

## Brief Description

Learn the process of creating and recycling paper.

## Objectives:

The student will be able to:

- Describe the process of making and recycling paper

## Materials Needed:

- 2 aluminum pie pans or rectangular roll pans
- 12"x 12" piece of fine-mesh screen (Fiberglass is best but wire screen will work)
- Large container that can hold at least 2 gallons
- Scraps of old paper such as notebook paper, junk mail, magazines or newspapers (The total amount of paper you need is equal to 6 sheets of newspaper.)
- 2 tablespoons of liquid laundry starch
- Paper clips
- Rolling pin
- Blender that holds at least one quart
- Large pile of newspaper
- Several sponges
- Crayon
- Scissors

## Preparation:

- Prepare an area to perform the activity to reduce the mess.

# Paper Pieces

## Background:

Paper is made from a mixture of 1% wood fiber and 99% water. Nearly all of this fiber comes from trees, but it can also come from cotton, banana leaves, hemp, kenaf and other plants. The trees are cut down and shipped to a mill. After the bark is removed, the logs are cut into millions of woodchips. These chips are the size of breakfast cereal flakes. They may be physically mashed or chemically treated to separate the wood fibers in to a soup-like mix called pulp. Some pulp mills don't even make paper, they use the cellulose for other products. If recycled paper is used in the mill, it would be mashed into the pulp too. The pulp is mixed with water and special machines spread the mixture onto a flat screen, roll it between presses and dry it. You can create a similar process with used paper and a few simple materials.

Florida Fact: In 2005 Florida had nearly 5 million acres of timberland for the production of paper products.

## Activity:

### Make a Deckle

1. First you need to make a deckle, a tool used to make paper. Cut a piece of screen that is the same size as the bottom of the aluminum pans and has four tabs on it. To do this, set the pan on the screen and use a crayon to draw a line around the bottom edge. Remove the pan and draw four tabs on the outline. Cut out the shape you have drawn on the screen. See Figure 1 on page 35 before you begin.
2. Cut a rectangular hole in the bottom of both rectangular pans or a round hole if you are using pie pans. Leave a one-inch wide "shelf" around each hole. The shelf will keep the screen from falling through the hole. (Figure 2)
3. Place the screen that you cut into one of the pans. Fold the screen tabs over the outside edge of this pan. Set the other pan on top of the screen. Clip the pans together at the tabs, using a paper clip at each place. Pull the screen edges out from the pans so that the screen is tight and not loose. Now you have a deckle. (Figure 3)

### Make the Pulp

1. Tear your paper into pieces about the size of a dime. Divide the torn pieces into six piles. This step can take some time so be sure to get some help.
2. Fill the blender with water to one inch below the one quart (32oz.) line. Add one pile of the torn pieces of paper. Blend at the highest speed until the newspaper pieces have broken down into fibers (about one minute). This mixture is your pulp and will look like cloudy water. Pour the pulp into your large container.
3. Repeat Step #2 with the other piles of paper that you have. Add two quarts of water to the pulp mixture in your container to make two gallons.

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# Paper Pieces continued

## Make the Paper

1. Add 2 tablespoons of liquid laundry starch to your pulp mixture and stir with your hands. The starch acts as a binder between the wood fibers in the mixture.
2. Hold the deckle with both hands and slide it gently into the pulp mixture at a slight angle.
3. Hold the deckle as level as you can, near the bottom of the container. When you have a uniform “cloud” of fibers floating over the screen, lift the deckle very slowly and evenly out of the container.
4. Place the deckle on a couple of sheets of newspaper and let it drain. When the newspaper is soaked, place the deckle on fresh newspaper. As it drains, carefully disassemble the deckle by removing the paper clips. Carefully remove the pulp sheet along with the screen or pan and place it on a fresh stack of newspapers.
5. Gently pat the pulp sheet with the sponges to press out any extra water. Do this many times and keep wringing out the sponges. When the pulp sheet is reasonably dry, peel it off the screen or the pan and place it between two sheets of newspaper.
6. Roll a rolling pin over the newspaper sheets containing the pulp sheet. This will remove any remaining water and pack the fibers together. Do this several times with fresh newspaper. Dry and save the newspaper, it can be used again.
7. Finally, place the pulp sheet on a fresh sheet of newspaper and allow it to dry overnight.

Don't forget to clean up. Do not pour the pulp mixture into a sink; it will clog the sink. Filter unused pulp mixture through the deckle. Remove the collected fibers from the screen and dispose of them in the trash.

## Extensions:

Recycled Paper Pots

Show Your Work

## Evaluation:

Have students make an organizational chart of the process of making paper.

# Paper Pieces

Figure 1

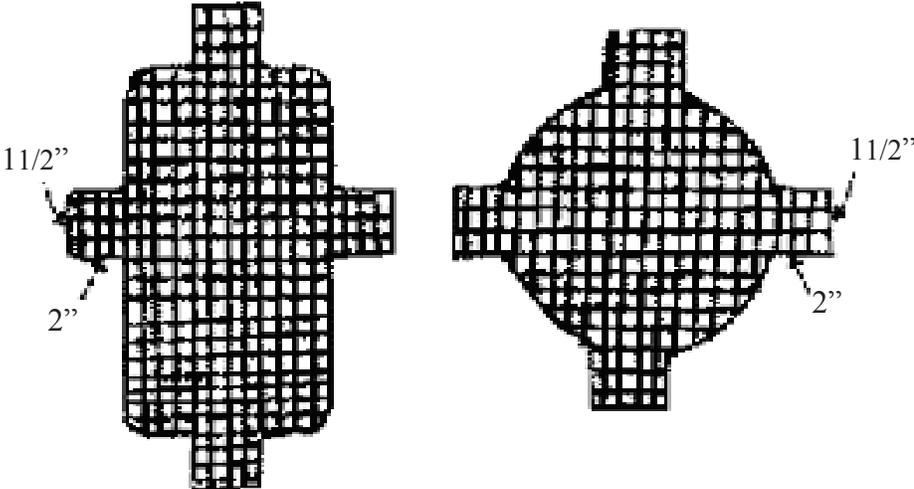


Figure 2

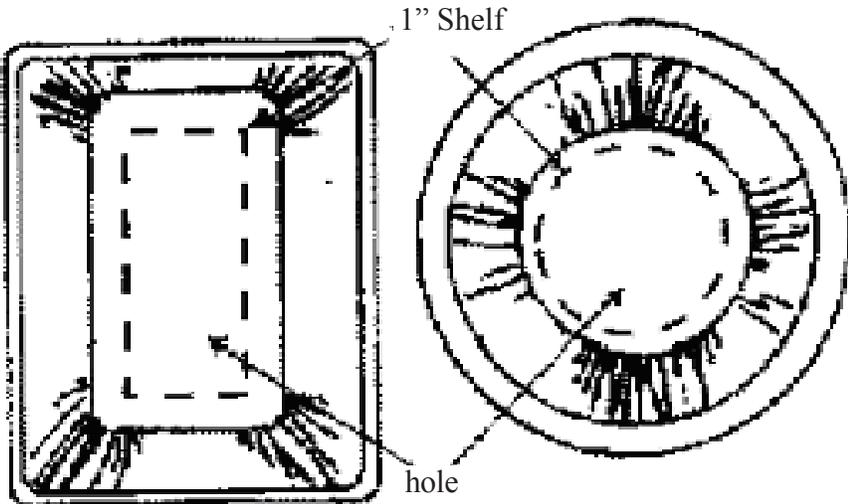


Figure 3

