

REDUCE. REUSE. RECYCLE.

KANSAS KIDS CAN!

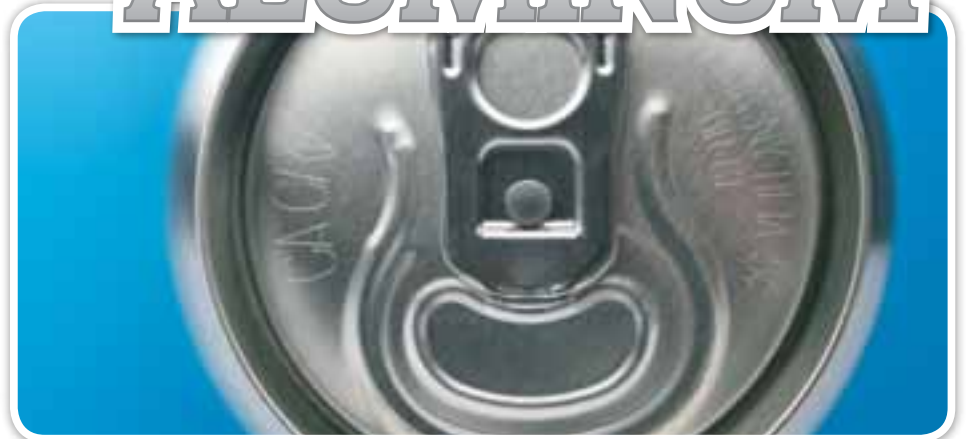
March 2011 - 24th Edition

www.kansasgreenschools.org

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Taking a Closer Look at ALUMINUM



We all know the sound well—the whoosh of carbonation escaping when we open that can of soda. Or perhaps we covered our meal last night with aluminum foil? Had a piece of pie in an aluminum pie pan? Rode in a car or took a trip on an airplane? But have you ever stopped to think about where that aluminum comes from? Aluminum is extracted from a mineral called bauxite. Most of the world's bauxite is found in South America, Asia and Australia. Bauxite is found near the earth's surface and strip mining is the most common method of extracting bauxite from the earth. Once the bauxite is mined, it is crushed and the ore is heated to remove as much water as possible. This process extracts the alumina from the ore and leaves behind a waste called "red mud." The alumina is then placed in a smelter where it is dissolved in a hot salt solution and an electrical current is passed through the solution to extract the aluminum. This process uses a large amount of energy. The aluminum is usually combined with other elements to make it stronger and then it's used to create items we use and come in contact with every day!



Bauxite

An important property of aluminum is that it is recyclable. Aluminum can be re-melted and re-formed into new products over and over again without losing its strength and recycling aluminum into new products uses 95% less energy than getting aluminum from bauxite. In fact, if everyone in the United States recycled the aluminum cans they currently throw away, we'd save enough energy to provide power to Kansas City, Topeka, Wichita, Hutchison, Pittsburg and Garden City combined! Not only do you save energy when you recycle, you keep from filling up our landfills with trash! So the next time you open that can of soda, **make sure you recycle it when you're done!**

RESEARCH!

Here are some vocabulary words in this issue you may want to investigate:

- ✓ Strip Mining
- ✓ Carbonation
- ✓ Smelter
- ✓ Post Consumer Waste



To find a place in your community to recycle, visit:
www.kansasrecycles.com



INVESTIGATE!

Exploring Aluminum

Become a physical metallurgist! A physical metallurgist studies properties of different metals and how metals can be used. Here are some ways you can explore the properties of aluminum:

• Physical Description:

Gather some different examples of aluminum like a piece of aluminum foil, an aluminum can and an aluminum pie plate. Describe what you see. Is aluminum shiny or dull? Is it malleable (bendable, shapeable) or is it stiff? What color is it? Is it light or heavy?

• Magnetism:

Using the items collected above, test to see if aluminum is magnetic by testing to see if a magnet is attracted to the items. How does this compare to other metals? What generalizations about magnetism and metals can you make?

• Conducting Electricity:

Will aluminum conduct electricity? Set up a simple circuit using a 9V battery, some copper wire and a small light bulb. Roll a small piece of aluminum foil into a long “wire” and insert it at different places within the simple circuit. Did the light bulb light up? Why do you think this is?



• Sink or Float:

Does aluminum sink or float in water? Take a small piece of aluminum foil and wad it into a ball. Does it sink or float? Now try compressing the ball of aluminum foil by pounding it flat with a hammer. Did the aluminum sink or float? Why do you think this happened?

• Additional Questions to Explore:

What do your findings tell you about how aluminum might be used? What do your findings tell you about how aluminum might be sorted in a recycling facility?

DID YOU KNOW?

Aluminum is the third most abundant element in the world! Where is aluminum on the periodic table of elements? What information about aluminum can be found in the periodic table?

Greening your Classroom

One of the biggest ways you can make a difference in your classroom is by reducing the amount of waste your classroom creates. For instance, the average student creates about 28 pounds of waste in paper alone each year! (Source: National Geographic Green Guide) Here are a few simple things you can do that make a difference:

- Use both sides of the paper—you'll cut down the paper waste you produce by half if you do this!
- Recycle your classroom's paper—each ton of recycled paper can save trees, petroleum products, landfill space, energy and water!
- Plant a tree—One tree can filter up to 60 pounds of pollutants from the air each year. (Source: www.resourcefulschools.org)
- Use paper towels in the classroom only when needed and use them sparingly.



INVESTIGATE!

