Paper Towel Strength and Absorbency

Summary

Think about the last time you spilled a drink. How did you clean it up? Most likely you grabbed the nearest roll of paper towels. Why didn't you use a roll of toilet paper or why didn't you grab a wad of notebook or computer paper? What is it about a paper towel that makes it so useful to clean up spilled liquids? It has to do with how the paper towels are made.

Paper towels are made from the same types of plant fibers that other types of paper are made from. The difference between paper towels and other types of paper comes when the paper fibers are mixed with a special type of resin to make them strong when they are wet. That's why paper towels don't tear as easily as notebook paper or tissue paper when they are wet. Once the sheets are made they have shapes pressed into them to make them look quilted. These shapes form air pockets to attract water. That is why paper towels are so absorbent.

Different brands of paper towels have different methods for manufacturing their paper towels. In this activity you will get to test different brands of paper towels for their strength and absorbency.

Goals

1. Observe what qualities about paper towels give them the best strength and ability to absorb water.
2. Test four different brands of paper towels to see which is the strongest and most absorbent.

Materials

- four or more different brands of paper towels
- a jar of pennies
- bowl of water
- teaspoon
- eye dropper or turkey baster
- two assistants
- record sheet and pencil (see below)

Preparation

1. First create a record sheet that you can use to record you data. An example of a good table is shown below:

Type of Paper	Results for Strength (number of coins)	Results for Absorbency (number of drops)

2. Record the four different brands of paper towels on the record sheet under "Type of Paper".
3. Cut 2 large pieces of equal size for each brand of paper towel. The eight sheets must be exactly the same size.

Pre-Activity

1. Before beginning the activity examine each brand of paper towel. Think about the following questions –
    a. What kind of quilting designs does each have?
    b. Are the paper towels 2-ply or 1-ply?
    c. Are the paper towels made from recycled paper or are they made from new wood products?
2. Make predictions about which of your paper towels will be strongest and which will be weakest based on your observations.

Activity

1. Have your two assistants hold a sheet of the first brand of paper towel at the corners over a sink or container.
2. Pour 5 teaspoons of water into the middle of the paper towel.
3. Place coins on the wet area of the paper towel one at a time. How many coins will the paper towel hold before it tears? Record the results on your data sheet.
4. Repeat steps 1-3 for the other three brands of paper towel.
5. Next, take out the other sheet of the first brand of paper towel. Have your two assistants hold the paper in the same manner that they did for step 1.
6. Fill your dropper and squeeze one drop of water on the paper at a time onto the paper towel. Count the number of drops the paper towel absorbs before it starts to drip. Record your results on the data sheet.
7. Repeat steps 5 and 6 for the three other brands of paper towel.
8. Look at your results. Are you surprised? Did you get similar results for both absorbency and strength? Do your results match your earlier predictions?

Extension Activities

1. You can try these experiments again with other types of paper to see how they compare to paper towels in strength and absorbency. Make predictions about which types will be stronger or weaker than paper towels based on the way they feel and look. Test them to see if you are correct.

Wrap-up

Now that you have completed this activity, you can make educated decisions about choosing the best type of paper towels based on strength and absorbency. However, you may also want to consider other factors when purchasing paper towels. Some paper towels are more expensive than others, especially if they are made from new materials or are especially strong or absorbent. Also, you may want to consider purchasing recycled paper towels, which helps to conserve waste and reduce the use of wood materials.

Resources

Adapted from
http://www.tappi.org/paperu/fun_science/detailsDetails.htm

http://www.quickerpickerupper.com/faqs.shtml

For more information on recycled paper towels
http://www.recycleminnesota.org/Buy%20Recycled/towels_3_3.html