



paper

Its making in **5 steps**



Québec
**Forest
Industry
Council**



Indispensable, multipurpose and recyclable!

THE HISTORY OF PAPER IS ONE OF THE WORLD'S MOST REMARKABLE DEVELOPMENTS EVER. IT WAS DISCOVERED BY THE CHINESE MORE THAN 2000 YEARS AGO. FOR A LONG TIME, PAPER WAS MADE FROM HEMP, FLAX AND THEN COTTON FIBRES. INCREASED CONSUMPTION LED TO A SEARCH FOR NEW RAW MATERIALS. IN 1840, A GERMAN BY THE NAME OF KELLER CAME UP WITH THE IDEA OF PRESSING WOOD AGAINST A MOISTENED GRINDSTONE TO EXTRACT THE FIBRE. WOOD PULP WAS BORN. PAPERMAKING TECHNOLOGY HAS MADE GREAT STRIDES SINCE THAT TIME, ESPECIALLY IN THE LAST 20 YEARS. THAT BEING SAID, THE FIVE MAJOR STEPS IN PAPERMAKING HAVE REMAINED UNCHANGED.

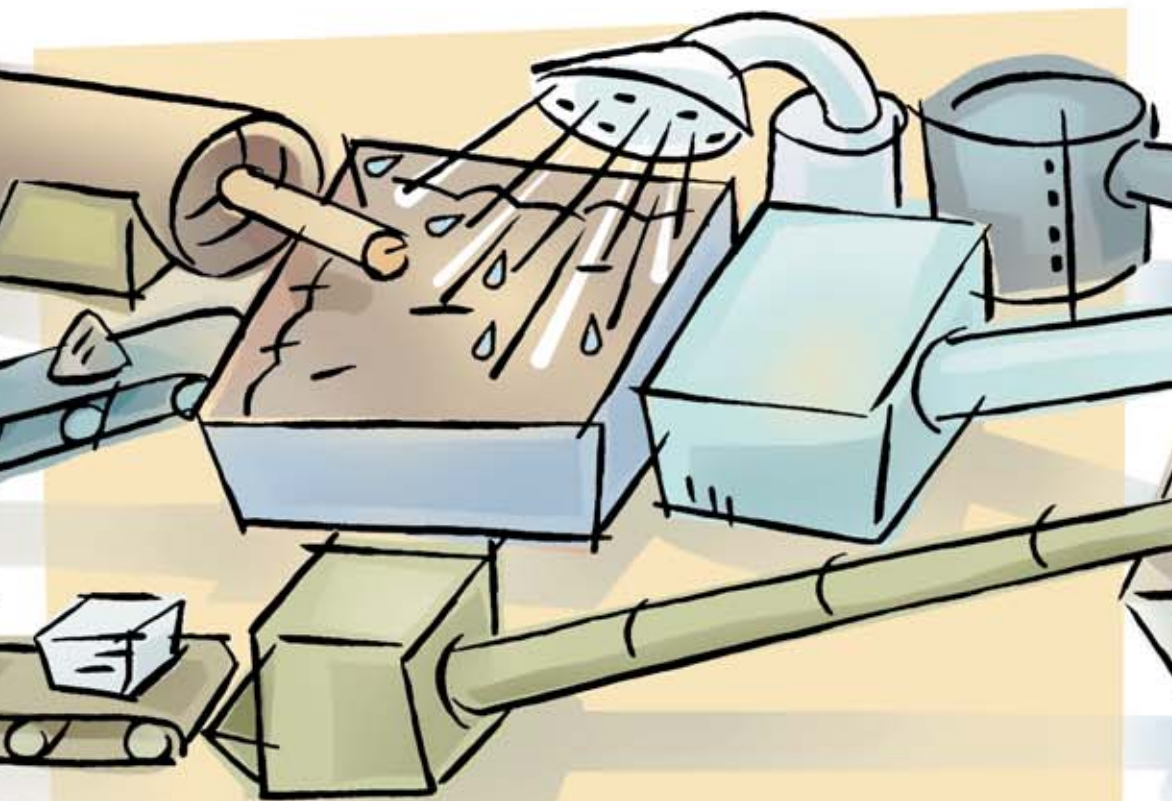
1

Fibre supply

Precious commodity that it is, wood is used primarily to produce construction materials. Paper and cardboard are increasingly made from sawmill by-products (chips, sawdust and shavings) and recycled paper and cardboard. Roundwood harvested from the forest is now only a minor source of fibre supply for the paper industry. Whenever logs are still used in the process, they are debarked after arriving at the mill. The bark is recovered and used as a fuel for producing steam and, occasionally, electricity.

