

# Ancient Technology



Learning about ancient technology using  
outdoor learning and  
interdisciplinary teaching methods



**Project part-financed by the European Union**

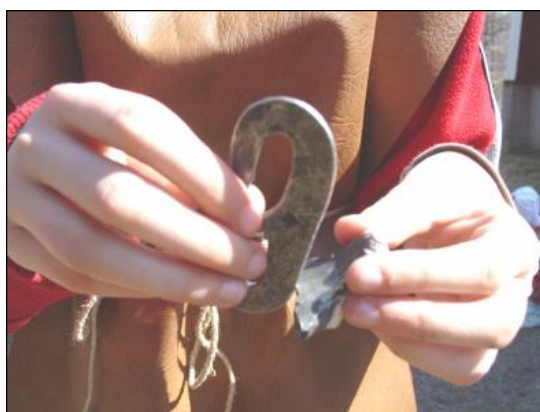
<b>Address</b> Nynäshamns kommun Viaskolan, Naturskolan 149 81 Nynäshamn Sweden	<b>Visiting Address</b> Sjöudden At the end of Storeksvägen Ösmo	<b>Phone</b> +46(0)8 520 73709  <b>Homepage:</b> <a href="http://www.nynashamn.se/natursko">www.nynashamn.se/natursko</a>	<b>Fax</b> +46(0)8 520 38590	<b>Mobile</b> Mats +46(0)8 52073709 Robert +46(0)8 52073708	<b>E-mail</b> <a href="mailto:mats.wejdmark@naturskolan.pp.se">mats.wejdmark@naturskolan.pp.se</a> <a href="mailto:robert.lattman@naturskolan.pp.se">robert.lattman@naturskolan.pp.se</a>
---	--	--	---------------------------------	---	---

## Preface

History is a school subject that often becomes too theoretical. Imagining what life was like many, many years ago is challenging and getting a grasp of the abstract amount of time between now and then can be even harder. Understanding how people thought and perceived the world in a different time period is even more complicated—we often have problems understanding how other people think today!

All the same, not knowing your history is like losing your memory and history is certainly an important school subject. By studying history, we can learn from previous mistakes and successes. Most people also find history a fascinating subject, although only reading books often renders an inadequate understanding of how people lived in olden days.

This instructors guide aims to supplement the one-dimensional world of history books with the many dimensions of outdoor learning. Reading about, or hearing someone lecture on, how people made fire during the iron age might make for an exiting story, but this memory soon fades. A pupil who has sat on a log with flint and tinder in one hand, steel in the other, and a freshly prepared cylinder of wood chips in his or her lap; this pupil has a concrete situation to remember. A pupil who has hurt his or her fingers on the hard steel; felt the soft tinder against the thumb; heard the sharp edge of the flint tear sparks from the steel; experienced the frustration of lost sparks; learnt the taste, smell, and itching eyes of juniper wood smoke; felt the heat and joy when the smoke suddenly ignites with a great “woofff”; this pupils has used all his or her senses and will remember the experience forever.



© The Nature School of Nynäshamn, June 2006,  
Mats Wejdmark and Robert Lättman-Masch

<b>Address</b> Viaskolan Skolgatan 35-37 149 30 Nynäshamn Sweden	<b>Visiting Address</b> Sjöudden At the end of Storeksvägen Ösmo	<b>Phone</b> +46(0)8 520 73565	<b>Fax</b> +46(0)8 520 38590	<b>Mobile</b> Mats +46(0)70 6388590 Robert +46(0)70 6388541	<b>E-mail</b> <a href="mailto:mats.wejdmark@natureskolan.pp.se">mats.wejdmark@natureskolan.pp.se</a> <a href="mailto:robert.lattman@natureskolan.pp.se">robert.lattman@natureskolan.pp.se</a>
<b>Homepage:</b> <a href="http://www.nynashamn.se/natursko">www.nynashamn.se/natursko</a>					

## The National Curriculum Lpo 94 on...

### ...History

#### The Purpose and Role of History in Compulsory Education

History education is to stimulate pupils' curiosity and eagerness to expand their understanding of the world in the time dimension. History education should also give pupils the opportunity to learn about the conditions and lives of men, women, and children during different historic periods.

#### Goals stated for grade five pupils

Pupils are to:

- Know the fundamentals of Swedish and Nordic history and be capable of comparing this with the history of some other countries.
- Be capable of recounting and comparing the thoughts and lives of men, women, and children between different times and social environments in Sweden and other places in the world.

### ...Arts & Crafts

Pupils are to:

- Be capable of using common tools for working with textiles, wood, and metal.

### ...Technology

Pupils are to:

- Be capable of recounting, within some familiar areas of technology, important aspects of the development of technology and its affect on nature, society, and the individual.



