PRODUCTS
BENEFITS AND SERVICES
FROM THE FOREST

ACTIVITIES

FOUNDATION FOR ENVIRONMENTAL EDUCATION
FEE

LEARNING ABOUT FORESTS

Dear friend of forests!

This booklet contains activities about products from the forest. You can read about products from the forest in the fact booklet.

1. WOOD

Activity

1.1. What WOOD I see!

Photo: MS Clip art

Introduction

We are surrounded by wood in our daily life. But do we actually notice it? Have you ever considered how much wood you actually use?
This exercise lets the pupils investigate what is made of wood, and/or what derives from wood, and where it is used. It can be done at home, in the classroom or anywhere else at the school.

The use of wood as material is beneficial for the environment as it is a renewable material. Wood also holds the carbon it collected during growth, and therefore acts as a carbon sink.

For the youngest pupils:

Task

Examine what is made of wood in the classroom or at home. Let the pupils wander around to investigate what is made from wood, making notes in the inventory list.

Duration

1 hour for investigation and registration. 1 hour for discussions about the observation.

Equipment

The inventory list from next page

Examples of possible findings

Floor, walls, furniture, window frames, toilet roll holder, ladle, skateboard, musical instruments, toothpicks, pencils.

Photos: MS Clip art

Afterwards

Discuss with the class their findings;

- Were there any surprises?
- What are the pros and cons of using wood as a material?
- Why is choosing products made of wood an environmentally friendly alternative?

PRODUCTS

For the older pupils:

Task

Examine what products you use in one day that is made from wood and products that derive from wood. Let the pupils use a camera to document all wood based products and to make a poster or a brochure to illustrate their findings.

Duration

Registration throughout 1 day + making a finished product

Equipment

- The inventory list from next page
- Camera
- Equipment to make a poster or similar

Examples of possible findings

In addition to the wooden products mentioned above; toothpaste, clothes made from viscose, paper products, medicine, ice cream.

Photos: MS Clip art

Afterwards

Discuss with the class their findings;

- Were there any surprises?
- What are the pros and cons of using wood as a material?
- Why is choosing products made of wood an environmentally friendly alternative?

PRODUCTS

Inventory list

Name_____

Where	What

Activity

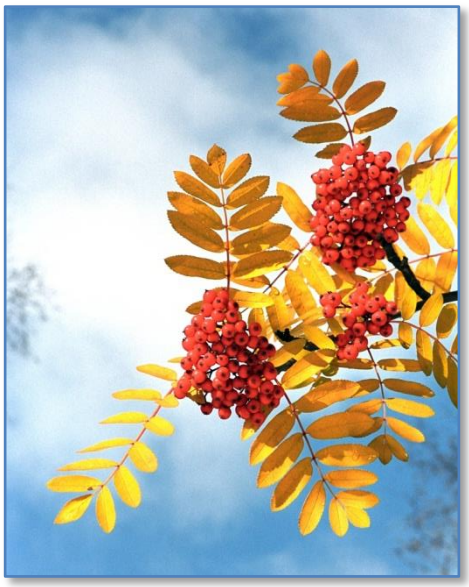
2. FOOD

2.1. Which one goes out?

Look at the photos. Can you find any reason why one of them does not fit with the three others?

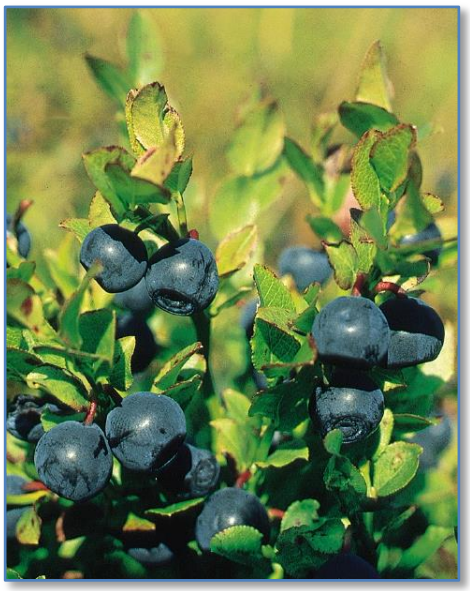
There is not one correct answer; your arguments decide if it is correct.

STRAWBERRIES



ROWAN BERRIES

CRANBERRIES



BILBERRIES

Photos: MS Clip art

Solution:

There can be many solutions to this question, and none are wrong as long as they are correctly argued for.

