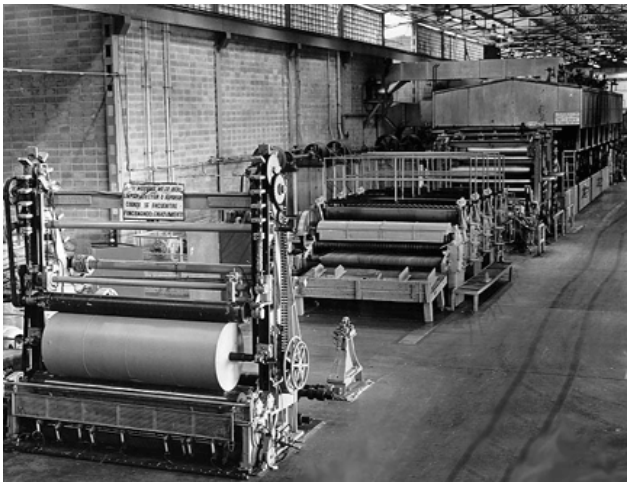
The History of Paper

LaCuKnoS Language Booster

We use paper for many things, including books, copiers and printers, tissues and toilet paper, bags, filters, food packaging, gift wrap, wallpaper, disposable plates and cups, lampshades, art, and many more. But do you ever think about where paper comes from and how it is made? Do you think about paper as a technology? As something that needed to be invented? As an invention that changed the world?

Before paper was invented, people wrote on other materials such as pottery, animal hides, wood, silk, papyrus and stone. But none of these materials was cheap and fast to produce or lightweight and easy to transport. The process for making paper was invented in China. The first paper was made from hemp around 200 B.C.E. More standardized processes were designed around 100 C.E. using soaked and pressed plant fibres that were dried in sheets on wooden frames or screens. Bamboo fiber became the most common paper making material for many centuries in China and elsewhere because bamboo grows quickly and easily. Paper is essentially a mat of plant fibers that is held together by the roughness of the fibers. Thus, paper can be made from almost any fibrous material, including cotton, hemp, flax, **wood pulp**, or **recycled** paper.



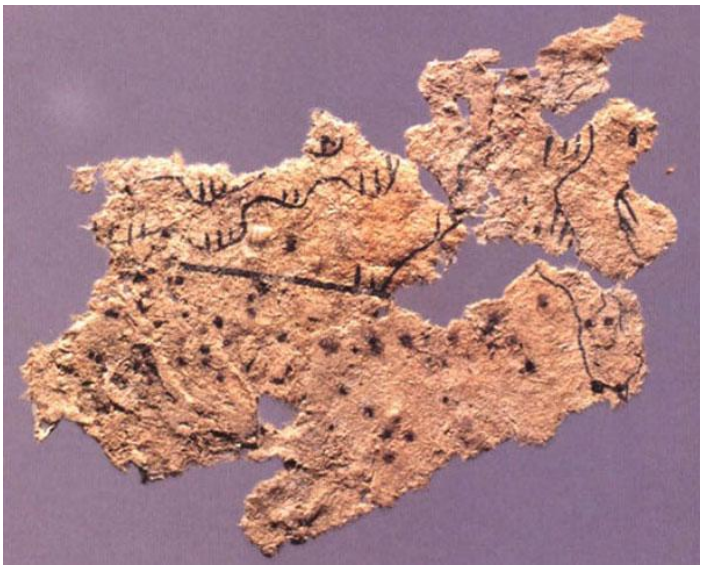
Today, paper is made mostly from wood scraps. Some paper is made from new wood and other paper is made from recycled wood products. Making new paper by recycling used paper, newspaper, and boxes, helps to **reduce** the amount of trash that ends up in **landfills**. Paper can also be **reused** instead of being thrown away after one use. Whether new or recycled, the material that becomes paper goes through a process of cleaning, bleaching and blending with water to create a slush. The slush is poured onto screens where it dries to become paper.

From its invention in China more than 2,000 years ago, until the 1800s, all paper was made one sheet at a time. During the Industrial Revolution, machines were invented to speed up the papermaking process by making paper in rolls rather than in individual sheets. Some modern machines can make a roll of paper 40 miles long in just one hour! While the technology for making paper has changed dramatically over the centuries, the basic steps are still the same, and you can try them yourself to make your own paper.

Discuss these questions with your partner, then write your answers.

1. Imagine that you were the first person to invent paper in 200 B.C.E. How would you convince other people to start using your new invention?

2. Do you think that digital technology will ever completely replace paper for reading and writing? Why or why not?



Making Paper

LaCuKnoS Science Investigation

As the human population continues to grow, so does the amount of resources we use and the amount of waste we produce. As our landfills for trash get larger and larger, we know that reusing, reducing and recycling are all becoming more necessary and cost effective. Almost half of all the trash produced by humans today is paper products, so recycling paper is an important part of overall recycling efforts. Reusing and recycling paper is one small step we can all take to protect our environment for our lifetimes as well as for future generations. We can also use **design thinking** to imagine, design and test new and sustainable ways to create products we need while reducing waste. Sustainable alternatives to tree-based paper include using bamboo, sugar cane pulp, and kenaf (a plant grown in South America).

In the following investigation you will make new sheets of paper from used paper products.