# Preparation Activities

## Knives and Safety

A short run-through on how to carve properly can prevent unnecessary injuries. Sit down with your legs wide apart, make sure there is no one in front of you, hold the knife in a firm grip, and carve away from you. To exert the greatest force, grip the knife as close to the blade as possible.

## Major Time Periods

Brushing up knowledge on the major time periods is important to help the pupils place the field trip exercises in the correct context. Repeat the progression from hunters and gatherers to agricultural societies and the major characteristics of the stone age, the bronze age, and the iron age. Focus on hunting, fire, and food preparation.



## Dividing Pupils into Groups

Provide each pupil with an object. To make five groups, use objects that can be associated with either the stone age, the bronze age, the iron age, the middle ages, or modern times. E.g. for a class of 30 pupils you will need six stone age items. These could be acorns, hazelnuts, a dandelion root, a piece of leather, a stone, or a bone. After receiving their items, the pupils must try to figure out which time period they belong to and then place themselves accordingly along a timeline.

## Clothes

Clothes for the field trip must not be sensitive to the smoke and sparks in the fire making exercises.



## Assembly and Introduction

After presenting the day's programme and going through practical details, we begin with some time travel. The pupils are given stone age outfits which also act as protective clothing while doing the exercises—use a tough fabric that can resist sparks, dirt, and rain. Our outfits are made from pieces of a plastic coated fabric that looks like leather. With a hole for the head and some rope for a belt, the pupils are instantly transformed to stone age men and women. Everyone wearing the same clothes can also be a liberating experience for some pupils. Of course, grown-up sizes are available for teachers and accompanying adults.

Before the actual time travel, we talk about the latest ice age and the thickness of the ice sheet at the point where we are presently standing. We also mention the great sea that was created when the ice melted away and how land slowly began to rise from the water. The first part of Sweden to rise was Scania, allowing humans to migrate in from the south. In a way, we are all descendants of immigrants!



### Suggested Programme

- 08.30 Assembly and introduction
- 09.00 Time travel
- 09.30 Morning snack
- 10.00 Presentation of exercises
- 10.20 Time for doing exercises
- 11.30 Lunch
- 12.00 Time for doing exercises
- 12.45-13.00 End of day summary and evaluation

*One of the stone age outfits used by both pupils and teachers during the field trip: plastic coated fabric that looks like leather with a hole cut out for the head and a rope for a belt.*

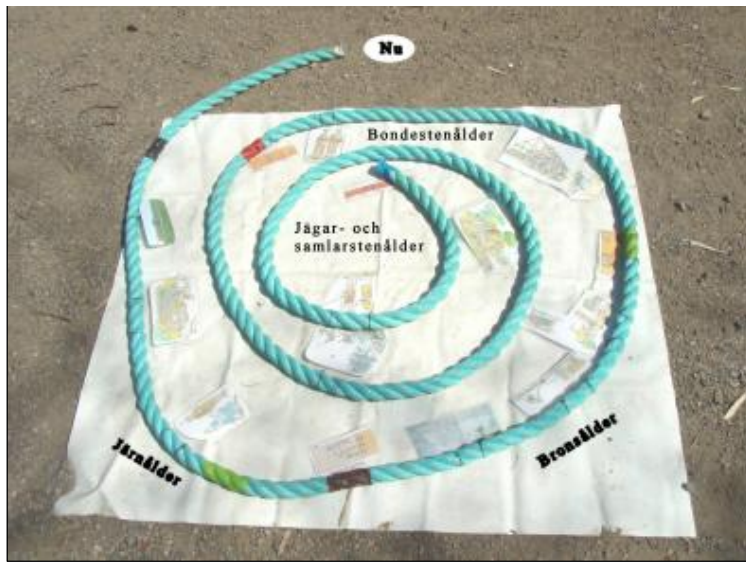
## Time Travel

To travel back in time, to when the first humans ventured into Scania, we will need a time machine. Anything can be used as a time machine as long as it rouses the pupils' imagination. We use a short stick with grooves and fitted with a propeller. One pupil beats a drum while we run a stick back and forth over the grooves to make the propeller rotate. We also sing a stone age yoik, a traditional Sami song.

The pupils have been told that the propeller will begin rotating in the opposite direction if they concentrate and imagine life 10 000 years ago. To help the pupils grasp this amount of time, we bring a timeline in the form of a rope with major time periods clearly marked and accompanying pictures of important events in human development. All in all, the time travel walk takes about half an hour.