Examples are:

- **Strawberries**: Are not from forests (unless they are wild strawberries)
- **Bilberries**: Are the only ones that are blue
- **Rowan berries**: Are the only ones that grow on trees
- **Strawberries**: It's the only photo definitely taken indoors. (We are not sure about cranberries as it doesn't show)

3. PAPER

3.1. Making recycled paper

Introduction

Paper can be recycled over and over again. In fact, up to six times. Making recycled paper requires less energy and water and thus is more environmentally friendly. But most important, making recycled paper is fun. And in the end you have a nice product you can use for many purposes.

This activity is extracted from "The story of paper trees and printing" written by Malene Bendix.

Preparations

Before you can make paper you need to have pulp and frames ready. Below are descriptions for how to make both.

Equipment for paper making

- Large bowl (larger than the frames)
- 2 frames - one with mesh (see description)
- Sponge
- Dry towels
- If possible, an iron to dry paper quickly
- Paper pulp (see description)

Photos: Forestry Extension Institute

How to make paper

- Take two wooden frames, one with mesh and one without. Hold them towards each other, so that the mesh is in the middle. Lay them flat and make sure the frame with the mesh is the bottom one.

- Dip the framework into the paper pulp until a thin and even layer covers the mesh.

- Take the framework out of the water, keeping it in a horizontal position. Let the water drain off.

- Carefully remove the top part of the framework.

- Flip the frame with the wet paper onto a damp cloth. Sponge the back of the mesh with a sponge.

- Gently remove the frame with the mesh. To dry your paper, either hang it on a string, or leave it inside a newspaper with some weight on top.

Equipment for making pulp

- Used white paper such as print waste, egg cartons, newspaper (but not too much as it makes the paper grey), old wrapping paper. Do not use glossy paper such as from magazines, as the way it is treated makes it unusable for recycling.
- Bucket for soaking paper
- Electric whisk

How to make pulp

- Tear the paper into small pieces and put it in a bucket. Add boiling water until it just covers the paper. Leave it for some hours, preferably overnight.

- When the papers have dissolved, use the whisk and whip the pulp. If it goes thick, add more water. It should be thin as slurry. The thinner the pulp is the thinner paper you can make

Equipment for making frames

- Wooden lists 3x3 cm (see the table below for measurements)
- Ruler
- Saw
- Wood glue
- Stainless steel screws
- Electric drill or Screwdriver
- A stapler, and stainless steel staples
- A mesh of nylon or steel, with a mesh opening of 24 pr. cm^2

How to make frames

Cut the lists to the correct length corresponding to the paper size you like. Screw four pieces together as a picture frame and use glue in the joints. Make two identical frames and staple the mesh onto one of them.

Size of the paper	The number of lists you need	The size of the mesh you need	Cut the lists this length
21 x 29 cm	2 each of 1,12 m	37 x 45 cm	4 each of 24 cm 4 each of32 cm
15 x 21 cm	2 each of 84 cm	31 x 37 cm	4 each of 18 cm 4 each of 24 cm
30 x 30 cm	2 each of 1,4 m	46 x 46 cm	8 each of 35 cm

4. BIOENERGY

4.1. Quiz

Circle the correct answer:

1. **Bioenergy is energy that comes from:**
   a. Fossil fuel
   b. Tidal waves
   c. Plants and trees
   d. Wind mills


Photo: Forestry Extension Institute

2. **How is the energy stored in plants?**
   a. As the green colour
   b. As sugar, starch and cellulose
   c. In the roots
   d. No energy is stored

3. **When will use of bioenergy increase the greenhouse effect?**
   a. When the volume of trees harvested is less than the annual growth
   b. When the volume of trees harvested is more than the annual growth
   c. When the volume of trees harvested is equal to the annual growth


Photo: MS clipart

4. **Bioenergy can be used for:**
   a. Heating
   b. As fuel for transportation
   c. Producing electricity
   d. All of the above

5. **Where does most of the energy in the world come from?**
   a. Sun
   b. Inside the earth
   c. Fossil fuel
   d. The ocean


Photo: Forestry Extension Institute

6. **Forest bioenergy development can provide socioeconomic benefits such as:**
    a. Creating and maintaining jobs in local communities
    b. Generating additional income to landowners
    c. Increasing tax revenues to local governments
    d. All of the above

Photo: MS clipart

7. **Calorific value is the amount of heat wood provides when burned. Which statement is correct?**
    a. All wood has the same calorific value per kilo
    b. All wood has the same calorific value per volume

Photo: Forestry Extension Institute

8. **Why is it important to dry firewood properly?**
    a. It makes it easier to carry
    b. It is difficult to burn wet wood
    c. Wet wood uses lots of energy to evaporate the moist when burning, which means less energy for heat