Materials: (per lab group)

- plastic tub
- paper frame
- recycled paper (cut in strips & pieces)
- cotton linter (shredded cotton)
- blotter paper
- water
- newspaper
- confetti
- hand lens

Procedure:

1. Fill the plastic tub 1/2 full with warm water.
2. Tear the recycled paper into small pieces. Groups can decide to use just the paper, or add paper towels.
3. Place the paper scraps into the water and add the cotton linter. Let soak for 5 minutes.
4. Use the stick blender to mix until the paper is broken down into fibers.

5. Look at the mixture with the hand lens and draw or describe what you see.

6. Dip the paper frame into the plastic tub.
7. Lift the frame straight up through the water so it is covered in fibers as the water drains away.
8. After the water has stopped dripping, place the frame on top of the newspaper.
9. Add confetti or other decoration to the paper.
10. Use the blotter paper to dry the paper on the screen.
11. Transfer the paper onto a window to finish drying (the damp paper will stick to the window).
12. Reuse the paper frame to make new sheets of paper.
13. While the paper is drying, look at it with the hand lens. Draw a picture and write a description of what you see.

With your group, discuss and answer the following questions:

How did the type of paper scrap used (notebook paper, copier paper, etc.) affect the paper you made?

What ideas do you have for how you could make colored paper?

Making Paper

LaCuKnoS Investigation Summary

Applying Design Thinking

Understanding what users want	Prototyping a new design	Testing and iterating that design
What do you like about the paper you made and what do you wish was different about it?	Describe something you could change about the process that would make paper better.	Describe how you would test your new version of paper to see if it does what you want it to.

Use language a 2nd grader would understand to describe why a piece of paper stays together when it dries.

Use language your science teacher might use to describe why a piece of paper stays together when it dries.

Paper Making
LaCuKnoS Concept Cards

Recycle/Reciclar

To put used things through a process that allows them to be used again and not go to the trash or to waste.

Hacer que las cosas usadas pasen por un proceso que les permita volver a usarse y que no vayan a la basura.

The city recycles old tires for use in making new roads.

Concept Card

Reduce/Reducir

To make or use less in amount or size.

Hacer o usar menos en cantidad o tamaño.

When I bring my cloth bags to the store I reduce the plastic that I use.

Concept Card

Reuse/ Reutilizar

To use again or use more than once.

Usar de nuevo o usar más de una vez.

She will not reuse her glass until it has been washed.

Concept Card

Wood Pulp/Pulpa de Madera

Wood that has been reduced to fibers through a mechanical or chemical process.

Madera que se ha reducido a fibras por un proceso mecánico o químico.

Wood pulp is the main ingredient for making paper.

Concept Card

Landfill/ Relleno Sanitario

A place for disposing of solid waste by burying the waste in the ground.

Un lugar para eliminar desechos sólidos enterrando los desechos en el suelo.

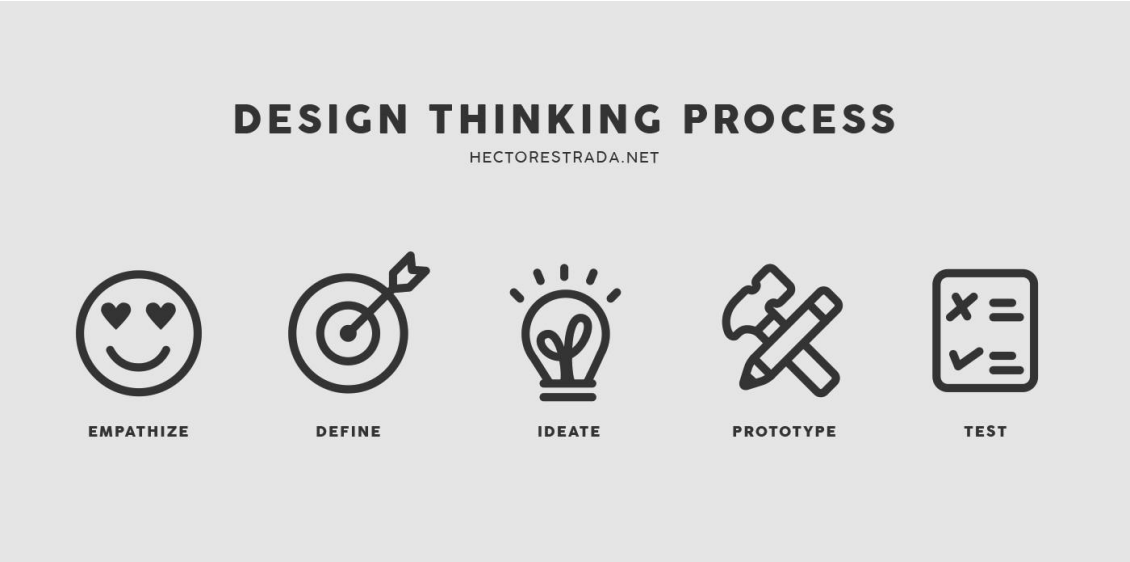
The city tried to reduce the waste buried in landfills by increasing its recycling program.

Concept Card

Design Thinking/El pensamiento de diseño

Design thinking is a human-centered, repeating process that designers use to solve problems.

El pensamiento de diseño es un proceso repetitivo centrado en el ser humano que los diseñadores utilizan para resolver problemas.



The team used design thinking strategies to understand how people wanted to use their product.
Concept Card