



Paper - naturally



Norske Skog and young readers

Norske Skog's full name means "Norwegian Forest Industries". This company is one of the world's leading suppliers of newsprint and magazine paper. It owns 23 mills, either on its own or with partners, in Europe, North America, South America, Australasia and Asia.

It cooperates with the World Association of Newspapers (WAN), a global society of 18 000 newspapers and publisher organisations in more than 150 countries. This collaboration aims to encourage young people to read newspapers and magazines.

Over a five-year period, Norske Skog and WAN will be launching Newspapers in Education projects in countries where the growth of democracy has created better conditions for a free press.

Newspapers in Education is an important way of making sure that Norske Skog's customers have stable and preferably growing circulations.

Its mills and big sales network put Norske Skog in a very special position. Global strength and experience combined with a local presence and knowledge make this company different from other paper producers.

Norske Skog was established in Norway in 1962. Its first newsprint machine started production four years later. The company has grown a lot since then, and is now a global business.



Exercises

1. Can you think of something we do every day which can't be done without paper?
2. Where does the word "paper" come from?
3. Name 10 different things we use paper for.

Paper - a fantastic material

Can you imagine a whole day without paper? Probably not. Paper is a fantastic material, which we can't do without. People all over the world use paper and cardboard every day for countless different purposes.

Some of these are boxes, wrapping paper, greaseproof paper, kitchen and toilet rolls, corrugated board, paper bags, writing paper, photocopy paper and book paper. And not forgetting paper for printing newspapers, magazines and other publications.

Paper is a natural product, made from renewable raw materials. Most of it comes from wood fibre, but other plants are used in some parts of the world.

Even after paper has been used, it can easily be recycled to make new paper. Wastepaper is often used in this way today. Recycling is important for the environment. So you should make sure that wastepaper gets collected.

The history of paper

The ancient Egyptians were writing on the pith of papyrus reeds as long ago as 3 500 BC. But true paper was invented in China. Ts'ai Lun probably made it first in AD 105. We know this because he wrote to the Emperor to report his success in creating paper from bark, hemp, rags and old fishing nets!

The Chinese tried to keep this invention secret from the rest of the world. But the art of making paper became known in much of Asia, north Africa and Europe over the next thousand years.

For a long time, all paper was made by hand. Then a Frenchman, Nicolais-Louis Robert, invented a machine in 1799 to do this job.

Paper was largely made from cotton or linen cloth and rags until the mid 19th century. Fibres from these materials were mixed with water and dried. People eventually discovered that other plant fibres could be used. Today, most paper is made from wood fibre.

Learn about paper : This booklet tells you more about paper - particularly newsprint and magazine paper, which are used for newspapers and magazines. You can learn where it comes from, how it is made, recycling it and how paper affects the environment.



Exercises

1. Find one or more newspapers published in your district.
2. Which is the biggest newspaper in your country (with the largest circulation)?
3. Go through a recent newspaper. Find the different subjects it covers (news, sports, culture, entertainment and so on).
4. Discuss why the freedom to say and write what we please is so important.



Exercises

1. Try to find an old newspaper, preferably more than 10 years old or even older. Perhaps the library can help you. Compare it with the same newspaper today. What are the biggest differences?
2. Find a news story which appears both in the printed newspaper and on the web. Do you see any differences and similarities? Can you remember whether this story was on TV, and how it was presented there?
3. Find out how much time you and your family spend every day on: A) newspapers B) magazines C) Radio D) TV.



Newspapers – part of our lives and our democracy

Newspapers and magazines are an important part of our daily lives. They provide news, entertainment, culture and lots of knowledge, communicate opinions and reflect our society. That gives newspapers an important role in our democracy. The right to say and write what we like, and the right to communicate opinions and news, are key freedoms in democratic countries.

Most newspapers are printed in large works. Today's printing presses are very advanced machines. The largest and most modern of them can print up to 80 000 newspapers an hour. High-quality paper is very important for such machines.

You may have noticed that the paper in different newspapers, magazines and advertising leaflets can vary quite a bit. Paper is made to suit the publication it will be used for. The kind found in ordinary newspaper feels a bit rougher and is not quite as glossy as the paper in many magazines. Called "newsprint", this paper consists mainly of wood fibre, water and perhaps some colouring.

