

## Making\_Paper\_Challenge\_Project\_2004.txt

Paper has a rich, colourful history which has spanned the world's geography and its cultures.

Paper is a part of our everyday lives, but few of us know much about how it is made. It turns out that making paper is not particularly difficult, especially if you use old paper scraps as your base. With a little practise and a few tools, you can learn to make beautiful homemade papers that can be used for notes, cards or gift wrap.

Paper is made from cellulose (SELL-u-los), which is in plant fibers. The cellulose is made by cutting down trees and then grinding up trees and dumping the woodpulp in acid. Not a pretty picture. Cutting down trees is not good for the planet. But recycling uses cellulose over and over again. Recycled paper can be made with less electricity, with less water, with a lot less pollution, and it saves trees from being cut down. Making recycled paper yourself is also lots of fun.

When we think of the origins of paper, our minds think of 5000 years ago to the Nile river valley in Egypt. It was there that a marsh grass called Cyperous Papyrus flourished. The Egyptians cut thin strips from the plant's stem and softened them in the muddy waters of the Nile. These strips were then layered in right angles to form a kind of mat. The mat was then pounded into a thin sheet and left in the sun to dry. The resulting sheets were ideal for writing on. Since they were also lightweight and portable they became the writing medium of choice of Egyptians, Greeks and Romans for record keeping, spiritual texts and works of art. It is from papyrus that the word paper comes from. Although papyrus sheets were similar to paper in terms of function, being laminated sheets they were technically more like a mat and therefore not the same as the papers of today. Similar processes were developed in other lands - in Central America during the 2nd Century AD the Mayans fashioned a similar product for bookmaking. In the Pacific Islands, a paper was

made by beating a fine bark over specially shaped logs to make clothes and ritual objects. However, none of these sheets would qualify as true paper today.

Paper as we know it today comes from another source - China. Excavations of tombs of the former Han Dynasty (207BC-9AD) have revealed silk cloth bearing the texts of Lao Tzu - the father of Taoism (born in 604BC). In 105 AD, Han Emperor Ho-Ti's chief eunuch T'sai Lun experimented with a wide variety of materials and refined the process of macerating the fibre of plants until each filament was completely separate. The individual fibres were mixed with water in a large vat. Next, a screen was submerged in the vat and lifted up through the water, catching the fibers on its surface. When dried, this thin layer of intertwined fiber became what today we call paper. T'sai Lun's thin, yet flexible and strong paper with its fine, smooth surface was known as T'sai Ko-Shi , meaning: "Distinguished T'sai's Paper" and he became revered as the patron saint of papermaking.

It wasn't until the 3rd century that the secret art of papermaking began to creep out of China, first to Vietnam and then Tibet. It was introduced in Korea in the 4th century and spread to Japan in 6th. There, during the 8th century, the Empress Shotuka undertook a massive project consisting of printing a million prayers - dharani - on individual sheets of paper, with each mounted in its own pagoda. With such a profound inception, it is not surprising that the fine art of papermaking has continued in Japan to this day, garnering deep appreciation and ever increasing sophistication.

Papermaking spread slowly throughout Asia to Nepal and later to India. It made its true push westward in 751AD when the Tang Dynasty was at war with the Islamic world. During a battle on the banks of the Tarus river, Islamic warriors captured a Chinese caravan which happened to include several papermakers. They spirited them away to

Samarkand, which soon became a great centre for paper production. Gradually papermakers made their way further west through the Muslim world - to Baghdad, Damascus and Cairo. Finally, when the Moors from North Africa invaded Spain and Portugal they brought the technology with them and so it was that papermaking entered Europe in the 12th century.

In Europe, the use of papyrus had dropped out in the 9th century. The preferred medium for the artists and literati of the time was the smooth and lustrous parchment. However, parchment - made from animal skin - was extremely expensive. In fact, it has been estimated that a single bible hand written on parchment required the skins of 300 sheep. The notion of paper being used as a practical everyday item did not occur until the 15th Century. When Johann Gutenberg perfected movable type and printed his famous bible in 1456, he not only spread the word of Christianity, but also sparked a revolution in mass communication. The birth of the modern paper and printing industry is commonly marked from this date.

Printing technology rapidly developed and created an ever increasing demand for paper. The early European papers were made from recycled cotton and linen - and a huge trade quickly developed around the trading of old rags. It is said that the black plague entered England from Europe on these old rags. Yet soon this source became insufficient and some curious attempts were made to source new materials - the most macabre of which was the recycling of Egyptian mummies to create wrapping paper! Others experimented with fibres such as straw, cabbage, wasp nests and finally wood, resulted in inexpensive - and replaceable - materials for paper making. Today, the long soft fibres of softwoods such as spruce have become the most suitable source of pulp for mass production.

