



## July 2009 – Reuse it or Recycle it!

Have you ever wondered how paper is made? What does recycling mean? In this issue, you will learn how to make your own paper and learn how lots of things can be recycled.

### Science Project

#### Make Your Own Paper

Did you know you can reuse used paper by turning it into new paper? This three-part project will show you how.

##### *Part 1: Collect Paper Scraps*



For this project, you will need lots of scraps of. Ask your family to start saving pieces of paper that they would normally throw away, like junk mail, newspaper, old notes, scraps from art projects, wrapping paper, tissue paper, or thin cardboard. Paper scraps that don't have much writing on them make the nicest paper, but you can reuse whatever you have. If you want your paper to be a certain color, collect scraps that are mostly that color.

##### What To Do:

1. Look at each of the different types of paper you've collected with a [magnifying glass](#). Do you see the little hairy-looking pieces on the surface of the paper? Those are called fibers. Do they all look the same? Are some longer or fatter than others?
2. Tear up the scraps of paper into small pieces. They should be about 1" squares.
3. As you tear them, look at the torn edges of each type of paper with the magnifier. What do you notice about the fibers of thick paper compared to the fibers of regular paper or tissue paper?

##### What's Happening?

Fibers are the hairy-looking things you see on the edges of paper when you tear it. Most paper is made from wood, which contains fibers called *cellulose*. All green plants (that includes trees) have cellulose inside their stems. What else is made from fibers? Take a look at your clothes - see the little fuzzy and stringy looking pieces on your shirt or pants? Those are fibers, too! Thin, smooth paper has small, narrow fibers and thicker paper with a rougher texture has much bigger fibers. That's why you can see the bigger fibers on the surface of some types of paper, like construction paper and cardboard. When you looked at the fibers of your torn paper

scraps up close with a magnifying glass, what did you notice? Can you tell what's holding the fibers together? You'll find out when you make your own paper in Part 3!

### *Part 2: Make a Drying Frame*

You will need an 8"x10" wooden picture frame (make sure it's one that no one needs anymore since it won't be useable as a picture frame when you're done) and a piece of screen or some sturdy netting with very small holes. The piece of screen should be a little bigger than the picture frame. You will also need a stapler and staples or else some [thumbtacks](#) with flat tops, scissors, and an adult to help you.

(A note to parents about supplies: \$1 stores are a great place to buy inexpensive wooden picture frames. A small piece of screen can be bought from a hardware store, or ask if they have any scrap pieces they will give you. If you don't want to purchase these items to make your own drying frame, you can buy a [papermaking kit](#) instead.)

What To Do:

1. Lay the screen flat on the table.
2. Remove the back and the glass from the picture frame and set them aside. You will not need them. Set the frame on top of the screen so that the back of the frame is touching it.
3. Have an adult help you staple or tack the edges of the screen onto the picture frame. Make sure you stretch the screen tightly as you go, or you will have a very hard time making a smooth sheet of paper.
4. Use scissors to trim any extra parts of the screen off.

You will use this frame as a mold to make sheets of paper in the next part of the project.

### *Part 3: Make It Into Paper!*

What You Will Need:

- Scraps of paper from Part 1
- Drying frame from Part 2
- Water
- Blender
- Plastic tub (large enough for the frame to fit in)
- Sponge
- Two smooth rags
- Stack of newspapers or a folded towel
- An adult to help

What To Do:

1. Lay a stack of newspapers on the table and cover them with a rag.
2. Fill the blender jar half full with torn paper pieces.

3. Fill the rest of the blender jar with water and put the lid on. Have an adult turn the blender on for a minute or two until all of the paper pieces are shredded and chopped up into a pulp.
4. Pour the paper pulp into the plastic tub then refill the blender jar with warm water and pour it in the tub, too. Use your hands to mix it all together.
5. Dip your frame into the tub. The screen side should be resting on the bottom of the tub. Use your hands to cover it with the pulp and spread it out evenly over the screen.
6. Hold on to the frame with both hands and pull it straight up out of the tub. Shake it very gently so the extra water drips back into the tub.
7. Ask someone to use a sponge to soak up even more water from under the screen while you keep holding the frame flat.
8. Set the frame on the stack of newspapers and rag, then press another rag over the top of your sheet of paper and carefully peel the paper off. Don't worry if some of the edges of the paper stick to the frame. Your paper probably won't be a perfect rectangle, but it will be a piece of artwork.
9. Lay the rag with the sheet of paper on it flat on the counter to dry. When it is completely dry, you can easily peel it off of the rag.
10. If you have some paper pulp left in the tub, you can follow steps 5-10 using dry rags to make another sheet of paper!

*Note: If your new sheet of paper rolls up when it dries, you can have an adult help you iron it flat using the iron's lowest heat setting.*

### What's Happening?

You may be wondering how those little scraps of paper stuck together again to make a whole new sheet of paper. As you learned in Part 1, paper is made of fibers that come from wood. **Cellulose** fibers are slightly sticky, so they help paper hold together. In fact, cellulose is used to make some kinds of glue! You "**recycled**" old paper by blending it up into tiny pieces. Those pieces of paper were made of cellulose fibers. The warm water you added made the cellulose sticky again and then when you pressed your new sheet of paper with the sponge, the fibers got matted down and tangled together, then they stuck to each other as they dried into a new sheet of paper.

### Fun Facts

- Glass can be recycled over and over again forever! It never wears out.
- If you throw away an aluminum (soda) can, it will still be a can in 500 years! (Instead, you could recycle it and it would become a new can that could be recycled over and over.)
- Only about 25% of the plastic bottles that are produced in the U.S. get recycled.