*Our time machine: a short stick with grooves and fitted with a propeller. When a second stick is run back and forth over the grooves the propeller begins to rotate. When it appears that the propeller begins rotating in the opposite direction, we have reached the stone age.*



*Left: Our timeline rope with time periods marked out and illustrations from a history book.*

*Below: A flint axe, an elk skin bowl, a reindeer skin drum, and a ceramic pot.*

## Stone Age: Hunters and Gatherers

The first stop on our journey through time is during the early stone age when humans lived as hunters and gatherers. This time period makes up a large portion of the rope. We speak shortly about Sweden's geography and climate during this time and touch upon important aspects of life in a society of hunters and gatherers, e.g. features of nomadic life and major technological advances.

To make the information less abstract we often tell the story of a family living at spot where we are currently standing. To include the history of fire we show a pot in which glowing embers could be kept heated by using a layer of moss for insulation. Preserving fire was vital before humans learnt how to make fire for themselves and also a convenient way of saving tinder.



## Stone Age: Agricultural Societies



*Horse hoof fungus used for making tinder. The fungus can be identified by its annual rings and its grey surface.*

Our second stop is during the late stone age when humans had settled and gone over to farming. Many places in Sweden did not rise above sea level until this time period. When did the location of your home school rise from under water?

A wide variety of topics can be chosen for a discussion on stone age agricultural societies. The choice of topics should be aimed at giving the pupils a basic understanding of the time period and building up anticipation for the exercises. We often talk about slash and burn farming where forest areas are cut down and vegetation burnt to make the soil fertile. We also discuss the transition away from a nomadic lifestyle and the adoption of

agriculture. Early fire making methods such as the bow drill are demonstrated. Using the bow drill, friction quickly creates enough heat for smoke to emerge but it takes longer to collect enough coal dust to allow transferring the heat to some tinder. This also provides an opportunity to show horse hoof fungus and explain how tinder is prepared.



## Bronze and Iron Age

Our third stop is the bronze and iron age. Emphasis is put on explaining new ways of making fire using steel. We demonstrate how to make fire using flint, tinder, steel, and a cylinder of juniper wood chips rolled up in birch bark. If you don't succeed in making fire during the demonstration, don't worry—the pupils will have plenty of time to prove their own skills later during the day.

### Last Stop

During our forth and final stop we bring up common aspects prehistoric life. From one of our leather bags we extract a rock crystal, some amber, a snake skin, some flint, a bone twirler, a clay fish, a bone rattle, and a Jew's harp. The rock crystal was used by traditional healers and believed to grant them otherworldly powers. The amber was believed to catch and retain sun beams and, similar to the snake skin, protected its bearer from illness. The flint could be used to cut off locks of hair as a sacrifice to the gods. The bone twirler, made from a foot bone of a pig, is assumed to have been used to summon good spirits. Bone twirlers have been found in graves dated from the stone age up to the middle ages.



*A clay fish, a Jew's harp, a leather bag, a bone rattle, and a bone twirler.*

It is now time to return to our present day where a morning snack lays waiting. We use the drum and time machine once again and this time the yoik might change into something more modern as the time machine propeller changes direction.

### Presentation of Exercises

After the morning snack it is time to walk through the five exercises the pupils are to complete. There is about 20 minutes for each exercise and the pupils move on to the next exercise when they hear the blowing of a flute made from a reindeer or cow horn. 20 minutes might feel like a short time for some exercises and a long time for others—this depends greatly on the interests of the individual pupil. If a pupil should show special interest in some activity, provide them the opportunity to enter more deeply into this activity at a later date.

### Exercises 1: Archery



*Bow and arrow and reindeer skin stretched over a trestle.*

In this exercise, the pupils practice shooting at a reindeer skin stretched over a trestle. Shooting with a bow and arrow always entails some risk and the following safety precautions are crucial: (1) set up the reindeer skin so that no one will pass through the line of fire, (2) a grown up should always stand at the pupils side during shooting—both for safety reasons and for advice, (3) arrows may only be aimed towards the reindeer skin, (4) pupils waiting for their turn stand behind the shooter, (5) each pupil is responsible for his or her arrow.

## Exercise 2: Lasso and Bolas

In this exercise, the pupils get to practice their skills with the lasso and bolas, a South American hunting weapon. Lassos are still used by the Laplanders to bring in reindeer, although modern nylon ropes are used rather than our thick rope and wooden loop. Before throwing the lasso, hold the wooden loop in your right hand and pull the rope through using your left hand. Pull three full arm lengths of rope through the loop while keeping your left hand grip at the end of the rope. Now hang the wooden loop from your right hand index finger, swing your right arm while keeping it stretched and let go of the wooden loop (the movement is similar to playing ping-pong). The rope will fly through the air and the loop will expand on its way towards the reindeer horn. Show the pupils the technique at least twice.