9. **Biomass will decompose if we don't use it and the stored carbon will return to the atmosphere as CO_2. If we use biomass for heating the stored carbon will also return to the atmosphere as CO_2, but is the amount:**
    a. Larger
    b. Smaller
    c. The same

Photo: Forestry Extension Institute

10. **What are the benefits of bioenergy?**
    a. Its available all over the world
    b. It's a renewable resource
    c. It can be made from waste, such as harvesting residue or animal faeces
    d. All of the above

Solution

1. Bioenergy is energy that comes from:
   a. Fossil fuel
   b. Inside the earth
   c. **Plants and animals**
   d. Wind mills

2. How is the energy stored in plants?
   a. As the green colour
   b. **As sugar, starch and cellulose**
   c. In the roots
   d. No energy is stored

3. When will use of bioenergy increase the greenhouse effect?
   a. When the volume of trees harvested is less than the annual growth
   b. **When the volume of trees harvested is more than the annual growth**
   c. When the volume of trees harvested is equal to annual growth

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   b. As fuel for transportation
   c. Producing electricity
   d. **All of the above**

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   a. Larger
   b. Smaller
   c. **The same**

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Experiment

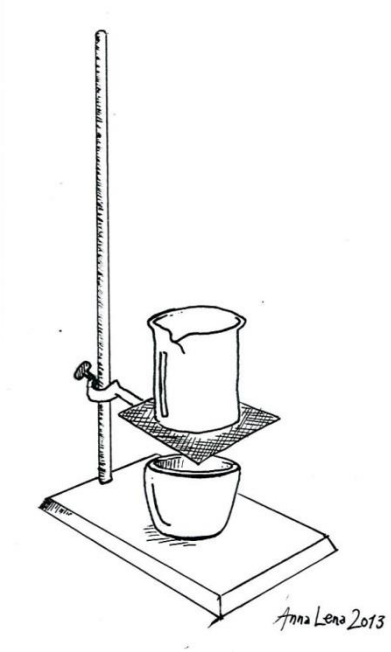
4.2. Energy from biomass

Introduction

An exciting experiment for the oldest primary school pupils is to compare how much energy can be obtained from various types of biofuels. Exciting in two ways; the combustion device must be installed, and later to see the results obtained in the experiment.

Purpose

The purpose of this experiment is to learn about different types of biofuels, and to see that biofuels of same weight have different volume.



Estimated time

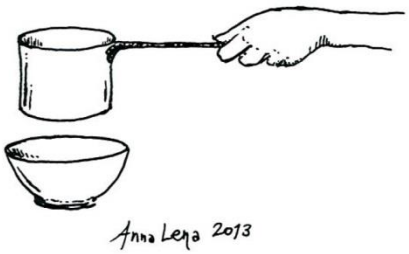
About 2 hours

Equipment

- Various kinds of biofuels
- Scale to weigh the biofuel
- Methylated spirits to ignite the fire
- Crucible (or some other heat resistant container)
- Beaker that can hold 2 dl (or some other heat resistant water container)
- Tripod or ring stand with iron ring, and wire gauze
- Water for testing and extinguishing
- Thermometer

Note:

If you don't have the equipment listed, you can simplify the method to heat the water.



Preparation

Prepare the same amount of different types of biofuel (e.g. 10 g). Examples of biofuels to investigate: Dry sticks from spruce, pine or from different broadleaved trees. Other items to try may be core wood, bark, sawdust, shavings, straw, grain and peat. Try also using methanol and ethanol if obtainable.

Prepare 10 cl of water for each type of biofuel you want to investigate. It is very important that the water temperature is the exact same for each biofuel you test. To ensure that all the pupils use water with the same temperature, tap water into jugs one day in advance. Measure the temperature just before the experiment begins.

Prepare water for fire extinguishing (only for emergency, the fire should burn-out by itself).

What to do

- Make precise measures of the biofuel by placing the crucible on the scale. Reset the scale to zero, and then add the biofuel
- Fill the beaker with 10 cl of water, and place it on the tripod/ring stand, on top of wire gauze.
- Pour 3 ml of methylated spirit over the biofuel to ignite it. Let the methylated spirit burn exactly one minute before it is placed underneath the beaker with water. It is a matter of making the biofuel burn up completely while heating the water
- When the fire has burnt-out, stir the water before you measure the temperature. Use the table below to record the values from each type of biofuel
- Repeat the procedure with various types of biofuel

Note

You may find air supply to the small fire difficult. A solution is to use a metal container and make a few small holes in it. A simpler solution is to try and blow gently. Perhaps pupils (and teachers) can find other creative solutions?

