



PAPER SOUP

I. Objectives

- a. Students will learn about the creation paper.
- b. Students will learn the process of paper recycling.
- c. Students will demonstrate the paper recycling process by creating their own recycled paper.

II. Materials

- a. 1 paper kit per group of students (no more than 6 groups)
 - Jug, wire mesh, oval thin mesh, square thin mesh, jug top
 - 12 paper cups marked at 1-cup capacity
 - 12 dishtowels & 6 sponges
 - 6 blocks, 6"x 6"
- b. 1 box paper towels
- c. Shredded paper
- d. Blender
- e. Water
- f. Pictures needed for presentation

III. Introduction

- a. We're going to be talking about recycling today, but there's a little bit you need to know before we talk about it...
 - What is recycling? (Allow students to answer)
- b. We're going to be talking about one of the many things we can recycle specifically.
- c. I've noticed that many classrooms in many schools have recycling bins!
 - What are some of the things they are recycling? (Cans, paper, etc.)
- d. Today we're going to be talking about PAPER! There's a lot of things about paper that we don't even notice because we use it so much!
 - What DO you know about paper? (If blackboard is available, write down student answers, whether true or not. Refer to this list throughout the presentation)

IV. Paper History

- a. Paper has been around for a long, long time!
 - How long do you think people have been making paper? (Since 3000 BC – 5000 years... that we know of!)
- b. People who actually created the paper were called "papermakers!"
 - Was papermaking a hobby or a job? (Job! People needed paper, and it was their job to make it! Some people create paper the "old-fashioned" way today as a hobby, though.)
- c. The first paper was called "papyrus," and was used extensively by the Egyptians, Greeks, and Romans.
 - It was made from the inner bark of mulberry & fig trees.
- d. The Chinese were the first to create paper from rags! (105 AD – 2000 years ago!)
 - What they learned passed from country to country until, by 1300, all of Europe knew how to create paper using rags!
- e. This also led to the development of a paper mill, which was a building built on a river that would use the flow of the river to turn the machinery needed to make the paper.

- Pass around picture #1.

CONTINUED

- a. It wasn't until 1843 (just a little over 150 years ago) that people discovered they could make paper using ground-up wood!
- b. The papermakers were in for bad news in 1798!
 - First papermaking machine was built.
 - From that point on, bigger and better machines were built.

II. Production of Paper

- a. We already mentioned that paper was made from wood, but there's a long process that has to happen to turn that paper into wood.
 - If paper is made from wood, where does our journey into the creation of paper start? (The forest!)
- b. The problem with trees in the forest is that there is something all around that tree that can't be used in creating paper- bark!
 - Bark is removed in a "barkdrum," a machine that tumbles the trees, scraping bark off as they tumble.
 - Pass around picture #2.
- c. After all the bark is removed, the tree is ground up into small chips that look like this:
 - Pass around picture #3.
 - Now, don't misunderstand. They don't grind up just a few trees... think of how much paper you use here at school!
 - They grind up a LOT of trees! Pass around picture #4.
- d. After the wood has been chipped, it is soaked in water, chemicals, and bleach until it breaks apart into small wood fibers, called pulp.
 - Pass around picture #5.
 - And here's a picture of those fibers REAL close up: Pass around picture #6.
 - The chemicals take out any ink that's still on the paper. This is called "de-inking."
- e. After the pulp is created, it's bleached again, washed, and dried in a set of machines that press the pulp flat through this whole process.
 - The machines that do this are NOT small! Pass around picture #7.
 - As the pulp is rolled, it gets thinner and thinner, and all of those wood fibers lock in tightly, until you have... Pass around picture #8.
 - The paper is finally rolled into one large roll. Pass around picture #9.
 - As you can tell, those are large rolls of paper!
- f. From there, the paper is cut into whatever shapes are needed and sold!

V. Recycling Paper

- a. The paper recycling process is not that much different from the production of paper.
 - The journey for creating paper began in the forest, but where does the journey for recycling paper begin? (Here in the classroom, or wherever else paper is collected to be recycled!)
- b. Instead of showing pictures for what happens during the recycling process... we're going to do it!
- c. The first thing that happens is the waste paper is collected and taken to the paper plant, where it is shredded.
- d. After it has been shredded, it is thrown in the same container with the shredded wood, with water, chemicals, and bleach. It breaks down with the wood!
- e. When it breaks down completely, you have pulp!
- f. Pass out one papermaking kit to each group of students, along with 2 cups, 2 dishtowels and paper towels.
- g. Show groups how to assemble their papermaking kit. Ensure that each group's kit is assembled properly.

h. After the pulp is ready (as yours is), it is sprayed onto a wire screen for the washing and drying process.

- Have groups dump both glasses quickly at the same time into the top of the kit.
 - Wait until all the water has drained out, and then have groups take the top off the kit.
 - Have groups lift thin screen (with pulp) off wire and place on flat dishtowel.
 - Put second thin screen on top of pulp.
 - GENTLY press sponge (don't press hard!) on top of screen to absorb water. Squeeze sponge out into glass. Do this until all pulp has been sponged and there is very little water left.
 - Peel off top thin screen.
 - Lay paper towels on second dishtowel.
 - Turn screen with sheet of pulp over onto the towels.
 - Use sponge again, but press as hard as possible this time and squeeze sponge out into glass.
 - Peel second screen off, leaving the sheet of paper on the paper towels.
 - Place paper towels on top of new sheet of paper (so it is sandwiched between paper towels) and press using block.
1. Do this twice, with new paper towels each time.
- Have students place new sheet of paper between towels under a weight (book, etc.) until the next day. Their paper will be dry and ready!
 - Essentially, you've just created paper the "old-fashioned" way (since we didn't have the machinery to do the job).
 - Paper can be recycled up to six times! After that, the fibers become too worn to effectively recycle!

VI. Conclusion

- a. You've known for a long time that we can recycle paper... now you know how we do it! AND how paper is created in the first place!
 - Make sure and tell everybody at home your newfound knowledge!
- b. Questions?





Buckland Mill - 1770
Original Painting by T. Forest



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