Many magazines are printed on paper which feels smooth or looks glossy. Such paper often contains a little clay or lime in addition to the wood fibre. Magazines with lots of fine colour pictures usually need a different paper from news- print.

The world's biggest newspaper

The newspaper with the world's biggest circulation (number of copies sold every day) is Japan's Yomiuri Shimbun, published in Tokyo. It had a daily circulation of about 14.4 million in 2002. The largest circulation of any newspaper on a single day was just under 22 million, reached by Russia's Komsomolskaya Pravda in May 1990.

The art of book printing

Book printing is one of the most important inventions in history. It was discovered by a German, Johann Gutenberg, who printed his first Bible in 1455. Before then, books were written by hand. Some leaflets containing news stories were printed in the 15th century, and are the ancestors of newspapers. The first regular newspapers appeared in the 17th century.

Does the printed newspaper have a future?

Newspapers have been one of our most important sources of information for a long time. Today, we get news and entertainment in a number of other ways, such as the radio, TV and the internet. Has the printed newspaper any future? Or is it out-of-date in a modern electronic world?

Those who study this subject believe that the printed newspaper does have a future. But newspapers change all the time, and will continue to do so.

Most modern newspapers produce both printed and internet versions. On the web, news is published as soon as it happens, and often in a brief form. Most printed newspapers appear once a day and usually go into greater depth on stories, with longer articles and background reports. But the biggest stories often appear first in the printed version, while the web newspapers, radio and TV follow them up.

Radio and TV stations also have their own internet site about their programmes. And newspapers write a lot about what happens on TV. The various media interact and complement each other. Printed newspapers will remain important in this way.

That's because newspapers have many advantages over computers and TV. You can take a newspaper everywhere, read it on the bus, in your armchair at home or in bed. Whenever you like, in fact, perhaps reading a little now and more later. It is easy to find your way around newspapers, and they are very good at combining text, pictures and other information in an interesting way.

Printed and electronic media

Radio, TV and the internet are often called "electronic media", while newspapers and magazines are "print media". Although these two types of media are fairly different, they also have a lot in common. They all inform us about news, entertainment, sport and a lot more besides.

Once most people had radio and TV, it was widely claimed that newspapers would die. And many thought that the PC and the internet would mean a "paperless" society, with no newspapers, magazines, books or paper at school or in the office. But that hasn't happened. We're using more paper than ever, and newspapers are still important and popular.

"Without letters, we would have to speak all the time"
- Tricia, 8 years from Tobago

"What if suddenly there was nothing to read?"
- Bewi, 10 years from Indonesia



Exercises

1. What are renewable resources?
2. Give examples of some resources which are renewable and some which are non-renewable.



Paper is a natural product

Paper is a very special material which fits into the cycle of nature. When made and used wisely, few products are so environment-friendly.

Why do we say that paper fits into the natural cycle? This is partly because its raw material is renewable and partly because wastepaper can be recycled.

The raw material used to make newsprint is renewable plant fibres from trees, which grow naturally with energy from the sun. In a cycle. When a tree is cut down, we must make sure that more are planted.

Paper can be recycled. This means using old newspapers and other wastepaper to make new paper. In that way, we can use the same wood fibre several times. In a cycle. Even paper fibres which have become too worn out for recycling are still useful. They can be burnt in furnaces or large power plants, so that we benefit from the energy.

Another cycle is involved. As trees and other plants grow, they absorb energy from the sun and carbon dioxide from the air. The carbon dioxide is stored as carbon, and stays with the wood fibres in the paper. When the paper is finally burnt, it gives off heat and the carbon dioxide returns to the air to be used by other plants. In a cycle.

What is fibre?

Whatever the raw material used, paper consists of small fibres which have bonded together. The wood fibre used in paper for newspapers and magazines is usually four-five millimetres long and about 0.03 millimetres thick. They are so small that you need a microscope to see them. In the paper, the fibres are spread evenly in a very thin layer. They bond together to stop the paper falling apart. An ordinary sheet of A4 writing paper contains about 10 million fibres.