Bolas is a hunting weapon used by South American Indians. Put one finger through the hole in the leather piece and let the balls rotate at thigh height. Now, let go of the bolas and watch as they get tangled in the animal's legs causing the animal to fall. Point out that if the bolas are swung vertically they might end up in a tree.



*The Lasso is still used by Laplanders to bring in calves for marking.*



*Bolas, a hunting weapon used by South American Indians. The bolas get tangled in the animals' legs or wings.*





### Exercise 3: Grinding Flour

The pupils are given a bag of wheat to grind into flour on a grinding stone. Grinding is done using a small spherical stone to crush the wheat. Add only a little wheat at a time and grind using circular movements. Every now and again, brush the wheat in towards the middle of the stone before you continue grinding. Remember to use soft movements, beating or knocking will cause the wheat to scatter onto the ground. If you do not have a concave grinding stone, as the one depicted below, any large flat stone will do. The flour the pupils grind will be used to bake bread later on in the day.



*Using soft circular movements, the whole wheat is ground to flour. Of course, the flour ends up coarser than that bought at the supermarket, but it is also more wholesome.*

### Archery

Remains of 400 000 year old spears have been found in Europe. The spear was the main hunting weapon until the bow and arrow were invented sometime between 18 000 and 10 500 B.C. Whereas the speed of a spear is limited by the muscle power of the hunter, the bow can convert slowly applied muscle power into a rapid movement. Compared to a spear, an arrow has a greater speed, a straighter line of flight, and longer range. Thus, the bow and arrow revolutionized hunting technique.

Source: Ancient Technology (nr. 2, 1990)



*The magic reindeer horn flute that sounds each time the pupils are to switch exercises.*

#### Exercise 4: Carving a Bullroarer

Bullroarers as old as 6 000 B.C. have been found during archaeological excavations in Denmark. Theories on how they were used diverge, the most common opinion being that they were used for religious rites. Other suggestions include communication, a musical instrument, or to scare off bears.



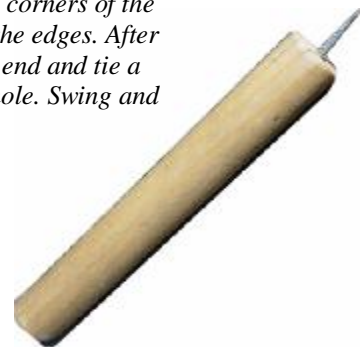
Each pupil is given a piece of wood of the dimensions 15 x 6 x 0.5 cm—lime wood is well suited for the purpose. The corners of the piece of wood must be carved off and the edges sharpened. To carve safely: sit down with your legs wide apart, make sure there is no one in front of you, hold the knife in a firm grip, and carve away from you. To exert the greatest force, grip the knife as close to the blade as possible. Emphasize that for sharpening the edges, the pupils must hold the piece of wood at an angle; if not they risk carving off too much wood.

Once the piece of wood has been carved into shape, drill a hole at one end. Use a simple hand drill consisting of a cylindrical piece of wood with a sawed off nail at the top. After completing the drilling, tie a piece of string through the hole.

To make the characteristic roaring noise, the bullroarer must revolve around its axis while simultaneously being swung in large circles. Sometimes, it is necessary to give the wood a bit of a spin before swinging the bullroarer. No two bullroarers ever sound the same since no two people carve the exact same profiles. Decorating the bullroarer with carvings helps identifying your bullroarer.



*The pupils first carve off the corners of the piece of wood and sharpen the edges. After that, they drill a hole at one end and tie a piece of string through the hole. Swing and listen to the roar!*



#### Exercise 5: Making Fire

For this exercise you will need flint, tinder, steel, juniper wood chips and birch bark. Start by preparing a cylinder of juniper wood chips wrapped in birch bark; once you get the tinder glowing there will be no time for this. Now, hold flint and tinder in your left hand, squeezing the tinder under your thumb about 1 mm from a sharp edge of the flint. Strike the steel against the flint in a lashing manner. Some pupils will accidentally strike the steel on their left hand fingers and there will be pain. With a little luck, some of the sparks torn from the flint will land on the tinder which will begin to glow.



*Tinder, flint, steel, and a cylinder of juniper wood chips and birch bark.*



Push the glowing tinder into the cylinder you prepared. Hold the cylinder horizontally and blow into one end. Turn your head away when breathing in to avoid getting smoke in your lungs. Smoke will make you cough and the fire will burn out. Continue blowing into the cylinder until the smoke becomes more intense. Increase your blowing with the intensity of the smoke until the gases in cylinder suddenly ignite with a “wofff” sound! Now place the burning cylinder in the fire place. After being used a few times, the flint becomes blunt and you must chisel off small chips of stone to create new sharp edges.



