruit. Photograph a leaf and track its changes before finally falling in autumn. Take pictures of an apple and watch its degradation. Take pictures of a mushroom or an acorn growing.

The pictures can be added to, or combined with, the pupils' memories, poems and thoughts.



A Day in the Forest 2

During this day, the children are to collect natural materials. The purpose of this exercise is to show what a rich variety of useful things can be found in the forest. Many of these may be taken home, a privilege regulated in the Swedish right of common access. The objects can be used for handicraft, art, cooking or perhaps simply laid out on a table for inspiration.

Chlorophyll the Cook

In a leaf there are many small, small rooms. In every room there is a kitchen. In every kitchen there is a cook. The cook, named Chlorophyll, can make food for the tree using sunlight and water. To do this, the cook also needs the air we humans exhale. Chlorophyll gets this air through a hatch in the roof (stoma). Using the air we have had in our lungs, Chlorophyll cooks for the tree. When he has fed the tree, he is happy. He then opens the hatch and lets the air bubbling up in his cauldron escape through the roof. This is the air we humans need to breathe to live.

Tree Music

Together with the pupils, a large and strange tree is selected. Let the children position themselves so that each is in a different spot in relation to the tree. One pupil can stand next to the tree, another farther away, a third can climb the tree and so on. When everyone has chosen a spot, the pupils look at the tree in silence for a moment or two. Each pupil then chooses one or two words that come to mind when looking at the tree. The teacher writes all these words down (or if the class is divided into groups, someone in each group is responsible for doing this). Pupils can now cooperate in constructing a poem using the words that were collected. When the poem is finished, gather objects found close to the tree that can be used as musical instruments. Create an orchestra and let the music accompany the poem. If the class is divided into two groups, one group can write the poem while the other assembles the orchestra (or alternatively in smaller groups).

Life Cycle of a Leaf

The lyrics and music to the right were written by Gerd Strandberg. If you would like a copy, please don't hesitate to call The Nature School.

Bladets Kretslopps-visa Text och melodi Gerd Strandberg.

Det var en gång en liten knopp som ämnat inte trötta sig. Den knoppen skulle bli ett blad och växla färd och var så glad. Och solen åken och regnet föll och blådkvicken i väpen höll. Och laqra med sin fjärd. Sen till frilädet hela sommaren. Då händer nåt som ingen ser!!

Vers II Till slut så trädet: Stoppa allt - stäng alla kanaler - det blir kallt! Och in i trädet kryper sen - den gröna chlorofyll färgen. Nu lyser bladet gult och rött, och stärkelsen blir socker-sött, Och sedan trillar bladet ner. Då händer nåt som ingen ser!!

Vers III Hoppsjättar, mikroskopiskt små, och gräsuppgor och maskar så förvandlar bladet vårt till jord. nu får ni tromme på mitt ord; Det var en gång en liten knopp, och allt går runt tar aldrig stopp, För blad ger syre till vår kropp, låt många träd få växa opp!!

☆ Gör gärna rörelser till. Nyckla III!

Tree Poetry

This activity (or at least the gathering of words) is well suited for the out of doors. Let each pupil make a list of 15 words describing a tree or a forest (this can also be done in groups). Make a similar list of verbs. Now let the pupils use these words in for example:

- Free verse
- Haiku
- Tanka
- Cinquain

I'm sitting in my tree
My knotty little pine
While the rain pours down
I can hear it dripping
Like a melody.
Mia, class 5C, Viaskolan

Haiku is a Japanese poem consisting of three rows of five, seven and seven syllables respectively. Example:

“Snow-covered birches (5)
glistening in the sunlight (7)
on this cold, cold winters day” (7)

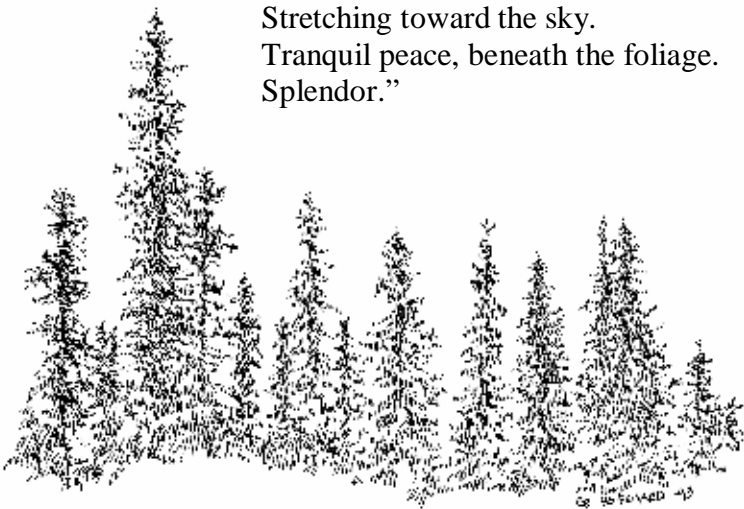
Tanka is a poem consisting of five rows of five, seven, five, seven and seven syllables respectively.