Renewable resources

We say that some resources are renewable because they can be used without disappearing or getting smaller. They are renewed by nature itself, with the aid of solar energy. Trees and other plants are examples of renewable resources which form part of the natural cycle. Water is another. But we must take care not to use more of these resources than nature produces. When we cut down a tree, we must plant others or make sure that the forest seeds more. Oil, coal and metals are examples of non-renewable resources. When we use them, the amount left gets smaller.

"Now that I know how to read, I know all the things I need to know in the whole world"
- Menave, 16 years from Ghana

Exercises

1. Name 10 things we can use wood for.
2. Why must we take care to plant new trees when old ones are cut down?



Exercises

1. Find out where you deliver recovered paper in your area.
2. Do you know what the paper you collect is used for?
3. Find several types of paper made by recycling.



Forests – a valuable resource

Forests and woods are a valuable resource. They are home to many different plants, animals and other organisms. We can also get close to nature in them.

But forests also benefit us in other ways. Wood from their trees is an excellent material, which can be used for many important things we need – houses, furniture and many other objects. Some wooden houses and furniture have survived for a thousand years.

Paper for newspapers and magazines is made from wood which can't be used as a building material. That includes the thinnest part of a tree or the wood chips left over at the sawmill. This represents a good use of resources. Some parts of the world use trees grown in plantations (farms) to make paper. In Europe, newsprint comes from ordinary spruce.

Wood is a renewable material. This means that a forest never runs out of trees if we use them sensibly. When we cut down a tree, we must always plant new ones or make sure that the forest seeds more trees.

The forest must be looked after, so that we take care of the plants, animals and other species which live there. Some forests are totally protected, while those we use must be managed carefully.

Energy from forests

Materials and paper are not all we obtain from forests. We also get energy. Wood can be burnt for heat. When wood and other naturally renewable materials are used to generate energy, we call them biofuels. And the energy generated is called bioenergy. This is environment-friendly energy, partly because it's renewable. The bark on trees can't be used to make paper, so it is burnt in the paper mill and the heat put to good use. This is an efficient way of exploiting bioenergy from forests.

Use paper again

The newspaper you read can be used again. This is called recycling. Old newspapers, magazines and other wastepaper are collected and turned into new paper. The material we collect is called recovered paper.

Collecting wastepaper is important. Recycling protects the environment – mainly because the amount of waste in landfills will be reduced, but also because it saves resources. Paper is a resource which can be used again, and should not be simply dumped.

The recovered paper is first sorted in a receiving plant before being taken to a paper mill. Waste cardboard is usually recycled into more cardboard, while old newspapers, magazines and other printed paper generally get turned into newsprint. First, though, we have to remove all the printing ink from the collected paper. This is done in large tanks at the mill, where the ink and paper dissolve. Both soap and water are used in this “de-inking” process. Finally, the water is drained away so that the wood fibres in the paper can be re-used.

Old newspapers become new

Newsprint is very often made from recovered materials. About half the world's supply of this kind of paper comes from recycled waste. Some newsprint only contains recovered paper, while other types have new fibre added. And some is made only from new wood.

But why not make all paper from recycled materials? The answer is that the wood fibres eventually wear out and vanish. So we must add new wood fibre from the forest. And some of the paper we use isn't recycled. Toilet paper, for instance.

“If I couldn't read, I wouldn't know that half of the world already rides a bicycle”
- Rajiv, 12 years from India

Collect paper : Is wastepaper collected where you live? Do your family and school collect it? Be sure to save the paper you use yourself, and encourage others to do the same.



Paper - naturally



How paper is made for newspapers and magazines

Paper for newspapers (newsprint) and magazines is made in mills by big machines which run day and night all through the year. Many of the people employed in these mills sit at modern computers and control the big machines, while others work in laboratories to check that the quality of the paper is good enough.

