

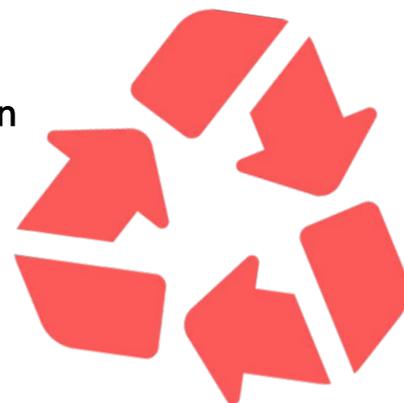


RECYCLING PAPER CHALLENGE & WOMEN'S HISTORY MONTH!

Challenge Goal: To make recycled paper out of paper scraps and newspaper, and celebrate women in history who are innovators in chemistry, engineering and the environment.

Materials:

- scrap paper and newspaper
- large bowl
- hot water
- cornstarch
- measuring spoon
- aluminum foil
- wooden spoon
- scissors



Instructions:

1. Cut up your paper or newspaper into small pieces and put them in a bowl.
2. Pour in enough hot water to cover the paper and stir until all the paper is wet.
3. Let sit for a few hours. Once the paper is soaked and mushy, it is ready!
4. Add a few tablespoons of cornstarch and mix well. This is the pulp.
5. Make a strainer by poking small holes into a sheet of aluminum foil.
6. Place the aluminum foil strainer onto newspapers or a towel.
7. Cover the foil with your paper pulp and spread thin. Make sure there are no holes!
8. Place another sheet of foil on top and stack heavy books to squeeze out extra liquid and press your paper flat.
9. Leave the pulp to dry for 48 hours (or longer!)
10. Once the pulp is fully dry, carefully peel away from foil. You just turned old paper into new recycled paper!

SCIENCE OF CELLULOSE



What is paper made of?

In the past, paper has been made from a variety of plants such as papyrus, sugar cane, bamboo, wood, and more! Today, paper is mainly made from wood and recycled paper products. Specifically, paper is made of **cellulose** fibers, which come from plants like trees. Millions of these fibers are tangled together in a thin layer. Cellulose fibers naturally bond to one another and water breaks down this bond.



How did we recycle paper?

When we covered our paper scraps with water, the fibers in the paper loosened their hold on each other. Now we're able to rearrange these fibers into new paper. When we added cornstarch, it helped bind the cellulose fibers together again.

When we left the recycled paper out to dry, the water evaporated from the pulp and the fibers stuck together again to form a piece of recycled paper!



Why is it important to recycle paper?

Recycling paper conserves natural resources, saves energy, reduces greenhouse gas emissions, and keeps landfill space free for trash that can't be recycled.

Recycling one ton of paper can save 17 trees, 7,000 gallons of water, 380 gallons of oil, and enough energy to power a house in the U.S. for six months!



WOMEN IN SCIENCE

Understanding how to maintain our natural resources has been shaped by many innovators through history. We're celebrating Women's History Month! Explore some of the women who greatly contributed to environmental science.



Source: linkengineering.org

Ellen Swallow Richards received her bachelor's degree in Chemistry from the Massachusetts Institute of Technology in 1873 and continued at MIT to run laboratories and teach chemistry. In 1887, she and her assistants conducted what was, at the time, the most comprehensive water-quality study ever attempted in the country. She created a map that could identify and predict areas of pollution. The end result was the country's first water-quality standards and wastewater treatment facility.

Flora Spiegelberg was the leading force behind the creation of a modern system of garbage collection in New York City in the late 1800s. Flora stressed the importance of the health of the population and the cleanliness of the streets. She served on a number of committees like the New York City Health Commission, the Street Cleaning Department, the Bill Board, the Public Water Commission, the Daylight Saving Commission, and the Jewish Working Girls Club.



Source: The University of Arizona



Source: The Green Prophet

At 16 years old, **Azza Abdel Hamid Faiad** developed an economically feasible method for generating biofuel by breaking down plastics. Her catalyst, called aluminosilicate, could inexpensively break down plastic waste while producing gaseous products like methane, propane and ethane, which can then be converted into ethanol. She won an award for her findings at the 23rd European Union Contest for Young Scientists in 2011.