Cinquain originates from the French word for five. It is a poem of five rows where each row has a well defined form and purpose:

- Row 1, the title, 2 syllables.
- Row 2, describing the title, 4 syllables.
- Row 3, describing an action or an activity, 6 syllables.
- Row 4, describing a feeling, 8 syllables.
- Row 5, some other word for the title, 2 syllables.

Example:

“Forest.
Ever growing.
Stretching toward the sky.
Tranquil peace, beneath the foliage.
Splendor.”



When the pupils have completed their poems, you can discuss the following questions:

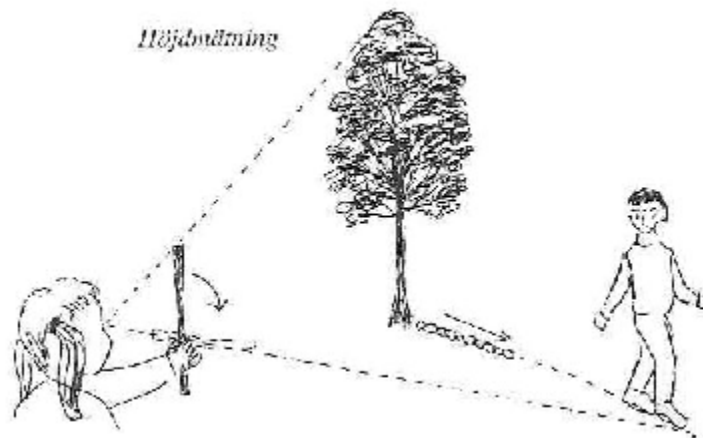
- Does the poem tell us anything about the authors view on mans place in nature?
- Does the poem tell us anything about how human activity is affecting the environment?
- Does the poem tell us anything about how nature and the environment affect us as humans?

Maths in the Forest

Measuring the Height of a Tree 1

There are different ways of measuring the height of a tree. Small children can make comparisons; the tree is shorter than, taller than, the same height as, etc. The tree's shadow can be marked at different times of day. Discuss why the shadow changes. Older children can measure the trees height using a 0.5-1 m stick. Stand at some distance from the tree and hold the stick up in front of you (see figure). Slowly back away from the tree until the foot and the top of the tree coincide with the ends of the stick. Now turn the stick until it is horizontal and see where the top of the stick points. Go to this position and pace the distance to the tree for an approximate measure.

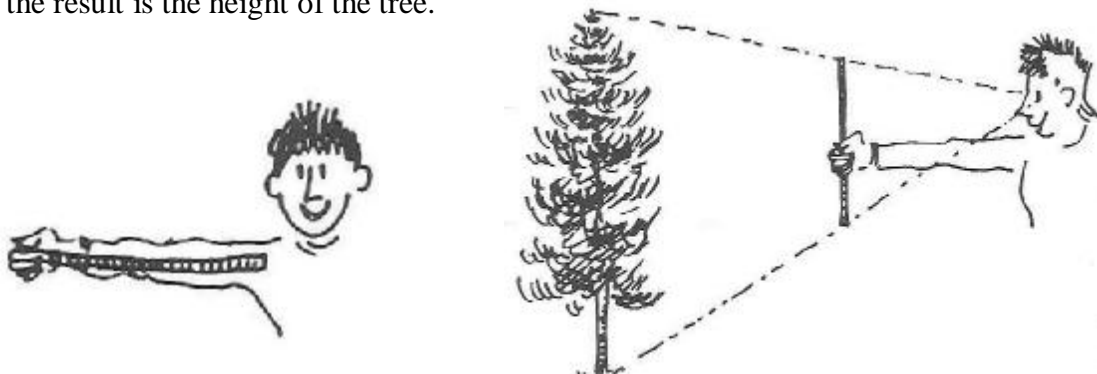
Measure and mark up the distance of one meter so that the children can test how many of their feet or paces there are to the meter. This is also a good way of practically employing multiplication and division skills. If the tree is 36 feet high with three feet to the meter, the tree must be $36 / 3 = 12$ meters high.