Putting Recycled Paper to the Test

We use paper every day—at school and at home, you'd probably be surprised at how much paper is involved in many of the things we do! How do you use paper in school? To write your assignments, in the books you read, to dry your hands? How about at home? You can probably name at least three ways you use paper at home fairly quickly—can you name more? Most of us don't stop to think about the ways we use paper, but take a quick look around you and you can find lots of different kinds of paper—notebook paper, glossy paper in the pages of your textbook, toilet paper, cardboard boxes, napkins in the cafeteria—all different types of paper, but all from the same source—trees! A lot of the paper we use today uses post consumer waste (PCW) or paper that has been recycled. But is recycled paper as good as paper that contains no PCW? Let's investigate!

MATERIALS

- **Assortment of Notebook Paper** (NOTE: Include at least one piece of notebook paper that is NOT made with any recycled material and at least one sheet that is—it is common to find recycled paper made with 30% post consumer waste, but see if you can find other notebook papers that are made with more than 30% recycled paper as well. Label the paper type so you can tell them apart as you test)
- **Pencil and pen**
- **Pennies or washers**
- **Tape**
- **Flashlight**

PROCEDURES:

Think for a moment about how you use notebook paper. What properties do you think would be important for notebook paper? Maybe you thought about whether or not pencil or ink smudges on the paper, how easily the paper tears, how well you can see through the paper (so you can write on both sides)?

Maybe you came up with other important properties? In this investigation, we're going to start with a smudge test and then challenge you to develop "fair tests" for paper strength and opacity (how well you can see through the paper).

1 Let's start with a smudge test. First let's consider what would be a fair test? Most smudges occur when our fingers rub across paper and smudges can happen using pencils or pens. So how can we be fair about the test? Well, we have to think about what we're going to do the same each time and the one thing we'll change. In the smudge test, the only thing we want to change is the type of paper. One will have recycled content, the other won't. So everything else in our test needs to be the same. We need the same amount of pencil or ink, so let's draw a 1" line in the same place on both sheets of paper with the same pencil and trying to use the same amount of pressure when drawing the line.

2 Next, we'll need to rub our finger over the pencil line on both sheets of paper, but again, we'll need to try to do so using the same amount of pressure with our fingers, going in the same direction and at the same speed. We may not be able to do that exactly, but it is important to try to do it the same on both sheets of paper.

3 Now we'll need to make some observations. Look closely at both lines on both sheets of paper. Is the line blurred at all, is there a smudge? How can we measure it? If we had a very accurate measuring tool we might be able to measure the length of the smear or we could create a scale: 0 = No smudge, 1 = a little smudge and 2 = a big smudge. How did the recycled paper do compared to the non-recycled paper? How can we be surer of our observations? You guessed it! Repeat the



test—a good number is between three and five and then of course, we'll need to average our results. Scientists often use data tables to record data, like the one shown below.

4 What are your results? Is there any difference in the recycled and non-recycled paper for pencil smudges?

5 Now try it with pen. Again, you'll need to design a fair test as you did with the pencil and record and analyze your results.

6 Challenge: Can you design a fair test to test the strength of the paper? Hint: Try cutting a thick strip of paper from each (make sure it's the same size) and stretching it between two desks, then see how many washers or pennies you can stack on the paper before it breaks. How about opacity or the ability to see through the paper? Can you design a fair test to see if there is a difference?

QUESTIONS TO THINK ABOUT:

Is there a difference between recycled and non-recycled paper? What are the trade-offs in using one over the other? Are there other important properties that you can test? How would you test them?

<i>(Example Data Table)</i>				
PAPER TYPE	TRIAL 1	TRIAL 2	TRIAL 3	AVERAGE
NON-RECYCLED PAPER				
30% RECYCLED PAPER				
70% RECYCLED PAPER				



How Many Trees Are We Saving When We Recycle Paper?

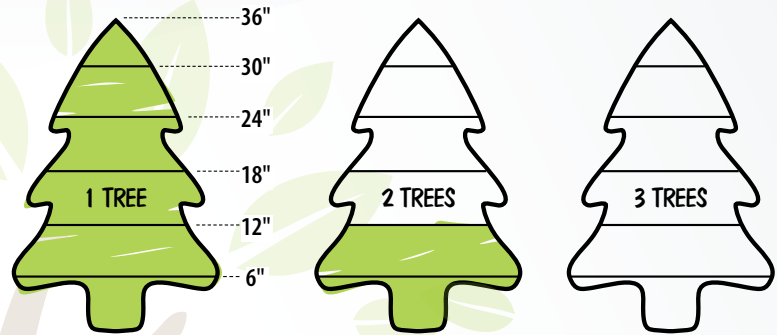
YOU NEED:

A paper recycling bin and a yard stick

PROCEDURES:

1. Create a data recording sheet that allows you to either color one section of tree for every 6 inches of paper you recycle, with each tree representing 36 inches or create a graph similar to the one shown that allows you to shade in a section of the graph for every 6 inches of paper recycled.
2. Stack all papers from the recycle bin neatly.
3. Measure how tall the stack is: _____ inches.
4. For every 36" or yard of paper you recycle, you save a tree!
5. Keep track of how many trees you save by recycling each month. How many trees did you save in a year?

NUMBER OF TREES SAVED!



OR

NUMBER OF TREES SAVED!

1 TREE	2 TREES	3 TREES	4 TREES

RECYCLING PAPER: SAVING TREES THINKING CHALLENGE

TOUGH CHALLENGE:

If your school recycled 522 inches of paper in a year, how many trees will your school save?

Tough Challenge: Each yard of recycled paper saves a tree and a yard is equal to 36", so divide 522 by 36 to get the total number of trees saved, 14.5 trees.