*The pupils first get to practice with only flint and steel. When they have learnt how to make sparks, they are given some of the textile charcoal we use instead of tinder*



*The glowing tinder is pushed into the juniper wood chips. The birch bark keeps the heat within the cylinder and protects your fingers. Blowing into the cylinder causes smoke to appear, as the smoke increases, you blow harder until the gases ignite.*

### Tips and suggestions

Tinder and juniper wood chips are not always easy to come by. Instead of tinder, you can use textile charcoal made from old jeans scraps. Fill a tin can with jeans scraps and place the can upside down with wood piled around it. Let the fire burn for one hour and then let the can cool off before extracting the charcoal or the scraps might catch fire.

The juniper wood chips can be replaced with hemp string made from cactus fibres. Scratch or grate the string to crush and tangle the fibres. Then roll the damaged string into a little ball and place it inside the birch bark cylinder. Pack the string rather tightly in order to achieve a high enough temperature to create a proper flame. If the string is too loosely packed, it will only glow and then fade out. The textile charcoal will start burning when you blow on it, as opposed to real tinder, which makes it easy to transfer the fire to the string.



*Roughed hemp string can be used as a substitute for juniper wood chips.*



## Bow Drill

For this exercise you will need a bow, a spindle, a fire board, and a bearing block. Appropriate choices of wood for the spindle and fire board are alder, sallow, or aspen.

Begin by placing the fire board on top of some birch bark on the ground. Wrap the string of the bow once around the spindle and place one end of the spindle in a cavity on the fire board. Use the bearing block to apply pressure to the other end of the spindle and pull the bow back and forth using long, steady arm movements. To avoid exhausting yourself, kneel down using one knee to hold the fire board in place and support the arm holding the bearing block on this leg. Keep drilling until smoke appears and a small amount of coal dust collects on top of the birch bark. Blow gently on the coal dust and transfer the glow to some tinder. Now proceed as in the previous exercise.



*The bow drill, the bearing block (used to push down on the spindle), the spindle, and the fire board.*



*Making fire using a bow drill is quite a challenge. The girl to the left will not be able to produce enough coal dust before her arms and back grow tired. The girl on the right is using a better technique. The optimal position is to use one knee to hold the fire board in place and support the arm holding the bearing block on this leg.*

## Assembly at the Fire Place

Shortly before lunch, we gather around the fire place. We have completed three exercises so far and the remaining two will be done after lunch. If none of the pupils have managed to make fire, we demonstrate how this is done so that we have an open fire during lunch. This is also an opportunity to discuss modern fire making devices such as fire steel,

matches, and lighters. The principle of all of these is the same; sparks are generated to light a flammable substance.

The flour ground during the morning is mixed with graham flour and water. The dough is shaped into small buns and baked over an open fire. Lunch is served outside and we often eat from elk skin bowls which rouses the pupils' curiosity and leads to many questions.

For desert we chew resin. Always explain to the pupils that you must first chew using your incisors until the resin crumbles, then you can chew with your molars. If you begin chewing with your molars directly, the resin will stick between your teeth. In olden days, resin was chewed for oral hygiene purposes, but the resin could also be used to fasten arrow heads onto arrows. The same resin would often be reused several times.



*Resin from conifer trees. In the north of Sweden, the habit of chewing resin lived on well into the 19-hundreds. The resin is a natural antiseptic and prevents caries.*

## End of Day Summary

After the pupils have completed all exercises, we let the pupils help bringing all materials and tools inside. Then we gather around the fire place and taste the bread for which the pupils have ground the flour. Giving the pupils the task of dividing the five buns equally between them is good practices of both maths skills and cooperation. The field trip is rounded off with an evaluation of the day's activities.



*The stone age bread is baked while the pupils carry on with their exercises. At the end of the day, the five buns are divided fairly between the pupils.*

### Recipe for stone age bread

- 2 dl of flour (ground by the pupils)
- 3 dl of graham flour
- 2.5 dl of water



# Follow-up Activities at the School

## Art

All forms of artistic expression can be used for follow-up activities on ancient technology. Painting, drawing, sculpting, taking photographs, building, and playing music can all be used to express feelings and thoughts concerning time, human development, and ancient history.