(Source: *Att kanna ett träd – och lära känna det*, Karin Lagerholm, 2000)

Measuring the Height of a Tree 2

Find a stick and shorten it, by breaking pieces off, until it is as long as your outstretched arm, from hand to shoulder. Hold the stick as shown in the figure, arm completely extended and stick altogether vertical. Go backward and forward until the stick appears to be the same height as the tree, i.e. the trees foot and top align with the ends of the stick. Now pace the distance from your standing position to the tree. Measure the length of your step, multiply with the number of steps and the result is the height of the tree.



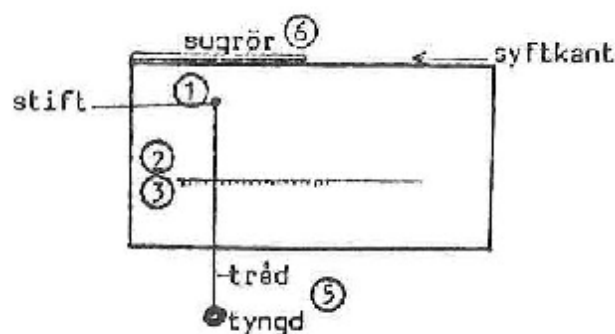
Measuring the Height of a Tree 3

Make your own hypsometer

1. Mark the point where the drawing pin will later be fastened (about 10-12 squares from the front edge and 5-6 squares from the top edge).
2. Draw a horizontal line 15 squares below this point (see figure).
3. Make gradations on the line. 0 goes under the drawing pin point. Each square (0.5 cm) corresponds to 1 m. Make gradations left and right (see figure).
4. Use glue or scotch tape to fasten the checked paper onto the cardboard. It is important that the upper edge of the paper is fully aligned with the upper edge of the cardboard.
5. Cut a 35-40 cm piece of thread and tie a loop at one end. Put the drawing pin through the loop and fasten the drawing pin at the point marked in step 1. Make sure the thread can move freely. Tie a weight (for example a screw nut) to the free end of the thread.
6. Use glue or scotch tape to fasten the straw or tube to the upper edge of the cardboard. Align it with the front edge of the cardboard. The hypsometer is now ready!

Materials needed:

1. Piece of cardboard.
2. Checked paper.
3. Thin tube or straw.
4. Glue or scotch tape.
5. A drawing pin.
6. Thread.
7. Weight (a screw nut).



Fact Box: Old Forest in Sweden

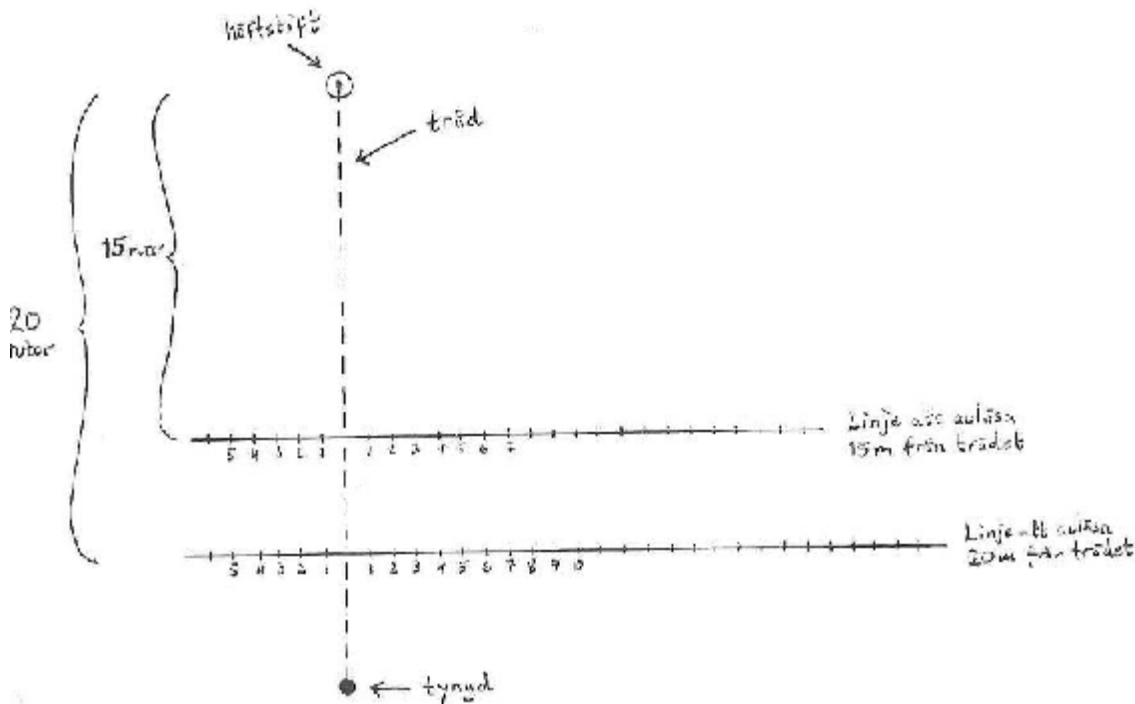
In Sweden there are few primeval forests. Of the cultivated forests, only about 6% is said to be “old forest” which means that the trees are more than 120 years old. Truly old forests, with trees of 160 years age or above, can only be found on 2% of the cultivated area. In absolute measures these 2% represent 450 000 ha. In nature reserves 25% of the forest is 160 year or older corresponding to a 190 000 ha area.

