

Paper Cup Stool

What do you think would happen if you tried to stand on some paper cups? They would be crushed, right? What if you used the power of **STEM** (Science, Technology, Engineering, and Math) to stand on the cups without crushing them? In this engineering challenge, you will create your own paper cup stool!

Materials:

- 5 - 10 Medium to Large Paper Cups
- 1 Piece of Cardboard (Big enough for your feet to fit on)

Procedure:

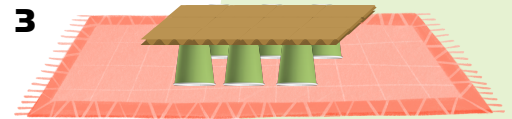
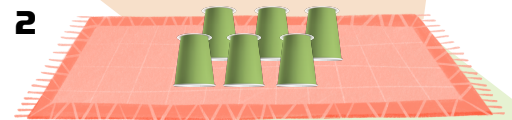
1. Try standing on 1 or 2 paper cups. Do they crush under your weight? If not, see what you have to do to get them to crush. We will use this same method later on.

2. Place at least 6 paper cups on the floor upside down. Spread them out evenly.

3. Place your sheet of cardboard on top of the paper cups.

4. Now try standing on top of the cardboard. Do the cups support your weight now? If you had to use a stronger method earlier to crush your single cup, try that same method now. Did it work?

Bonus: If you have extra supplies, try adding another layer of cups and cardboard to make a two-tier stool!



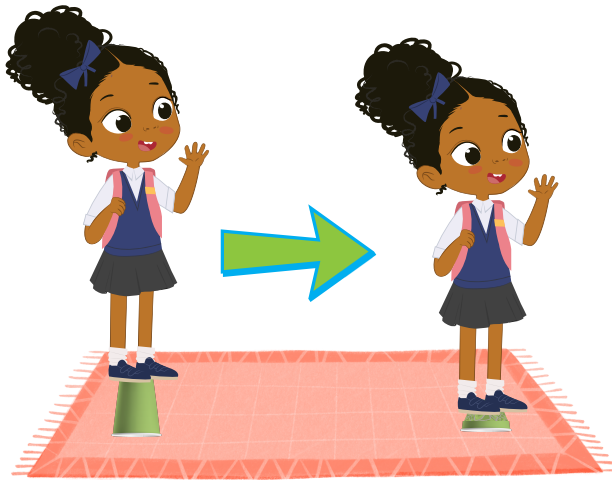
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WHAT'S HAPPENING?

It has to do with weight distribution. Check out the math below!

When all the weight is on 1 cup, it is too much and the cup is crushed.

$$\begin{array}{ccccc} 60 & \div & 1 & = & 60 \\ \text{pounds} & & \text{cup} & & \text{pounds per cup} \end{array}$$



When there are more cups and a piece of cardboard, the weight is distributed, or spread across the materials and the weight is supported.

$$\begin{array}{ccccc} 60 & \div & 6 & = & 10 \\ \text{pounds} & & \text{cups} & & \text{pounds per cup} \end{array}$$



DID YOU KNOW?

An **engineer** is someone who studies how and why things work. If you liked exploring this activity, maybe engineering is for you!