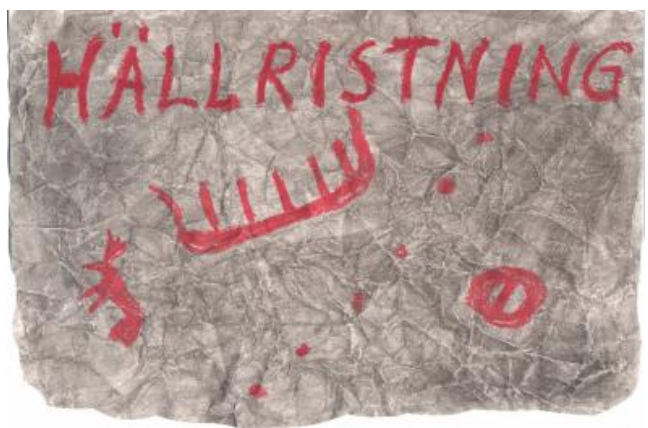
*One class built a mobile where each pupil contributed an elliptical drawing depicting his or her experiences during the day.*

## Rock Carvings

Why not let each group of pupils preserve their memories of the day on a rock carving? For inspiration you could study rock carvings in illustrated books or visit a real rock carving if there is one near your school.

Instructions:

1. Tear the sides off a sheet of paper to give it the shape of a rock.
2. Draw your rock carvings using a red oil crayon.
3. Scrunch the paper into a ball and then smoothen it out again.
4. Paint the paper using black water colour.
5. Apply water to rinse some of the colour off the paper and then let the painting dry.
6. Give the paper a concave shape, fill the cavity with some paper scraps, and fasten the "stone" onto a base sheet of paper.





# Additional Activities

## Outdoor Activities and Games

### The Digging Stick

The digging stick was one of mans earliest tools. Making a digging stick is easy but you can spend a lot of time decorating it. To practice basic digging skills, try unearthing a dandelion. Since dandelions are so common, you can learn to handle the stick without endangering the species—on the contrary, many people see the dandelion as a weed. Furthermore, the dandelion cannot be confused with any poisonous plant and for outdoor survival purposes it is a good source of carbohydrates. The dandelion root is one of the most carbohydrate rich wild plant parts you can find in Sweden.



To prepare the dandelion root: wash it and cut it into small pieces. Let the pieces soak for a few hours and then throw the water away. This gets rid of the bitter taste of the root (the bitterness differs greatly from plant to plant). Cook the roots for 20 minutes and then eat them as they are or perhaps with some salt and butter.

### Making a Hearth

Making a fire together with the pupils enhances their teamwork abilities and involves skills from many other school subjects. Remember that lighting an open outdoor fire is sometimes prohibited, call the Swedish Rescue Services Agency and find out before beginning this exercise. The safest time of year for lighting fires is October through March.

Remember to always protect the ground upon which you make your fire. Two simple ways of doing this is to: (1) build a raised area using stones and fill the cracks with sand, or (2) place three large stones on the ground and a sheet of metal on top (e.g. the lid of a metal barrel). Both of these methods are suitable when you want to make a number of small fires. If you want to make a bigger fire for the whole class, we recommend building a permanent hearth which can be reused.



*Left: a raised hearth. Always fill the cracks between the stones to protect the underlying soil.*

*Centre: the bottom of a metal barrel placed on three stones.*

*Right: a handle makes it easy to carry the barrel bottom.*

The following are a few creative ways in which to use your fire:

### **Making Charcoal Crayons**

Start with a tin can and a hazel stick as thick as a finger. Saw the stick into pieces that fit the can and pack as many pieces of hazel as possible into the tin can. If you have a fireplace with old ashes: place the can upside down and push it a couple of centimetres into the ashes. If you are making a fire on a sheet of metal: fill the tin can with sand before pushing the hazel pieces into it, then place the tin can upside down on the metal sheet. Place wood all around the tin can and let the fire burn for one hour. Let the can cool off before you extract the charcoal crayons or they might catch fire. Use the crayons for drawing during your next art lesson.



### **Making Charcoal**

Making charcoal is basically the same as making charcoal crayons. Swap the hazel stick for larger pieces of wood and use a metal bucket instead of a tin can. A cylinder shaped bucket is better than a conical one since it is easier to fill the former with wood. Place the bucket upside down and push it a couple of centimetres into the soil or ashes. Place wood all around the bucket and let the fire burn for two hours. Let the bucket cool off before extracting the charcoal to avoid it catching fire.



### **Stick Tug of War**

For this game you will need a sturdy stick carved to provide a comfortable grip at both ends. Both players place their right feet against each other and each player grabs hold of one end of the stick using his or her right hand. The winner is the competitor who can bring his or her opponent out of balance or force him or her to let go of the stick.





## **Arts, Crafts & Technology**

### **Making a Bow Drill**

To assemble a complete bow drill set you will need to make a bow, a fire board, a spindle, and a bearing block. For the bow, use a regular piece of string and some freshly cut wood since dried wood is less flexible. For the fire board, use a piece of dried alder wood. For optimal effect, let the alder wood soak in a solution of water and birch ashes before drying. Prepare a small cavity in the fire board for the spindle and cut slit through which the coal dust can pass. For the spindle, use aspen wood. For the bearing block, use any kind of wood and prepare a cavity for the spindle. To avoid friction and heat, place a small stone at the bottom of the cavity in the bearing block.

