

# BUILDING TENSION

FOSTER + PARTNERS



# Building tension

Learn how forces of tension and compression work together to keep tall buildings standing.

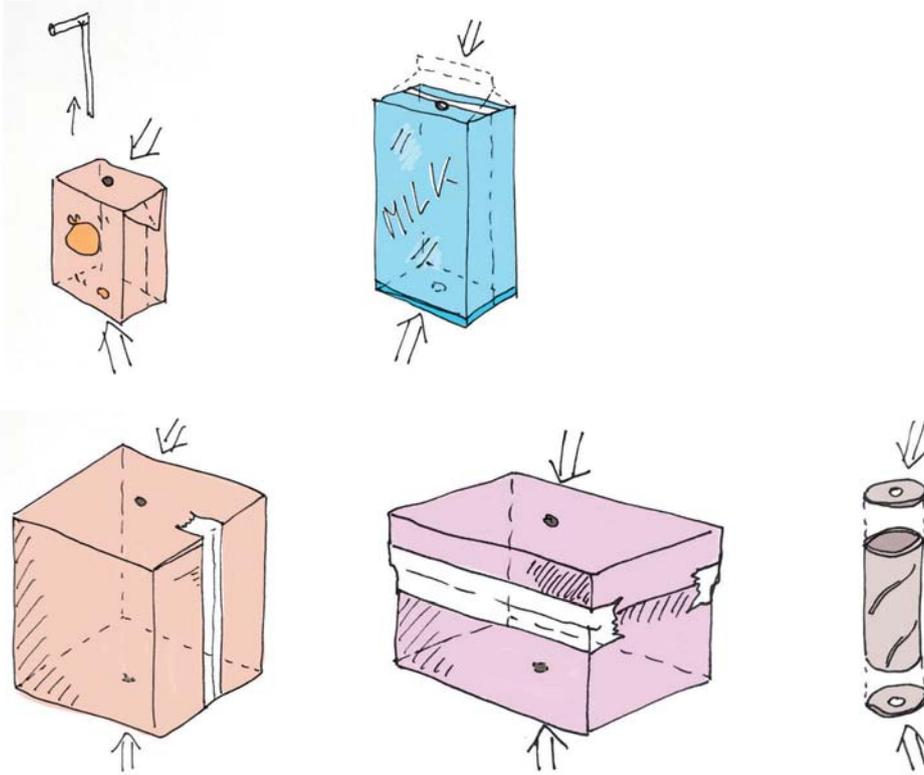
How do towers stand up without falling over? Those who have tried stacking building cubes know that the taller the tower, the wobblier it becomes.

This is where structural engineers come in - to help build the tallest buildings in the world without them falling down!

One method is to press the building blocks of the tower against each other from the top and the bottom to create a rigid structure. This ensures there is good and firm contact between the different blocks, making it much harder for blocks to slide out individually.



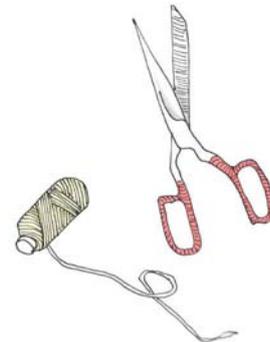
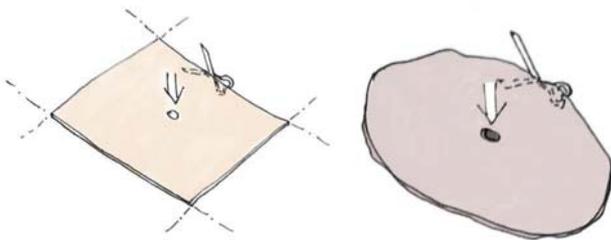
## You will need...



### Building blocks

These could be either beverage containers (milk or juice for example), or any small cardboard box! You will need to pierce a hole through its top and bottom, so make sure it is soft enough to make these holes.

You could also make other shapes like cylinders. Take the cardboard core of any loo roll and glue a cardboard 'cap' at each end of it. Pierce a hole through these caps with a pen. There you go! You have now a cylindrical building block!



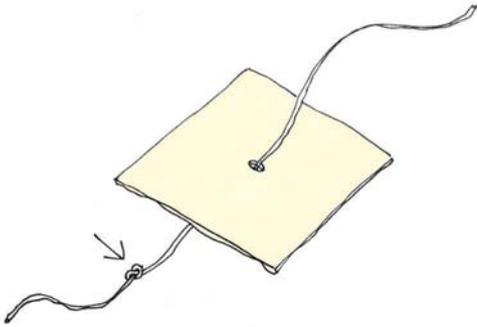
### Base and roof

These could be cut out of cardboard or thick paper. It could be a square, circle or even a squiggly shape, be inventive! If you don't have cardboard then you could use magazines, for example. Make sure they are big enough so your building blocks fit inside them! Once your shapes are made, pierce a hole in the middle, just like you did with your building blocks.

