

## **Makin' Paper**

*A Wood Magic Forest Fair* Activity for 4<sup>th</sup> Graders

### **Objective**

Students will be able to explain why recycling is important and will be able to describe the basic steps in the papermaking process.

### **Overview**

Students will discuss the need for recycling, including the components of municipal solid waste. They will learn how paper is made; both from virgin fiber and from recycled paper and will recycle tissue paper into new paper.

### **Materials List**

"How Paper is Made" poster (approx. 18" x 24") – enlarged from Bowater coloring book

Paper Recycling poster (approx. 18" x 24")

Student Papermaking Kit (1 per student plus one for instructor – need 31)

Baby food jar – two-thirds full of water

3 squares of toilet tissue

8" x 4" piece of hardware cloth screening

yogurt container

4 oz. metal can with both ends removed

1 full sheet of newspaper folded in half 3 times

1 pencil

1 woodchip

1 student cover sheet - "Making Paper from Paper" (see end of lesson plan)

Small pile of wood chips

4 staplers

Recycling bin with samples of recyclable items – al. can, steel can, plastic bottle, glass bottle, newspaper, magazine)

Globe

Cardboard egg carton, cereal box, newspaper, tissue

Corrugated paper, computer paper

### **Preparation**

Set up student papermaking kit at each child's seat. Organize teaching materials at front of room for easy access for instructor(s).

### Step-by-Step Instructions

1. Ask, "Who can tell me one thing they have learned today?"
2. "Raise your hand if you can tell me the name of the planet we live on." [*show globe*]
3. "Raise your hand if you can tell me the name of the country in which we live." [*point to US on globe*]
4. "Did you know that every person in the US uses almost 750 pounds of paper each year?"
5. "Raise your hand if you weigh about 50 pounds. It would take 15 of you to weigh as much as the stack of paper that you use every year!" [*Count off 15 kids and have them stand up.*]
6. "Who can tell me what paper made from?" [*trees*]
7. "Paper comes from trees in 3 main ways. Have you been to the sawmill yet? What do they do with the wood chips and scraps left over when a board is cut?" [*send the chips to the paper mill*] "About one-third of all paper is made from wood scraps."
8. "How about the trees that are thinned out to give the trees more room to grow? Trees that are too small or twisty to make into nice, straight boards are chipped up and made into paper. So, another third of paper is made from small trees."
9. "The final third of all of the paper that is used is made by grinding up paper that people recycle. Each year we try to use even more recycled paper in the new paper products that we make. Why? Because recycling helps us keep the planet cleaner and helps to make the most of our natural resources."
10. "Who can tell me what a 'natural resource' is?" [*a gift from nature*]  
"We call this the Wood Magic Forest Fair because trees are kind of a magical natural resource. We can cut them, use them, plant them, and grow them again."
11. "Does anyone know what we call natural resources that can be grown again and again?" [*renewable*] "Of course, we still want to use them wisely. Let's take paper, for example. Maybe you need to write yourself a note to remember to bring your homework to school tomorrow. Do you ever write yourself a little reminder note like that? Well, you could get a whole sheet of notebook paper and write something like, 'Bring homework tomorrow,' but that's only 3 words and it would be kind of wasteful to use a whole sheet of paper for just 3 words! So, you could use a small sheet of paper or tear off a piece of notebook paper. That way, you are *reducing* the amount of paper you are using.

"Another way you can use paper wisely is to *re-use* it. Instead of just throwing that note to yourself away tomorrow after you look at it and remember to bring your home-work with you, maybe you could stick it inside your notebook and use the back side of it for another note some other day. That would be *re-using* the same piece of paper.

“A third way to use paper wisely is to recycle it. Some schools and businesses have special recycling bins where you throw away used notebook paper. Instead of being taken to the landfill, this paper is *recycled*. So, three ways to use paper wisely are: *reduce, re-use, recycle*. Can you say that with me,”REDUCE, RE-USE, RECYCLE; REDUCE, RE-USE, RECYCLE; REDUCE, RE-USE, RECYCLE. Good!”