### Silly Science

- Have you heard the joke about the garbage truck?
  - *Don't worry, it's a load of trash anyway.*
- How did the can act when it was being recycled?
  - *It was crushed.*
- What's black and white, and read all over?

- *Recycled newspaper!*

## Way Cool Websites

- Explore this ["Recycle City"](#) to discover ways you can reduce, reuse, and recycle!
- [This site](#) has links to lots of games, activities, and quizzes about recycling.

## Teacher Tidbits

### What Is Recycling?

Recycling is something you can do to help cut down on waste. When you recycle, something worn out can be made new again, instead of just being thrown away. There are also two other ways that help us avoid waste.

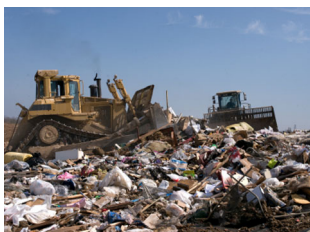
Not getting more than you really need is a good way to reduce, or use less. By using less paper and glass, we can help save the earth's resources like trees and minerals from the ground. What are some ways you can reduce waste? Why not use a reusable glass, metal, or hard plastic water bottle instead of using lots of thin plastic ones? Using washable dishes and cloths instead of paper plates and paper towels is a good way to reduce the amount of paper and plastic we use and throw away.



Instead of just throwing something away, we can try to think of ways to reuse it first. What are some things in your house that you can reuse instead of throwing away? Can you think of some ways to reuse a glass jelly jar, a milk carton, an empty cardboard cereal box, brown paper bags, plastic bags, or a metal soup can? Try your ideas out and see how well they work. Even after you reuse those things, you can probably still recycle them!

True recycling is more than just reusing something. It means breaking something apart and turning it into something new. The most common things that can be recycled are paper, glass, and metal. Many types of plastic and things made of wood can also be recycled. If something cannot be reused, and it is made from a material that can be recycled, we can take it to a recycling collection bin so that it can be made into something new! To find out where you can recycle things where you live, visit [this website](#).

### Why Should We Recycle?



Do you sometimes take out the trash at your house? You probably have a dumpster or garbage container outside of your house that a garbage collector comes and empties into a big truck once a week. Where does all the garbage go after the truck gets filled up? It goes to a landfill or a dump, where piles and piles of trash and waste are compacted (pressed down or crushed) and then buried in the ground. Grass can be planted over the buried trash to make the land look

better and be safer. Sometimes landfills can leak dangerous chemicals into the soil that can eventually get to streams, lakes, and rivers, where water that we drink comes from. Lots of animals live in that water and drink it too. When landfills are built and taken care of the way

they are supposed to be, they are not dangerous, but they do use up land that could be used for other things instead, like building houses.

When things are recycled, not as much gets thrown away and sent to landfills. Recycling helps keep our earth clean because not as much land is filled up with garbage. Recycling paper and wood means that not as many trees will get cut down, so not as many animals will have their homes destroyed (see our [Animal Homes](#) issue to find out more about kinds of animals that live in trees).

Many products that can be recycled are made from materials that come from the earth. Minerals called ore and silica are used to make metal and glass. These are called **natural resources** because they are found naturally on the earth. This also means that we cannot make more of these resources, so when they are all used up, that's it, we can't create more to keep making products! Thankfully, there are still a lot of natural resources left, but each day there will be less and less since new products are always being made and using up more of the earth's resources. We can help make the earth's natural resources last longer by reusing things we already have and recycling things we don't need.

Another problem with making new products, such as plastic, is that it creates **pollution** in the air that we breathe. The chemicals and other things that are used to create lots of products are dangerous and some of those chemicals are left over after the products are made and can eventually end up in water that comes into our houses through our faucets. Recycling does not create as many dangerous chemicals that pollute the air and water as making new products from natural resources does.

### **Science Question of the Month**

Question: "If newspapers can be recycled then why don't loggers use that instead of cutting down more trees?"

Lots of things that are made from paper (including newspapers, paper bags, and cardboard) can be recycled and made into new paper products. Unfortunately, in the US we use more paper products than we recycle. That means that lots of people keep buying new paper products (everything from paper towels and toilet paper to paper plates and printer paper) and there is not enough recycled paper to make enough products to keep up with the amount of paper products that are sold and used.

It is also important to know that when paper is recycled, the fibers become shorter which makes weaker paper. The more it is recycled, the weaker the fibers will become. That means that we can't just keep recycling the same paper forever.

Recycled paper is actually used in a lot of paper products, though. Most paper mills (where new paper is made) use at least some recycled paper in the products they make. In fact, in 2007, most paper products made in the US were made from nearly 37% recycled paper fibers! Also, a lot of fibers that are made into paper come from wood scraps and leftover pieces from sawmills where trees are cut into boards and logs for homes and other things to be built from. So, even though trees will still be cut down, they are not all being directly used up to make paper.

## Science Words

**Recycle** - when materials are broken down, processed, and made into new things.

**Cellulose** - threads of fiber that are found in the walls of green plants and can be used to hold paper together.

**Natural Resources** - a material that comes from the earth that cannot be created by humans.

**Pollution** - when something that can cause damage or harm is released into the air or water.

## Printable Worksheet

Use the worksheet below to help kids review which things can and cannot be recycled and then sort them into the correct section of the recycling bin. Discuss other things around the house that you can or cannot recycle.

# What Can You Recycle?

The recycling bin at the bottom of the page has three parts to separate glass, paper, and metal. Circle the items on the page that can be recycled in the bin, then draw a line to the right part of the bin. Color the picture.