### **Making Stone Age Toys**

Carve a bear profile, or any other animal, from a block of wood. Drill a number of holes through the profile and tie a string through the centre hole. Attach a small stick (a spear) to the other end of the string. Holding the spear, swing the animal into the air and try to pierce through one of the holes.

Attach a piece of string to a 30 cm long fork branch and tie the other end of the string around the middle of shorter stick. Holding the fork branch, try to swing the stick up so that it lands on the fork.



*Prehistoric toys that require skill and concentration:*

*Left: can you land the stick on the fork branch?*

*Right: can you pierce the bear with the spear?*



### **Making Tools**

Let the pupils search the forest for objects they can use to make tools, household utensils, or hunting weapons. Either decide beforehand what to search for or simply let the pupils be inspired by the objects they find. The pupils can also be instructed to invent new tools.

### **Making Jewellery**

Jewellery can be made from any outdoor object—your imagination is the limit. Make necklaces of acorns, bracelets of juniper berries, and rings from bark on sticks. Using clay you can make amulets. Why not let the pupils make amulets with their signs of the Zodiac?

### **Invent the Wheel or a Floatation Device**

Give the pupils the task to move a heavy object from point A to point B using a wheel or floatation device of their own making. Use objects found in the forest and pieces of string.



## Arts and Music

### Making a Rune Stone

Make mini rune stones; either by painting directly onto a stone or by first chiselling runes and then filling them with colour. Keep the rune stones in the classroom or let the pupils bring them home and place them in their gardens. Begin the exercise by visiting a real rune stone if there is one close to your school.

### Rock Carvings in the Snow

Let the pupils make organic colours, e.g. by cooking red cabbage or beetroots. Chose a spot on the schoolyard or some other place where the “rock carvings” can lie untouched for some time. Tread the snow flat and hard and then paint rock carvings using the organic colours, either authentic ancient patterns or your own modern ones. Take photographs so that you can remember the rock carvings after the snow has melted away.

### Stone Age Orchestra

Let the pupils build their own instruments using their imagination to envision what stone age instruments might have looked like. Assemble a stone age orchestra and perform a concert for parents when presenting the work on ancient technology.

### Making a Willow Flute

A good time to make a willow flute is during spring when sap rises through the trees and the bark easily comes loose from the underlying wood. Ask the landowner for permission to cut down a number of small branches from a pussy willow, mountain ash, or maple.

Start with a piece of wood 10 to 15 cm long and as thick as a finger. Make a diagonal incision at the thinnest end (1). Make a small triangular cut 2 cm in from this end (2). At the middle of the stick, cut through the bark all the way round. Knock gently against the bark and carefully remove it from the underlying wood (3). Extend the triangular cut to a flat surface all the way to the end of the stick. The wedge shaped part can now be cut off completely or hollowed out (4). Replace the bark and blow to play the flute (5, 6).

1



2



3



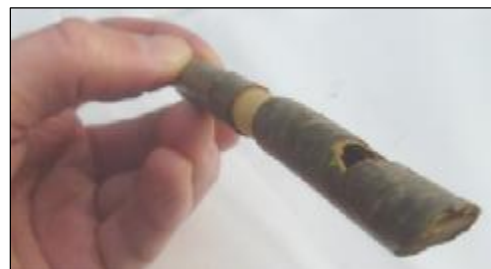
4



5



6



*This flute was made from mountain ash cut in early May.*

## **Swedish**

### **How Tinder was Invented**

Let the pupils write a short story about how humans learnt to make and use tinder. How did humans figure out that you can cut fungus off a tree, shred it, let the scraps soak in water and birch ashes, beat the scraps to make them soft, and finally dry them? What did the inventor look like, how did he or she proceed, how long time did it take, etc?

### **Rune Postcards**

Make your own paper for the postcards and then decorate the postcards with runes. Let each pupil send a card to a friend or relative. Don't forget to include the rune alphabet so that the receiver can interpret the runes.

### **Silent Collaboration**

Divide the class into groups and give each group a task. The task must be one that requires collaboration and that can be solved using silent communication, e.g. building something using sticks and strings. Do the exercise twice, first requiring no spoken communication and the second time allowing pupils to talk to each other. Compare and discuss the results to enlighten pupils on the importance of spoken language for human development.