(Source: *Miljötrender nr 1*, 2003)

Using the hypsometer

(the tree must be no taller than 20 m)

1. Stand at a distance of 15 m from the tree.
2. Look at the top of the tree through the straw on top of the hypsometer. Hold the thread fixed in its current position when you turn the hypsometer in order to read the measurement from the 15 m line.
3. Repeat step 2 but measure the foot of the tree.
4. Add the results of step 2 and 3 to obtain the height of the tree.



Estimating the Volume of a Log

Search for a pile of logs or a fallen tree in the forest. Measure the diameter of the log or the tree trunk at two places and calculate the average diameter. The radius is the diameter divided by 2 and the area of a circle can be calculated using the formula $3.14 \times r^2$. Estimate the volume using the formula for the volume of a cylinder.

$$3,14 \times r^2 \times h$$

r = radius, h = height

Estimating the Volume of a Living Tree

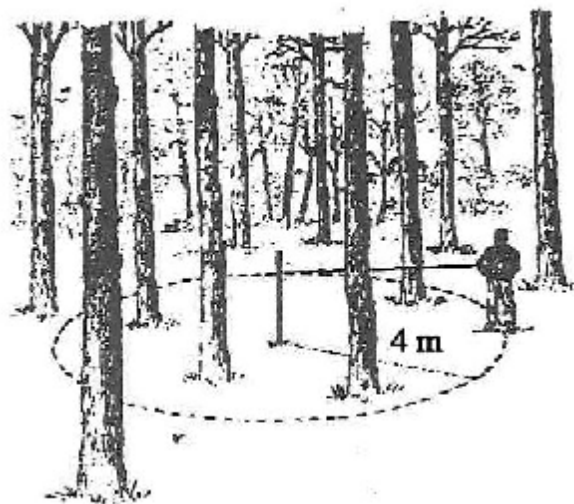
A reasonable approximation of a tree's volume can be obtained using the formula 3.14 times the radius squared (radius measured at breast height) times the height divided by 2.

$$3,14 \times r^2 \times h/2$$

Estimating Cubic Meters of Timber per Hectare

Knowing the volume of a tree, the pupils can now calculate the amount of timber per hectare in an area. One hectare is 100 x 100 m and using a string of 4 m length you can estimate how many trees there are in 50 m². Drive a pole into the ground and fasten the 4 m string to the top of it (see figure). Mark your starting point and walk in a circle keeping the string stretched. Count the number of trees within this circle having approximately the same size as the tree in the previous exercise.

If the pupils can find a price of timber they can also calculate an estimated value of the trees in their area.



How Many Trees Where in Your Mailbox This Year?

An easily performed study is to weight all direct mail received in one's mailbox during a period of one week. From this data, calculate the weight of direct mail per household and year. Assume that one tree can be converted to 50 kg of paper. How many trees are needed to produce the direct mail to pupils' households combined? How many trees are required to produce all direct mail in Sweden each year? How many trees would we need if all households worldwide were to receive the same amount of direct mail we do in Sweden? During the last week of February 2003, an average Swedish household received 700 g of unaddressed direct mail.

Fact Box: Swedish Forests

- There are 23,5 million ha forest (1993).
- The timber stock is 2,7 billion m².
- Around 65 million m² is felled yearly.

Experiments and Other Activities

Nature Experiments

The compendium "nature and environment experiments" can be found on The Nature School's internal FirstClass homepage. It is a collection of experiments from a variety of books (references included of course). Many experiments are about forest and trees (see pages 1-10, 46, 49, 51, 60-66).

Explore your classroom or school. How many things are made of wood?

Forest in a Jar

All forests go through changes, a process called succession. Let the pupils reflect on the difference between a cultivated forest and one that is left alone. How does a forest develop and what is the difference between a forest that is felled regularly and one that is not? The following experiment can be used to introduce the concept of succession.