Smurfit-Stone





2

Pulping

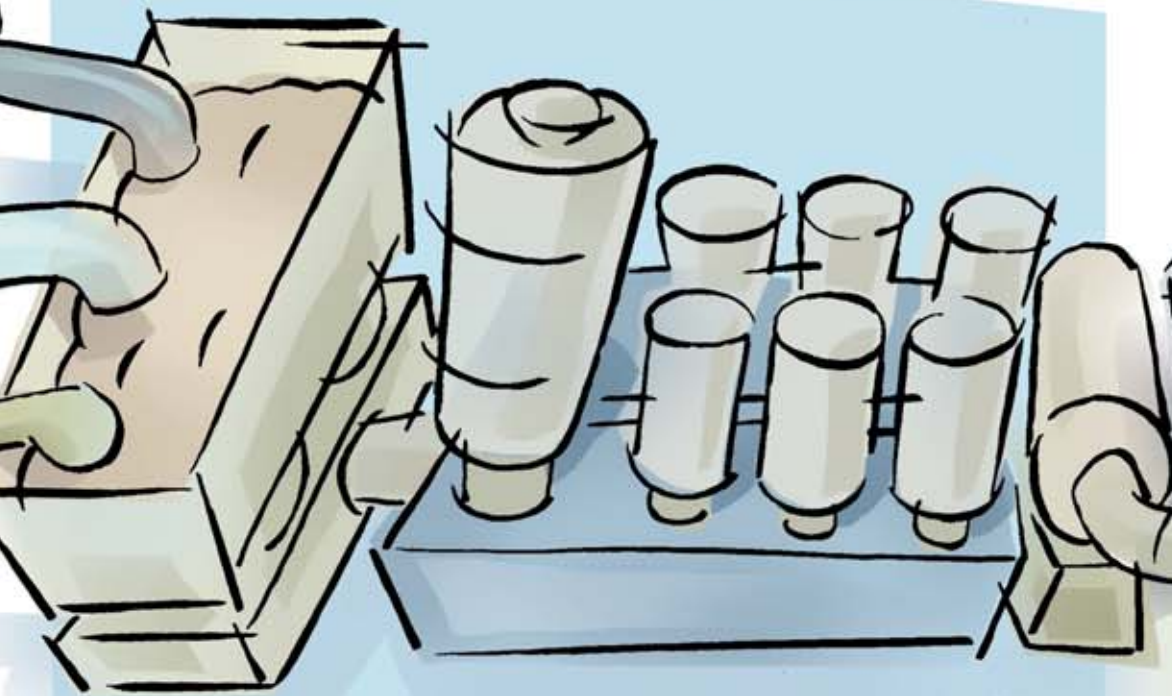
Wood is principally made up of cellulose fibres stuck together by a substance called lignin. Fibre from spruce, which is found in many parts of Quebec, is recognized as being the best in the world for paper making. To transform wood into pulp, these fibres must be separated.

Mechanical pulp is obtained by pressing debarked logs against wet grindstones. The process is made more efficient by first grinding the chips in the refiners. Quite often steam plays a role in this defibration. The final product is called thermomechanical pulp. When reactants are added to initiate the separation of lignin and cellulose, the result is chemithermomechanical pulp. These different types of mechanical pulps are suitable for making newsprint.

To prepare chemical pulp (the best known is called "Kraft," which means "strength" in German), chips are cooked under high pressure in huge pressure cookers (called digesters) into which chemicals have been poured. The combined action of these products and the heat dissolves the lignin and frees the wood's long fibres, but without breaking them. Papers made from chemical pulp provide strength and are used to make grocery bags, for example.

Recovered paper and cardboard used in the preparation of recycled pulp are sent through huge repulpers (breakers) for disintegration, then mixed with water. Contaminants (plastic, glass, metal, polystyrene, etc.) are removed from this mix using screens and a cleaner. If need be, the pulp obtained is then deinked through the combined action of water, chemical products, heat and mechanical energy. Recycled pulp is often used to make cardboard, newsprint, and industrial and domestic tissue products (toilet paper, paper towels, facial tissues, napkins, etc.).