## **English**

### **The Hidden Axe**

Let the pupils work in pairs. One pupil decides on a hiding spot for an imaginary axe and the other pupil must find the axe. The pupil who knows the location of the axe must guide his or her friend speaking only English. If the axe is hidden nearby, the guiding pupil can stay put and shout out instructions. If the axe is hidden far away, both pupils can walk to this location together.

### **Word Soup**

In this game, the teacher pretends to be a traditional healer who needs help cooking a magic soup. The teacher gathers the class around a white piece of cloth laid out on the ground and tells the pupils that he or she needs help finding ingredients. Most any ingredients will do, the aim of the exercise is to practice speaking English.

The pupils are told to search the forest for soup ingredients. When all pupils have returned, the ingredients are added to the soup one by one. For younger pupils, an appropriate challenge is to place an object on the cloth and say its name, e.g. "stone", "acorn", or "twig". If the pupils have not yet learnt very many English words, the teacher can name the object and the pupils echo this word.

For older pupils, the exercise is performed in a manner which requires speaking in full sentences. All pupils gather around the cloth and the teacher says:

"Tell me what you've got and put it in the pot"

The first pupil replies: "I've got a stone. I'll put it in the pot"

The other pupils echo "You had a stone. You put it in the pot. (go back to your spot)"

This procedure is repeated with the next pupil who might have brought a twig, and so on. Often, two or more pupils will have brought the same object which is good since repetition facilitates learning.

Once all ingredients have been added to “the pot”, the teacher “stirs” the brew to mix the ingredients. Now, each pupil is to taste the soup. The first pupil approaches the white cloth, picks up an object, pretends to taste it, and says:

“The stone is good”

The other pupils reply “The stone is good. Put it in the wood!”

The first pupil returns to his place, the second pupil gets to choose an object from the cloth, and so on. Finally, when all objects have been picked up they are returned to forest where they were found.

## **Maths**

### **Timeline**

Make a timeline on your school yard. Use chalk to draw on the tarmac or mark important dates using stones and twigs. If you can fit a hundred metre timeline onto your school yard, representing 10 000 years will result in each year being 1 cm long. Let pupils find and mark time periods or important events such as the birth of Jesus, the black death, etc. Also let each pupil make their own timeline using a 2 m rope where important events are marked using adhesive tape. Converting distances on the 2 m rope to the 100 m outdoor timeline is a good maths exercise.

### **Units of Length, Width, etc**

Divide the class into pairs and let each pair of pupils sit down with their backs against each other. Using a stick, each pupil now draws a simple figure on the ground in front of him or her. The aim of the exercise is for the other pupil in the pair to replicate this drawing. Communication may only be done using parts of the body to describe lengths, widths, etc. Compare the resulting drawings and discuss the difference between using body parts as units of length and width and our modern standardized units.

### **Stone Age Problem Solving**

Give the pupils a task in the form of a riddle or a story. E.g. a stone age man wants to make a canoe from a tree trunk. The canoe must be twice as long as its passenger and at least 1.5 times broader than his or her hips. The tree must also provide wood for a paddle that is 1.5 m long and 15 cm broad at the bottom end. Which tree in the immediate surroundings is best suited for this provided that it must be big enough to use for the canoe although large trees incur extra work in chopping away excessive wood? No modern tools are allowed: only sticks, strings, etc. Adapt the difficulty of the exercise to suit the pupils’ skill level.

### **Making a Sundial**

Let the pupils make their own sundials. This can be done as a group exercise or individually. Drive a pole into the ground at a location that receives sunlight throughout the whole day. Mark the position of the pole’s shadow at several times of the day and let the pupils design the dial. Test the accuracy of the sundial during school breaks.



## ***Literature, Homepages & Other Sources*<sup>1</sup>**

Mats Glantz & Rolf Olsson (1987), *Outdoor Life and Handicraft*, LTs Förlag.

Tom Johansson (1993): *Ancient Technology*, ICA Förlag.

[www.fornidateknik.z.se](http://www.fornidateknik.z.se), The Institute for Ancient Technology. Click MNT-projects to find texts on how to preserve fire, fire making techniques, how to make bows and arrows, and how to make bolas.

[www.backedal.fhsk.se](http://www.backedal.fhsk.se), Bäckedal's high school. Offers courses and written material on ancient technology.

[www.geolaromedel.se](http://www.geolaromedel.se), Retailer of flint and other stones. Phone: +46 (0)9 754 86 21.

[www.presentbutiken.se](http://www.presentbutiken.se), Retailer of reindeer skins and horns.

Wilma Nature Products: Sells resin for chewing and fire making kits (steel, flint, and tinder). Phone +46 (0)940 201 29.

Koler Wood AB: Sells birch bark in bulk. Phone +46 (0)911 800 23.

---

<sup>1</sup> Translated for illustrative purposes only. Might not be available in English.