Have the pupils write down their hypotheses of what will happen and at the end of the experiment they can write down what did in fact happen. Pour 5 cm of earth and 8 cm of water into a glass jar. Put the jar on a windowsill and let the earth sink to the bottom of the jar. Plant an aquarium plant in the jar. Leave the jar in the window without a lid and without replacing the water that evaporates. Let pupils put some seeds in the jar twice a week. They will grow and then rot. Keep adding seeds even after the water has evaporated and the aquarium plant has died. The seeds will grow and when the earth becomes to dry, you must add water, symbolizing rain. Sunflowers can be the trees of the jar. Make even more out of this experiment by visiting a lake being overgrown or a swamp (a marsh or a bog). Is a lake always a lake? How did the land develop when rising up out of the water after the ice age? The word succession can be replaced by “nature’s development”, “natural course of events” or something similar for the younger children. (Idea and picture: *För det vilda*, 1992)



Make Your Own Paper

When making your own paper it becomes obvious that only small amounts of energy are needed to recycle paper. It is much more costly, in energy, to transform a tree into pulp from which paper can be made. The wood must be cooked at high temperatures and chemicals must be added. Ask the pupils if they think they could make paper from wood. Below are instructions for a simple way of making small pieces of paper or cards. To attain finer pulp you can use a handblender.



Materials needed; two buckets, half filled with lukewarm water, a newspaper, an ice-cream carton and a piece of cloth that will let through water (for example an old shirt).



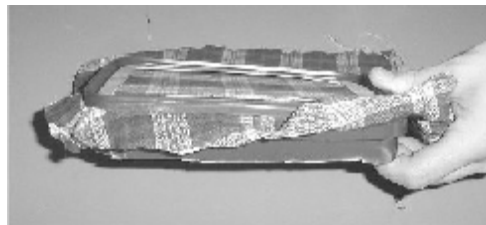
Cut away the bottom of the ice-cream carton so that you are left with a frame of about 4 cm height. This will be our deckle.



Cut a piece of cloth slightly bigger than the lid of the ice-cream carton. You'll need a separate piece of cloth for each paper you make.



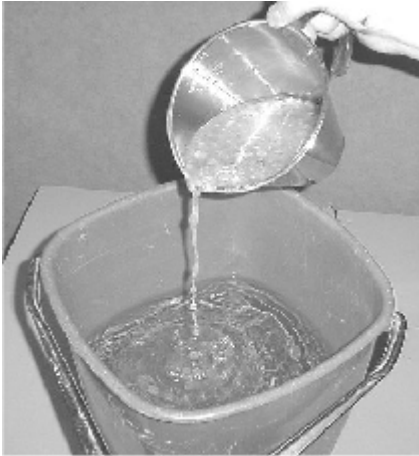
Cut a hole in the lid of the ice-cream carton matching the size and shape of the paper you wish to make.



Sandwich the piece of cloth between the lid and frame of the ice-cream carton to create a combined mould and deckle.



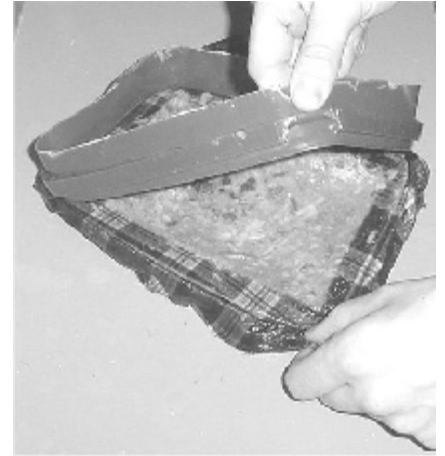
Put whole pages of newspaper in one of the buckets. Apply soap to your hands and rub the paper until it disintegrates.



Take half a litre of the pulp and pour it into the second bucket.



Immerse the mould to fill the deckle with water. Let all water sipper through the fabric.



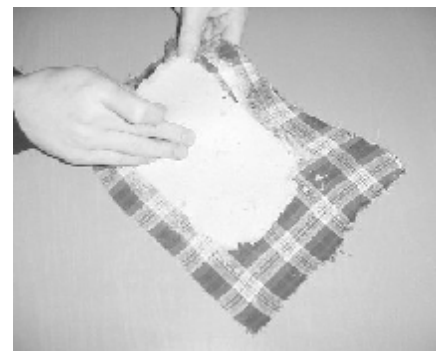
Loosen the frame.