The demand for paper also created the need for greater efficiency in production. In the late 18th century the labors of Nicholas Luis

#### Making\_Paper\_Challenge\_Project\_2004.txt

Robert resulted in the creation of a machine that could produce a seamless length of paper on a endless wire mesh with squeeze rollers at one end. Perfected and marketed by the Fourdrinier brothers, the new machine made papers soon replaced traditional single sheets made by hand. In Europe and America, the mass-production of paper became a thriving industry supplying huge volumes of paper for the production of newspapers, books, magazines, paper bags, toilet paper, money and a huge variety of other purposes - including clothing, chimney's and even coffins! Today, the increasing volume of paper consumption has become a complex environmental matter - and the need for new materials increasingly urgent. While recycling has done some good, much paper is still wasted.

In the west, as industrial paper production boomed the art of hand paper-making has been driven nearly to extinction - being practiced only by a few fine artists and crafts people. However, in small areas throughout Asia, the tradition has lived on. Incidentally, the traditional Asian paper which is often referred to as "rice paper" is not made from rice fibres at all. More commonly it is made from the versatile mulberry tree - varieties of which are also used for feeding silkworms and in medicine. In contrast to the cold precision and standardisation which industrial production demands, the soft, subtle textures and natural feeling of hand made paper is said to echo the warm heart of the papermaker who makes each sheet with devotion.

In Thailand there are records of paper making going back seven hundred years. Traditional uses of paper have been for Buddhist texts, temple writings and ritual purposes. It used to be that paper was made from the inner bark of the Khoi tree *Streblus Asper* (L.) Lour. Earlier in the 20th century paper production from Khoi began to die out because of a shortage of Khoi trees. It was not until the Japanese occupied the kingdom during the second world war that paper making again flourished in Thailand. For centuries the Japanese had

#### Making\_Paper\_Challenge\_Project\_2004.txt

been making paper called "Kozo" from the inner bark of the mulberry tree *Broussonetia Papyrifera* (L.) Vent. In Thailand the mulberry tree - known as "sa" - grew in abundance and the Japanese demand for maps, banknotes and other documents caused sa paper production to flourish. The mulberry tree is still abundant in Thailand - growing wild all over the Northern forest and lowland areas - and Thai artisans continue to produce handmade paper using the same technique that they have done for centuries. Yet, as international demand for these products is increasing, new speciality papers are being developed which incorporate colour dyes, flower petals and other materials into their design. HQ Group were among the first people in Thailand to produce sa papers incorporating petals and leaves nearly ten years ago and our original paper sheet designs using bougainvillea petals and tamarind leaves, for example, are still hugely popular internationally

#### Material List:

Paper scraps (see plan for details regarding paper selection)  
Warm water  
Cornstarch (sometimes called cornflour - but not cornmeal!)

#### You will need:

Large bucket or tub  
Rigid frame or tools/materials for making one - see below for details  
Standard knife or spoon  
Paper towels  
Window screen  
Metal snips or utility scissors for cutting screen.

To make paper, you will need a frame with an inside dimension slightly larger than the sheets you plan to make. You can use an old picture frame or even a standard window screen frame - anything that

will allow you to provide rigidity for the mesh. We found an old piece of polycarbonate plastic and cut a frame out of it as shown on the right. This works very well because it is easy to handle. To create the cutout, we simply drilled four holes in the corners and then cut the opening with a jigsaw. You can also assemble a frame using wood slats along with nails or screws. It doesn't have to be elaborate.

When your frame is finished, you are ready to make the pulp. The choice of paper is important and the best way to find what works best is to experiment with different papers and different combinations. The more fibrous the paper, the easier it will be to work with and the stronger it will be when you are finished. In general, paper that is hard to tear will be stronger than flimsier paper. You can have good success with old manila envelopes, newspaper and advertisements made out of colored cardstock. To achieve color sheets, simply use colored paper; you can use printed color sheets, but they do not provide nearly as much color as actual colored paper. Separate your selection into piles and tear the paper into small pieces as shown on the right. Soak the torn paper pieces for as long as possible to make it easier on your blender; an hour is fine but overnight is even better. You can potentially also use food colouring.

Next fill your blender about halfway with warm water and add a few pieces of your soggy paper until you have achieved the consistency of lumpy applesauce. If voids of air become created in the mixture, it's an indication that you need to add more water.