A modern paper machine is usually about 100 metres long, almost 10 metres wide and seven-eight metres high. Newsprint is very thin – generally about 0.06 mm. A pile of 170 sheets of such paper would be about one centimetre thick. The most modern machines make paper at a speed of more than 100 kilometres per hour, as a thin sheet of paper which can be up to 10 metres wide. In just two weeks, the fastest paper machines can produce a sheet of paper this wide and as long as the distance around the Earth at the equator.

When finished paper comes out of the machine, it is wound into big rolls. These are transported to the printing works which produce newspapers and magazines for you to read.

The drawing shows how paper for newspapers and magazines is made in the big mills.



"There are too little cartoons in the newspapers"
- Huni, 9 years from Vietnam

Paper is high technology

Some of the worlds most advanced computer systems are needed to control the process of making high-quality paper.

1. Woodyard

Paper is made from the parts of a tree which can't be used to build houses. Some of this material comes from sawmills, while some is the topmost section of the tree or trees which are too small to use in buildings. The bark is removed and burnt to provide heat for the mill. After the logs have been chopped into short pieces, they are ground up or cut into chips – bits of wood about four-five centimetres long.

2. Recovered paper



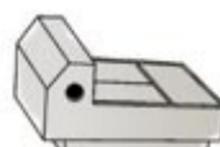
2. Recovered paper

Recovered paper comes in large compressed bales of old newspapers and magazines. The paper is dissolved in water and chemicals in a large rotating drum. Then the ink is removed in large tanks (de-inking) with the help of water, soap and air. The ink sticks to air bubbles which float on top of the water and are removed. Printing ink and other sludge are burnt to produce heat for use in the mill.

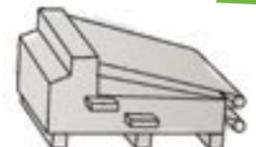
3. Dissolving



4. De-inking



4. Bleaching



3. Making paper pulp

What we call "paper pulp" consists of wood fibres about three-four millimetres long. To make paper, these fibres must be separated. One way to make pulp is to grind logs against large revolving stones. Another is to heat wood chips and rub them between two rotating steel plates. A third method is to recover wood fibre from wastepaper. Some mills use only one of these methods, whilst others use two or all three.

4. Bleaching, filling

Paper pulp looks like a grey "porridge". To make the paper white enough, the pulp must be bleached. Fillers, usually clay or lime, are also added to some types of paper used in magazines. This gives the paper a smoother finish. To make the paper strong enough, cellulose – the longest and strongest fibres in a tree – is often added. All these ingredients are mixed with a lot of water and pumped into the paper machine.

4. Clay



4. Sulphate pulp



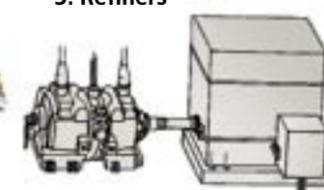
1. Woodyard



3. Grinding



3. Refiners



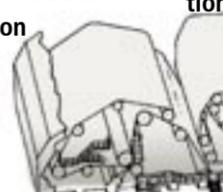
4. Bleaching



5. Wire section

The first part of the paper machine is the wire section, where the pulp is spread evenly over the whole width of the paper sheet on a special wire mesh. Water is removed by squeezing the pulp between two of these perforated screens. The water runs out through the screens, leaving the fibres behind. Paper is starting to appear.

5. Wire section



6. Press section

6. Press section

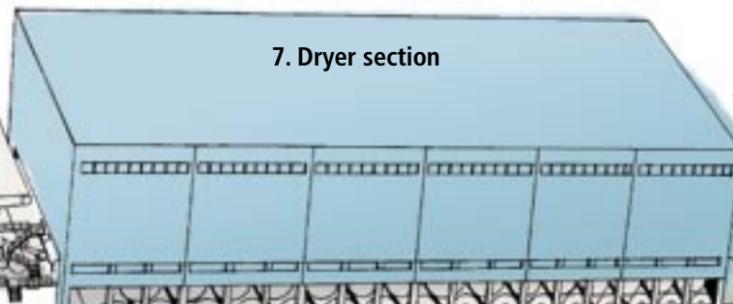
The sheet now enters the press section of the machine, where the paper lies on a layer of felt. Even more water is squeezed out between large cylinders which rotate at high speed.