Put the piece of cloth on a dry newspaper.



Hang to dry.



Carefully remove the dried paper from the cloth.

Special Tip:

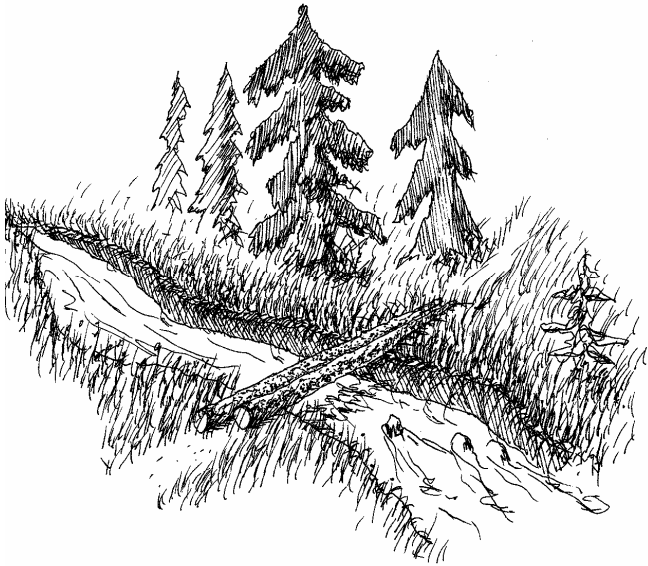
Add petals from a flower to the pulp. This produces a beautifully coloured paper useful for letters, etc. Don't flush excess pulp down the drain when you're finished. This can clog the pipes. Instead sift and use excess material to make figures.

Good Reasons for Preserving Biologic Diversity in the Forest

- Esthetical values (beauty, uniqueness, symbolism, nostalgia, sensualistic)
- Ethical values (rights of species or generations to come, religion)
- Values for research (understanding of the world, future research)
- Economical values (future medical uses, biotechnics, food)
- Ecological values (all species are parts of a whole, knowledge of key species)
- Global values (a common species in Sweden could be rare in a global perspective)
- Genetical values (unique genes can never be recreated if extinguished)

Trees in Folk Law

Trees played an important role in the beliefs of older days. There were groves and glades where gods could be worshipped. At the homestead a tree was often planted to house the spirit of the place. This tree would usually be deciduous, for example an ash, a lime tree, an elm or a maple. In many places, these trees stand to this day. Trees were also planted at weddings or when a child was born.



Trees of strange shapes were often ascribed magical properties. Trees with some kind of cavity, for example, were used to cure diseases. The sick child was pulled through the hole in the tree in hopes that the illness would disappear. Toothache could also be cured by some trees. First a stick was used to poke at the sore tooth. The stick, now with puss on it, was thereafter shoved into the bark of the tree. It was believed that the ache of the tooth would thus be transferred to the tree.

The ash, has always been special to us northerners. The great world tree in northern mythology, Yggdrasil, was an ash. Its treetop encompassed the entire earth. Oden, leader of the gods, hang himself in Yggdrasil as a sacrifice in order to gain greater wisdom. According to myth, the first humans, Ask and Embla, were made from the tough timber of an ash.

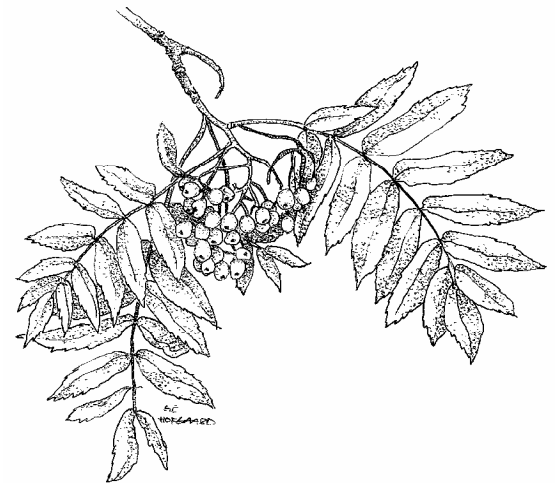
The oak, has also been said to possess magic powers, even in Christian times. This might be due to its imposing size. A Christmas fire should preferably devour wood from an oak. When there were outbreaks of diseases, purifying fire could be made by burning oak wood. According to folk law in West Sweden, the devil himself swore to take all children when the oak was bare. This is why God let the oak keep its leaves as long as possible in autumn. You can even find oaks that will keep their leaves all through winter.