Now you have a sheet of paper but it is wet and on a frame. The easiest way to proceed is to set the frame in the sun to dry. After a couple of hours, you will be able to pull the paper easily from the mesh. The disadvantage is that your frame/mesh will not be available during that time. The alternative is to remove the wet

paper from the mesh so you can make more sheets without waiting. Cut out a piece of cardboard slightly larger than the size of the paper you are making. If you are using binder clips to hold the mesh to the frame, you can remove the clips and mesh from the frame; at this point you can set the mesh/paper out to dry or remove the paper from the mesh alone (its easier to remove the paper from the mesh without obstruction of the frame). If your mesh is permanently attached to the frame (like ours) flip the frame over onto the cardboard. Tap the mesh and wiggle the frame until the paper falls off the frame onto the cardboard. This can be tricky, but after a few tries, it becomes easy. Lay the sheet out to dry, preferably in the sun and when all the water has evaporated: you just made paper! If there are ridges, you can briefly iron the dry sheets with an ordinary household iron set on low heat.

The size of your paper will be determined by the size of your frame. A larger frame, of course, requires a larger tub and is slightly more difficult to work with. It is recommended starting with a standard size first before progressing to larger sheets.

The color of your paper is based on the color of your scraps. Printed color scraps do not provide too much dye for the paper sheets: you should rely on colored paper scraps to create colored paper. You can also mix colors to create blends. Another idea is to add the pulp to the basin with a temporary barrier right in the middle. Add different color pulps to the two sides and gently remove the barrier at the last moment before lifting the frame. With some practise you can create multi-colored paper!

You can also include additional items to your paper. Small visible pieces of paper add visual interest to the sheets. You can make some very interesting paper by adding some regular newspaper scraps to the blender and blending for just a few seconds until there were pieces as small as a typed letter or two; those letters show up in

the final product and are very unique. You can also add, small flower petals, flower or vegetable seeds, tiny leaves, dryer lint, or threads; simply toss them into your basin just before gathering the pulp with the frame

The other lower cost way: (geared for kids project)

Making recycled paper is messy. It is also a lot of fun. You will have to use a food processor and an electric iron. It is best to do this with some friends and family. That way you can spread the mess and the fun around.

WHAT YOU NEED:

2 full newspaper pages torn into 2-inch squares - food processor - 2 tablespoons white glue (Use Elmers which I believe is more non-tox) - 2 or 3 cups water - sink with 4 inches water - old panty hose - coat hangers - electric iron

OPTIONAL: insect screen - strainer - food coloring - dryer lint - (I bring home shredded paper from work ) - vegetable or flower seeds or petals

STEP #1

You're going to first make the frames that you'll use to make paper with. Undo the coat hanger and use the wire to make a flat square about 6 by 6 inches big. Stretch one leg of the panty hose over it. Take your time; it could snag. If you put tape on the ends of the wire, it will snag less. Make sure it is tight and flat. Tie knots in the hose. Use the other leg for another piece of paper. You will need one frame for every piece of paper you make. You might want to make more than one or two. Or for more permanent ones, use window screens you no longer have a use for.

STEP #2

Put a handful of the paper and some water into the food processor. Close the food processor and turn it on high. Keep adding paper and water until you have a big gray blob. You may have to add a little

Making\_Paper\_Challenge\_Project\_2004.txt

more water to keep things moving smoothly. Keep the food processor on until all the paper has disappeared. Then leave it on for 2 whole minutes.

Put the glue in the sink water and add all of the paper pulp you just made. Mix it really well. Use your hands. (I recommend using a BIG dishtub or rubbermaid type tub so you dont accidently clog your drain!!!!)

Mix up the sink water (Rubbermaid tub) again and then scoop the frame to the bottom of the sink. Lift it real slow. Count to 20 slowly while you are lifting. Let the water drain out for about a minute. Mix up the sink (tub) every time you make a new piece.

STEP #3

Try other things like the screen or a strainer. Try adding lots of food coloring, or lint, or leaves, to the food processor.

Now you have to hang the frames on a clothesline or put them out in the sun. Wait until they are completely dry with no dampness at all. You Can then gently peel off the paper.

Now use the iron - set on the hottest setting - to steam out your paper. You Can keep making paper until the pulp is all strained out of the sink.

See how strong your paper is. Trim it with scissors. Write on it. It is strong. Make Christmas cards or other cards or writing paper Don't be fooled. When a bag or a box says that it is 100% recyclable that means that you can recycle it. It does not mean that it is made out of recycled paper.

I am not sold on the sink method as it will probably clog your sink.. use a dishpan or rubbermaid tub

tenzicut - who brought shredded paper from work home for this