7. Dryer section

7. Dryer section

From the press section, the paper enters the dryer. Its fibres are now bonded together in a sheet, but even more water must be removed. The paper passes at high speed through 40-50 rotating steel cylinders, which are heated inside with steam. This heat causes the water in the paper to evaporate.



8. Rolls

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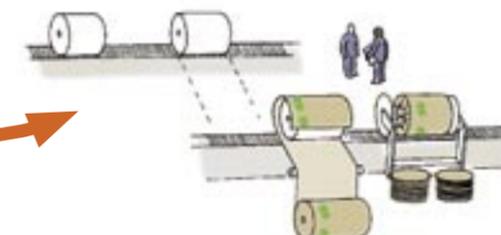
The dry paper passes through more big steel cylinders to get a smooth finish, and is then wound into large rolls which are the same width as the whole paper machine. Some types of paper go through yet more steel cylinders to become even smoother.



9. Wrapping

9. Wrapping

In the wrapping section, the finished rolls of paper are checked and packed in paper. Each roll is labelled for transport to the right printing works. It is then ready to be printed as newspapers or magazines.



What you need:

- A frame with a flat mesh. You can make this yourself
- A plastic tub holding about 20 litres of water, and large enough to dip the mesh into
- Water
- Blotting paper or kitchen towels
- Rolling pin
- Domestic blender or similar
- Some old newspapers, serviettes, egg boxes or other paper.



Exercises

1. Find three subjects you study at school which could use newspapers.
2. Explain why newspapers are a good teaching aid in the subjects you choose.
3. Have your teachers used newspapers with your class?
4. Is your school cooperating with a local newspaper on using newspapers in the classroom?



Make your own paper

All paper is made by dissolving fibres of wood or other materials in a lot of water. This creates paper pulp, which is collected on a mesh. Water is pressed and dried away, leaving the finished paper.

Today, this process takes place at high speed in big machines. But you can easily make your own paper. Follow these instructions at school.

1. Make a mesh frame

Start by finding or making a frame with a mesh bottom. If you have a flat mesh of a suitable size, you can use that. Or make your own. The frame is made from pieces of wood about 20 centimetres long and 10 centimetres wide. You can make the mesh by fastening gauze tightly to the frame with a stapler or small nails, so that it forms a base.

2. Dissolve the paper

Now start to make paper pulp. Rip up your newspapers, serviettes, egg boxes or other paper into tiny pieces and put them in the plastic tub. Add plenty of water. Leave it until the next day, so that the paper can dissolve. Beat the water with a blender or the like. The dissolved fibres are now well mixed with the water. We have made paper pulp.

3. Dip your mesh into the water

Take the mesh frame and dip it into the water. Let it lie on the bottom of the tub for a while, then lift it carefully straight out. Put it over a sink, for instance. A lot of water still has to be removed, so things can get a bit messy.

4. Paper sheet on the mesh

You have collected a layer of wood fibres on your mesh, while most of the water has poured out. A mat of fibres is now lying on top of the mesh, which will become a sheet of paper.

5. Use blotting paper

Put blotting paper or a kitchen towel over the paper sheet. Leave it for a time to absorb water. Roll the rolling pin over the top of the blotting paper/towel. That squeezes more water out of the paper sheet. But be careful. If you roll too hard, the fibres can be squeezed out of position and the mat may break.

6. Dry the paper

Let the paper dry completely, preferably until the next day. You have now made your own paper. Don't give up if it doesn't work first time. You can try different types of mesh and amounts of dissolved paper and water. You may have to try and fail to become a skilled papermaker.

Newspapers in Education - world-wide

Newspapers and magazines are used in classrooms around the world. They show us the world we live in. They tell us what is happening where we live and in distant places.

So newspapers and different magazines are very suitable for teaching us geography, social science, history, language and a lot more.

Newspapers and schools cooperate in many countries. Such collaboration began in the 1930s, and exists today in a number of countries on several continents.

The World Association of Newspapers (WAN) supports Newspapers in Education projects in more than 30 countries. In many of these, the projects are very important for teaching children and young people to read and to learn about democracy, freedom of expression and the society they live in.





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