12. “Now, let’s look at how paper is made. [show *Bowater drawing “How Paper is Made.”* Go through the steps of the papermaking process. Point out where in the process recycled paper would be added.] Some paper is made completely from wood chips that are small trees that have been ground up or were scraps of wood from sawmills. Other paper is made from a combination of wood and recycled paper. [show *corrugated, computer paper*] And some paper can be made entirely from recycled paper. “ [show *egg carton, cereal box, tissue paper, newspaper*]

13. “Where does our paper go when we are finished with it? Well, if we put it in the recycling bin it goes to a recycling facility and then to a paper mill where it becomes new paper. If we put it in the trash can it goes to a *landfill*. Raise your hand if you have ever seen a landfill. A landfill is basically a big hole in the ground that we fill up with garbage. Modern landfills are huge – bigger than 40 football fields put together and twice as tall as most trees! They are mountains of garbage! Because we throw away many poisonous materials like batteries and chemicals, special liners and water filtering systems have to be put in the bottom of landfills to protect our groundwater. This makes building landfills very expensive. The average cost of building a landfill in SC is \$1 million per acre. How many of you would like to live next to a smelly landfill? Nobody wants to live near one. There’s a funny-sounding abbreviation for this: *NIMBY – Not In My Backyard*. No one wants a new landfill to be built near where they live – certainly not in their backyard! Since people are moving out into the country a lot these days, it’s getting harder and harder to find a place for a new landfill that’s not in someone’s backyard. “ [Landfill space is *nonrenewable natural resource*.]

14. “One more thing about this landfill problem. Did you know that ½ of what gets thrown away and ends up in a landfill is paper?! By recycling paper we can cut our garbage problem in half!”

15. "Today, we're going to make recycled paper. In front of you is a paper making kit. When factories recycle paper, they shred the used paper and mix it with lots of water to turn it into pulp. The pulp is poured onto screens, and machines press the water back out. The paper is then dried on rollers. We will follow the same steps:
- Put water in your baby food jar.
  - Tear three squares of tissues into shreds.
  - Stir the pulp with your finger
  - Put one end of your screen on top of your yogurt container.
  - Place the steel can on top of the screen.
  - "DUMP" the pulp into the can all at once to keep the paper and water from separating.
  - Remove the can. (If you don't like the way the paper looks, start again.)
  - Fold the other end of the screen over your new paper circle.
  - Place the "screen sandwich" inside a folded newspaper.
  - Roll with the bottle roller.
  - Staple a cover paper over your damp recycled paper to carry it home.
  - Write your name on the cover.
  - Open the cover paper at home and let your recycled paper dry overnight.
  - Use your paper the next day (to write, color, cut, paint, etc.)."

16. Sing the "Use it Twice" song:

"Paper here and paper there,  
Stacks of paper everywhere.  
Put it in the recycling bin.  
Use that paper over again.  
Advice! Be nice! Use it twice!"

"You did a great job! Would you like to sing it again? OK, here we go!" [sing the Use It Twice Song again]

17. If you have time, review what you've covered today. Say, "Raise your hand if you can tell me:
- How much garbage does each person generate each year? *[750 pounds]*
  - What is an example of a non-renewable resource? *[landfill space, oil, gas, coal, aluminum]*
  - What are some examples of things that can be recycled? *[aluminum cans, newspapers, office paper, glass, plastic bottles, cardboard]*
  - How does recycling paper help the environment? *[conserves landfill space, makes good use of our natural resources]*
  - Why don't paper companies use only recycled paper to make new paper?" *[the fibers in recycled paper aren't strong enough for all kinds of paper; many types of paper must be made from wood chips so they will be strong]*
- \*\*SEE NEXT PAGE FOR HANDOUT "MAKING PAPER FROM PAPER"

## **MAKING PAPER FROM PAPER**

Name \_\_\_\_\_

### **WHAT FACTORIES DO:**

- use lots of water (95% water / 5% paper)
- shred paper
- mix water and paper to form pulp
- pour pulp onto screens
  
- use presses to remove water
- dry paper on large rollers

### **WHAT YOU CAN DO:**

- fill baby food jar  $\frac{3}{4}$  full of water
- tear 3 squares of tissue into shreds
- stir paper into water with your finger
- put screen and can on yogurt cup; dump pulp into can
  
- fold screen over paper circle
- place inside folded newspaper;
- roll with medicine bottle roller
- place damp paper inside this cover
- dry overnight
- use your paper the next day!

## **FACTS**

- Paper made from paper is better for the environment than paper made from trees. (74% less air pollution, 35% less water pollution, 65% less energy, 40-50% less landfill space)
- Each time paper is recycled, the wood fibers are shortened. Therefore, tree pulp is often added to the recycled pulp to make it stronger.

## **SUGGESTIONS**

- Recycle newspapers, magazines, and brown cardboard in your county recycling program (check rules for curbside and drop-off programs in your community). Recycle office paper at your school (call 803-779-0608 with questions). Buy recycled products whenever you can.

***\*\*NOTE: To make student handouts from the page above, reduce to 85% of original size and run 2 handouts per 8 1/2 X 11" sheet of paper (portrait format).***