3

Bleaching

To make certain types of paper and cardboard, pulp must be bleached. The products used help to dissolve or eliminate more of the lignin, the natural adhesive that binds wood fibres. The product obtained is not only white, but also less likely to yellow over time. Intensive research and significant investment have enabled the industry to considerably reduce the environmental impact of bleaching.





4

Forming the sheet

The pulp entering the headbox is generally 97% water. It is sprayed onto a conveying wire (i.e., a kind of long screen in the form of a continuous loop). Its filtering action, combined with a suction system, makes it possible to extract most of the water in the pulp and form a sheet. Pressing this between rollers removes more water. The sheet then passes into the drying section where, on contact with huge cylinders generally heated with steam, most of the remaining water is evaporated. Nowadays, infrared drying, air flotation drying and microwave drying are the leading-edge technologies for making the water content of the sheet uniform.

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Surface finishing

Depending on the finish desired (our mills make several dozen types of paper), the sheet passes between heated rolls (calenders) that compress the surface and make it smoother. Special clays can also be added to improve sheet properties (surface finish, printing quality, etc.). During reeling, each characteristic is checked electronically: moisture content, smoothness, density, colour, opacity, burst resistance, etc. The results of these tests are sent by computer to the control station, where adjustments are made.

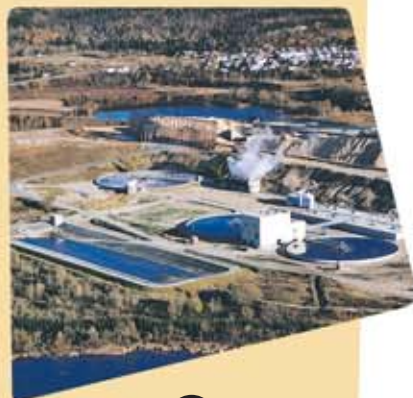


Kruger

Environment

FOR MORE THAN 20 YEARS, PAPER MANUFACTURERS HAVE BEEN INVESTING ENORMOUS AMOUNTS OF CAPITAL IN MODERNIZING THEIR PROCESSES AND IN PROMOTING THE RECOVERY, REUSE, RECYCLING AND RECLAMATION OF WATER, ENERGY AND FIBRE. THESE EFFORTS HAVE CONSIDERABLY REDUCED DISCHARGES INTO THE ENVIRONMENT. FURTHERMORE, WASTES, DISCHARGES, AND EMISSIONS ARE ALL SUBJECT TO RIGOROUS ENVIRONMENTAL PROTECTION STANDARDS.

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30% post-consumption

Games

1

Word Search

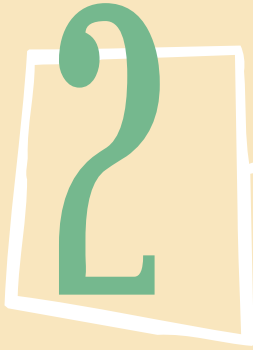
This word search deals with products derived from paper. Included in the list below are 28 such products. Once you have found all the words in the grid and crossed out the letters, 12 letters will remain. Placed side by side, these letters form two words, thus solving the puzzle. Naturally, the solution is another paper product.

Words in the grid can be crossed off horizontally or vertically, top to bottom, bottom to top, left to right, or right to left.



- | | |
|----------------|--------------|
| Bag | Newspaper |
| Blotting paper | Paper cup |
| Booklet | Paper towel |
| Box | Phone book |
| Calendar | Photo |
| Cardboard | Placemat |
| Check | Plate |
| Coffee filter | Postcard |
| Diaper | Sign |
| Dictionary | Silk paper |
| Egg crate | Stamp |
| Envelope | Straw |
| Magazine | Tablecloth |
| Matches | Toilet paper |

Slabmree



The Paper Scramble

The letters of eight words related to the paper industry have been scrambled. Example: **RPEPA=PAPER.**

Unscramble these eight words and create a ninth with the numbered boxes.

