How Strong is Paper?

Science Film Festival
Knowledge Through Entertainment

This experiment will focus on the principles of compression and tension, allowing participants to observe how different materials respond to being squeezed or stretched. By testing these forces, participants will explore their practical applications in engineering and construction.

Ages: 7 - 11 **Under 30 minutes**

This activity shows how simple materials like paper can be strong through efficient design, linking to sustainable engineering. It highlights using renewable or recycled materials to minimize waste and reduce reliance on non-renewables, introducing kids to material efficiency and sustainability in a fun, practical way.

MATERIALS

- Paper
- Books
- Tape

STEP-BY-STEP TUTORIAL

1

Step 1
Get your materials ready: paper, tape and books!

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Step 2
Get two pieces of paper and fold each sheet in half horizontally.

3

Step 3
Arrange the folded pieces of paper side by side to create small tent-like structures. Ask your students to predict whether these paper tents will be strong enough to support the weight of a book.

4

Step 4
Next, take three pieces of paper and fold each one into thirds horizontally. Tape the ends together to form three solid shapes. Now, test how strong they are by gradually adding weight to each. How much weight can these folded papers support? What does this tell us about structural strength and design?

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Step 5
One... Two... Three... Four...

6

Step 6
Now, let's try round pillars. Take three pieces of paper, roll each one tightly around a can, and tape the ends to hold the shape. Once secured, carefully slide the can out, leaving behind three paper cylinders. Test their strength by placing weight on top to see how much they can support compared to the folded paper structures.

7

Step 7
Still going at fourteen...
How many will they hold?
Why don't you go find out!

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The activity can be linked to sustainability by demonstrating how even simple materials like paper can be incredibly strong when used in efficient structural designs. This relates to sustainable engineering and architecture, where innovative designs often use fewer resources or environmentally friendly materials, like recycled paper or cardboard, to achieve structural strength. It also highlights how we can minimize waste by using everyday materials in smarter ways, reducing the need for more resource-intensive products.

Additionally, this experiment can inspire discussions on reducing reliance on non-renewable materials by showcasing the potential of renewable or recyclable materials in construction. It's a great way to introduce kids to the concept of material efficiency and sustainability through a fun and practical experiment.

SOURCE

https://www.kiwico.com/diy/stem/engineering-building/how-strong-is-paper

KiwiCo was founded to nurture children's creativity and problem-solving skills through hands-on projects, making it easier for parents to provide enriching activities. The company simplifies the process of building, exploring, and creating together by designing fun and educational experiences that foster creative confidence. With a growing team of designers, experts, and kid testers, KiwiCo aims to equip children with the skills they need to face future challenges. Founder and CEO Sandra, an engineer and mother of three, created KiwiCo to inspire curiosity and exploration in families.