MAGIC TUBE

Next: Materials and Explanations

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MAGIC TUBE - STRONG TISSUE PAPER

Believe it or not, you can make paper so strong that it cannot be ripped! Tissue paper is known for a few things. For example, tissue paper is soft and nice for blowing your nose. Tissue paper is not, however, known for its tensile strength. Most people wouldn't be surprised if a common housefly could tear through a piece. In the Magic Tube - Strong Tissue Paper experiment, though, we'll show you a way to make tissue paper nearly impenetrable.

Materials
• Tissue paper
• Toilet paper roll
• Wooden dowel
• Rubber band
• Salt

EXPERIMENT
1. Place the tissue paper over one end of the paper towel roll. Secure the paper in place with a rubber band.
2. Try puncturing the tissue paper using a wooden dowel. See how easily the dowel pushed through the tissue paper?
3. Place a new piece of tissue paper over the end of the toilet paper roll and, once again, secure it with a rubber band.
4. Set the toilet paper roll on a flat surface so that the tissue paper is flat against the surface.
5. Pour salt into the toilet paper roll until the roll is 3/4-full with salt.
6. Lightly tap the toilet paper roll on a hard surface to help pack the salt.
7. Again, try to push the dowel through the tissue paper on the end. Wow… it's next to impossible!

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HOW DOES IT WORK?
It may seem obvious that a wooden dowel can easily push through a piece of tissue paper, but what changes when you add salt to the tube? The amount of force you push into the tube remains the same. In fact, you might add even more force into the tube once the salt is added… but the tissue paper just won't budge.

The key to the tissue paper's newfound strength is the addition of salt. The hundreds of thousands of salt grains offer much more surface area to dissipate the force you thrust into the tube. As the force spreads from grain to grain of salt (and against the outside of the tube), the force is also spread across the entire area of the tissue paper. The increased surface area makes the tissue paper appear much stronger than before!

Don't stop your testing with salt in the tube... keep experimenting!
• Try different materials in the toilet paper roll! Gravel, sugar, beads... which works best?
• Does the length of the tube make a difference? Try a paper towel roll and see!
• Test different brands of tissue paper to find the strongest of them all!
HERE IS WHAT YOU NEED

TISSUE
TOILET PAPER ROLL
WOODEN DOWEL
RUBBER BAND
SALT
1. Place the tissue over the toilet paper roll and secure it with a rubber band.
SEE HOW EASILY THE STICK PUSHES THROUGH THE TISSUE
2. Fill the tube 3/4 full with the salt.
3 Tap it on the table

4 Now try to push the dowel through the tissue
Why can't you push the dowel through the tissue when the tube is full?