Results

Type of biofuel	Temperature

Afterwards

- Were there any possible errors that could impact on the results of the experiment? (E.g. biofuel not completely burned out, inaccurate measures)
- What does it mean that biofuels do not add any extra carbon dioxide (CO_2) to the atmosphere?
- The different types of biofuel are all made of biological material. Where does the energy in for example wood originally come from?

Additional experiment

Use fresh and dry sticks from the same species to get a comparison between dry and wet wood using the same methods and procedures.

5. PRODUCTS IN GENERAL

Activity

5.1. What can you find in forests?

Find the missing words in the maze. They appear horizontally, vertically and diagonally.

For help you can use the table below which contains all the words you are looking for.

P	A	Q	W	N	I	F	K	F	T	L	R	O	A	Z
X	S	D	T	H	Z	I	R	A	N	I	M	A	L	S
B	U	F	O	O	D	R	R	Q	M	M	B	E	I	X
S	P	A	Z	A	B	E	E	S	R	A	V	C	R	I
R	H	Q	E	U	P	W	T	D	P	Q	U	F	W	N
I	E	A	B	A	S	O	R	S	O	I	M	P	O	S
H	R	O	D	C	X	O	Z	I	Y	Q	C	U	H	E
S	B	W	T	E	M	D	U	L	W	H	O	E	S	C
N	S	H	Z	H	G	J	K	E	A	G	N	W	S	T
E	O	J	Y	T	I	L	U	N	X	J	E	Z	Y	S
S	H	K	L	X	T	Q	X	C	T	G	S	Q	L	O
T	W	U	Z	W	I	H	A	E	I	H	J	Y	G	X
S	S	H	E	L	T	E	R	Z	T	W	P	Z	L	H
J	P	L	A	M	E	D	I	C	I	N	E	U	D	A
I	X	J	H	Q	I	A	W	T	H	U	L	A	Q	P

FOOD	SHADE	MEDICINE	CONES
SILENCE	ANIMALS	HERBS	INSECTS
SHELTER	FIREWOOD	SPICE	NESTS

Solution

	A	Q	W	N	I	F	K	F	T	L	R	O	A	Z
X	S	D	T	H	Z	I	R	A	N	I	M	A	L	S
B	U	F	O	O	D	R	R	Q	M	M	B	E	I	X
S	P	A	Z	A	B	E	E	S	R	A	V	C	R	I
R	H	Q	E	U	P	W	T	D	P	Q	U	F	W	N
I	E	A	B	A	S	O	R	S	O	I	M	P	O	S
H	R	O	D	C	X	O	Z	I	Y	Q	C	U	H	E
S	B	W	T	E	M	D	U	L	W	H	O	E	S	C
N	S	H	Z	H	G	J	K	E	A	G	N	W	S	T
E	O	J	Y	T	I	L	U	N	X	J	E	Z	Y	S
S	H	K	L	X	T	Q	X	C	T	G	S	Q	L	O
T	W	U	Z	W	I	H	A	E	I	H	J	Y	G	X
S	S	H	E	L	T	E	R	Z	T	W	P	Z	L	H
J	P	L	A	M	E	D	I	C	I	N	E	U	D	A
I	X	J	H	Q	I	A	W	T	H	U	L	A	Q	P

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PRODUCTS

Activity

5.2. Which products are not from forests?

Introduction

It is amazing how many products contain something that derives from trees. Not all are obvious. Trees have many more qualities than just to provide us with wood. Wood consists of many substances that can be extracted and used in other products.

Can you figure out which ones that definitely have nothing to do with trees?

	Magazine		Internet
	Syrup		Cardboard
	Egg		Firewood
	Skateboard		Glass
	Toothpaste		Salt
	Ice cream		Toilet paper
	Pencils		Medicine
	Paint		Charcoal
	Rubber		Nuts
	Cinnamon		Wine cork
	Cabinet		Canoe paddle
	Cones		Weetabix
	Staples		Shoe polish
	Chewing gum		Napkins
	Sponges		Photo films
	Cellophane		Crayons
	Chair		Guitar




Photos: MS Clip art

Solution

X = products that definitely has nothing to do with trees

	Magazine	X	Internet
	Syrup		Cardboard
X	Eggs		Firewood
	Skateboard	X	Glass
	Toothpaste	X	Salt
	Ice cream		Toilet paper
	Pencils		Medicine
	Paint		Charcoal
	Rubber		Nuts
	Cinnamon		Wine cork
	Cabinet		Canoe paddle
	Cones	X	Weetabix
X	Staples		Shoe polish
	Chewing gum		Napkins
	Sponges		Photo films
	Cellophane		Crayons
	Chair		Guitar

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