The rowan, was the tree of Thor. Up until the beginning of the 20th century it was believed that the rowan attracted lightning. The rowan could also protect you from this natural phenomenon. In addition, the rowan had a number of other qualities. Among other things the harvest could be improved if the farmer tied a twig of rowan to his plough. Naturally rowan was not to be used when building houses. If rowan wood was used the house elf would be displeased bringing bad luck to the household.

The lime tree, was said to contain a gigantic snake. The lime tree snake was so long it could easily encircle a whole city.

The Hazel, could protect you from strikes of lightning, snake bites and could be used for magic concerning matters of love. In West Sweden hazel poles could be used to awaken the dead. You would simply go to the graveyard at night and draw three circles round the grave while reciting The Lord's Prayer and calling to the dead. The deceased person was then expected to rise from his or her grave.

(Source: *Älvor, troll och talande träd*, Ebbe Schön, 2000)



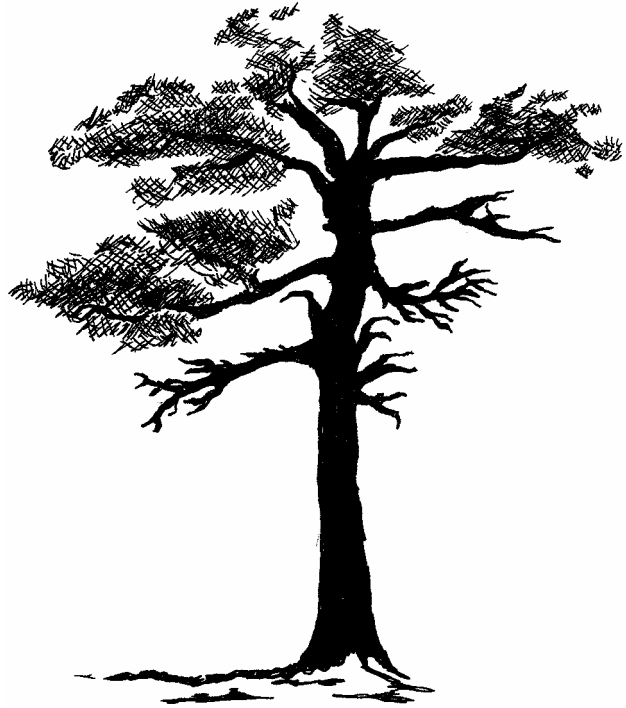
Build a Tree

The leader instructs participants to build a tree while at the same time explaining the functions of different parts of the tree.

Heartwood. Have two tall pupils stand with their backs to each other. On the leaders command they stretch their arms upward. The heartwood is the inner stable core of the tree. Its annual rings of cells, creating tubes, are now clogged with resin and pitch.

Taproot. Choose four pupils that will sit down at the base of the heartwood. The taproot can be very long and stretch up to 30 m down into the ground. The taproot enables the tree to get water from the ground and anchors the tree firmly so that it won't fall over in storms. Not all trees have a taproot, but this one does.

Lateral Roots. Four pupils lie on their backs with their feet touching the feet of the Taproot. Spread arms and hair to create root hair. The roots spread out like the branches but underground. There are thousands of root hairs that suck water from the ground.



Ask taproot and lateral roots to slurp water. Show them how to slurp.

Sapwood. Let the sapwood consist of four pupils standing in a circle round the heartwood, facing inward and holding hands. The sapwood is the living part of the wood and its job is to transport water from the roots up to branches and leaves. The sapwood can transport hundreds of litres of water every day at speeds up to 160 km/h.

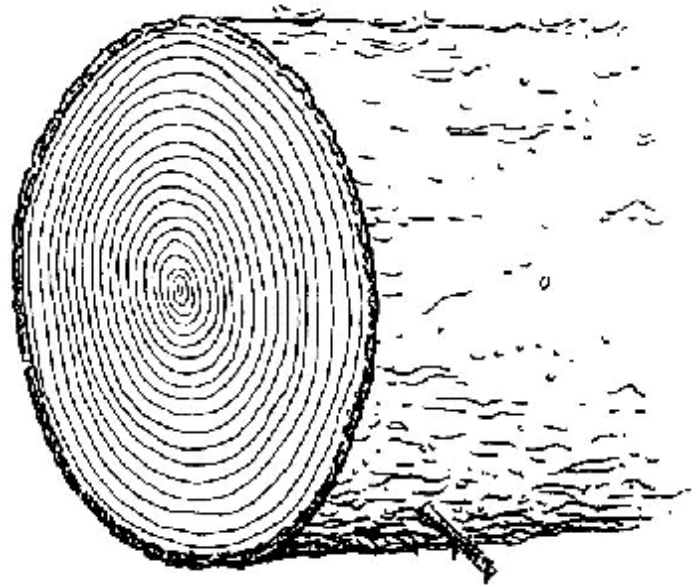
When the leader asks the sapwood to pump water, the sapwood goes “wheee” and raises its arms.