1 ERTE



2 SHGANSIV



3 RAODADCRB



4 RIETBM



5 LPUP



6 EPCSUR



7 NYEGER



8 ROSFTE



Decoded word:

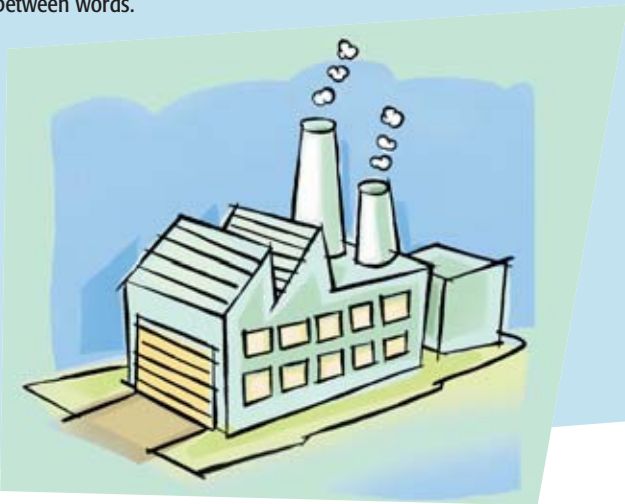


3

Action in the Air

G	R	E	E	N	H
1	2	3	3	4	5

To decipher the message, you must replace the following numbers in the main grid: 1 by G; 2 by R; 3 by E; etc. Afterwards, deduction will allow you to find all the missing letters. You will then be able to read the sentence line by line from left to right. Blank spaces mark the separation between words.



11	9	11
4		Q
2	3	14
1	2	3
8		3
Y		1
8	12	4

In order to decipher the message hidden in the grid below, you must circle all the letters located between two vowels or between two consonants. Once this is done, bring all the circled letters together and separate the words at the right place so that the message becomes as clear as water.

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

Quebec's pulp and paper industry has played its part in dealing with the potential effects of greenhouse gases. The coded grid below contains a sentence that describes one of the positive results of actions taken by the industry.

Almost every letter has been replaced by a corresponding number. In order to help you decipher the message, the key to the code for some letters is revealed below:

O	U	S	E	G	A	S	E	S
6	7	8	3	1	9	8	3	8

3	2		16	12	L	L	8		12
7	3	B	3	13		5	9	V	3
7	13	3	14		15	5	3	12	2
3	4	5	6	7	8	3		1	9
16	12	8	8	12	6	4	8		B
5		11	3	2	13	3	4	15	
13	3		1	9	9	0			

More Paper, Less Water



O	S	U	E	H	I
A	I	T	U	A	K
E	S	U	M	I	O
T	E	R	A	E	F
O	C	E	U	R	E
P	E	U	R	O	P
F	E	A	P	A	L
O	H	M	I	A	V





5

Time for Recycling

As a general rule, most kinds of paper or cardboard are recyclable aside from those covered in a plastic substance. In case of doubt, call your local recycling service to find out what you can recycle.

In order to test your awareness of recycling, let us see whether you can recuperate the numbers to create letters and, consequently, build statements that have a link with recycling. Every number corresponds to a letter on the dial pad. However, there are three letters to every number. Consequently, 4 can translate as either G, H, or I. You must choose the right letter. In order to facilitate deciphering, we have indicated the necessary punctuation signs, dashes, apostrophes, as well as the letter Q, which does not appear on the phone keys.



72737 226 23 73292533 87 86 73836

84637.

46 226232, 6659 2 84473 63 843

72737 26678633 47 73292533; 46

7383725 268687437, 5453 52726, 632759

896-844737 63 843 72737 47 73292533.

Q83232 4676787 6837 4253 843 72737

48 73292537 3766 843 864833 782837.

6

Maze Phrase

Complete the following maze phrase:

COGENERATION IS...

The following rules must be followed:

You must use all 70 letters of the grid to complete the maze phrase.

To find the words that will continue the maze phrase, you must move right to left, left to right, top to bottom, bottom to top, but never diagonally.

When you have successfully connected all the letters in the maze, you will then need to separate them correctly to find the words of the maze phrase.

The start and finish points, as well as the two first words of the maze phrase are indicated below. Now it's your turn to play!

T	I	L	F	O	R	C
I	V	A	C	O	F	E
T	E	T	I	R	E	P
E	C	E	G	T	H	U
P	H	N	O	D	N	L
M	O	O	L	P	A	P
A	C	N	E	A	P	E
S	I	E	G	T	S	R
O	N	R	O	R	U	I
I	T	A	C	Y	D	N

↑ Start
↑ Finish