### Additional materials

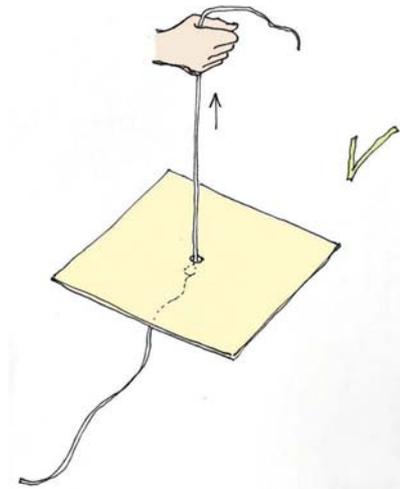
You will also need some scissors and twine (or string) to help your building stand tall without falling over.

# How to build your tower



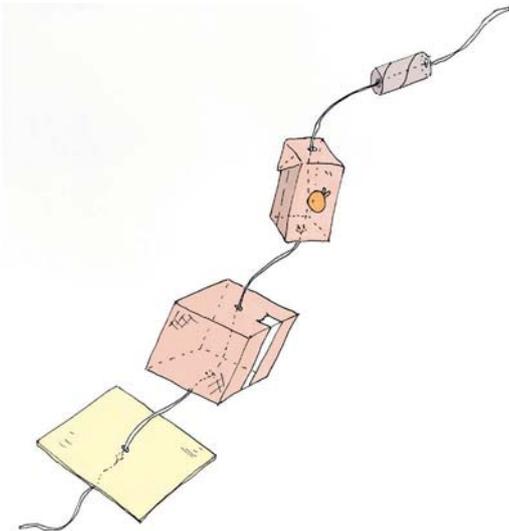
## Step 1

Take a long piece of string or twine and tie a big knot at one end. Thread your string through the hole in the base you made earlier. Be careful not to make the hole too big, as you don't want the knot to pull through.



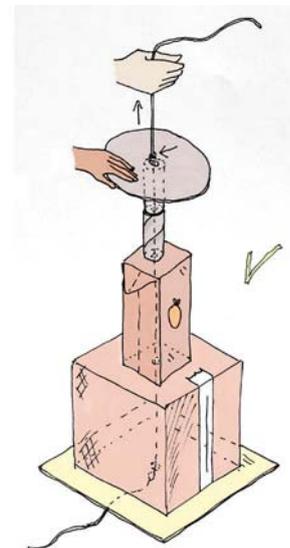
## Step 2

Pull the twine up through the base; if the knot holds in place, you can move on to the next step.



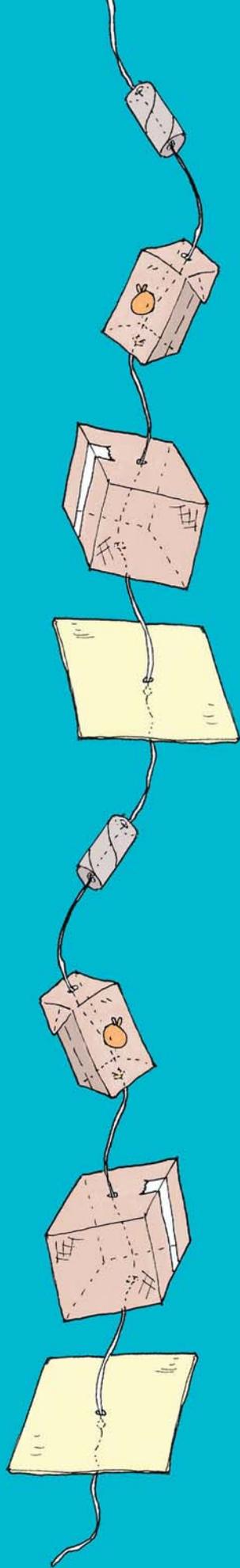
## Step 3

Put your base on a flat surface, perhaps a table top or on the ground. Make sure the side with the knot is facing down. Take the building blocks and thread the string through them one at a time. Once all the blocks are on, add the roof.



## Step 4

Take the end of the string at the top and pull gently so the blocks come closer together. Be careful not to crush the blocks together. Slowly tighten more until you feel the string is taut and the blocks are pressed firmly one on top of the other. Hold the string in this position and make a knot just above the roof, so when you let go the tension in the string stays. You now have your tower!



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