Cambium/Phloem. Let an additional four pupils create a ring around the sapwood, also facing inward, stretching their arms upward and waving their hands to symbolize leaves. The inside of this layer, the cambium, yearly adds to the sapwood, creating annual rings. The outside, the phloem, transports food (sugar) created in the leaves to the rest of the tree.

When this layer is told to make food the pupils wave their hands and absorb energy from the sun. When the pupils are told to bring the food down they bend their knees and say “whooo”.

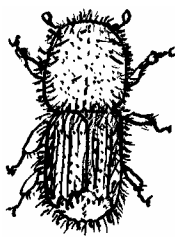
Bark. The remaining pupils will be the bark. They stand in a ring facing outward, arms raised and fists clenched. The bark is the trees protection. Against what? (fires, insects, fungus, cold).

Now the whole tree is put to work. The heartwood stretches upward, arms in the air. The roots slurp water. The Sapwood carries water upward by saying “wheee” and raising their arms. The phloem flutters the leaves and brings found downward by saying “whooo” and bending knees. The bark raises arms and clenches fists to protect the tree.

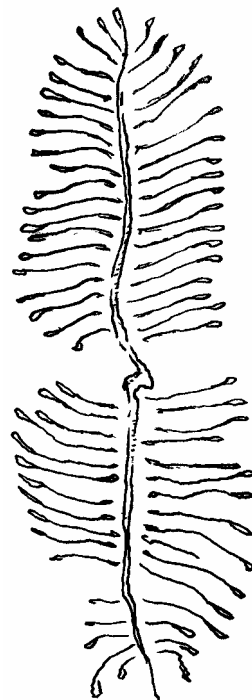


Let a pupil pretend to be a pine borer using two sticks as antennas. The pine borer flies around trying to attack the tree. The tree, however, has a strong defence. Ask all participants to shake hands and thank each other for good teamwork. Help the roots up!

(Source: *Sharing the Joy of Nature* by Joseph Cornell, translated to Swedish and adapted by Miljöverkstaden in Helsingborg)



Pine borer.



Structure for laying eggs, bored by pine borer.

Good reasons to put a “no direct mail” sticker on your mailbox.

- Paper is saved and thus fewer trees must be felled.
- Energy and money is saved.
- More forest can be left undisturbed, helping to increase biologic diversity.
- Fewer transports caused by mail distribution.
- Less mail for the household to go through.

What can you do?

- Put sticker saying “No Direct Mail. Thank You!“, or something similar, on your mailbox. This is a great way of avoiding unaddressed direct mail.
- To avoid direct mail addressed to you personally, call the direct mail branch organization in your country. In Sweden this is SWEDMA on 020-55 70 00. They will send you an opt out form which you can use to avoid addressed direct mail.
- Get coupons of the net. Some people don’t opt out because they are afraid to miss out on special offer coupons. In Sweden these coupons can be found on the internet at www.kupong.se. This service also allows you to use filters that show only coupons applicable in your local store and lets you print only the coupons you really want.
- The grocery store periodicals can be found at the shop. Some people don’t opt out because they like getting the periodicals from Konsum and Ica (two large grocery store chains in Sweden). These periodicals can be picked up at the store, ask for one at the register if you can’t locate them.

Links, First Class Resources and Books

Träd och buskar vintertid, Fältbiologernas förlag, 1974

Att krama ett träd – och lära känna det, Karin Lagerholm, Tiedlund förlag, 2000

Lära med skolskogen, Billy Ederlöf och Sven-Olle Larsson, 1998

www.skogeniskolan.se www.environ.se
www.skogssverige.se www.snf.se

On The Nature School’s internal First Class homepage the following resources concerning trees and forest can be found:

- Nature and environmental experiments.
- Mathematics and out door pedagogics.
- Signs of spring.
- Damage done to the forest.
- Energy requirements for direct mail production. (report)

Last Words - How can we justify distributing this information in printed form? This guide weighs a maximum of 100 g. If a teacher working with “The exploding mailbox” convinces two pupils to put “no direct mail” stickers on their mailboxes, the result is a paper consumption reduction by 70 kg per year (calculated from 700 g of direct mail per week). If you are considering throwing this guide in the dustbin, please place it in an in-house post envelope and return it to The Nature School. This way we can reuse the material at another time.