

The Smallpeice Trust
**ENGINEERING
@HOME**

12

The
Wind Power
Challenge

#EngineeringAtHome

Suitable
for ages:

6+

Time
needed:

1hr+



smallpeice 
Dare to imagine

Curriculum links: Maths – shapes, measurement; Science – energy, electricity; D&T – design, make, evaluate

Skills learnt: Design, building, testing, evaluation



Since our Smallpeice team can't visit schools, we've decided to challenge each other to make a wind powered lift which you can test at home.

Learning Objectives

Create purposeful, functional and appealing designs

Select from a wide range of materials and use tools to perform practical tasks

Build structures, exploring how they can be made stronger and more stable

Evaluate your ideas and products against design criteria

Topics Covered

WIND ENERGY

<https://bit.ly/37maQsj>

RENEWABLE ENERGY

<https://bit.ly/2XS5rWO>

THE GENERATOR EFFECT

(how spinning something can generate electricity)

<https://bit.ly/3hcKRrU>

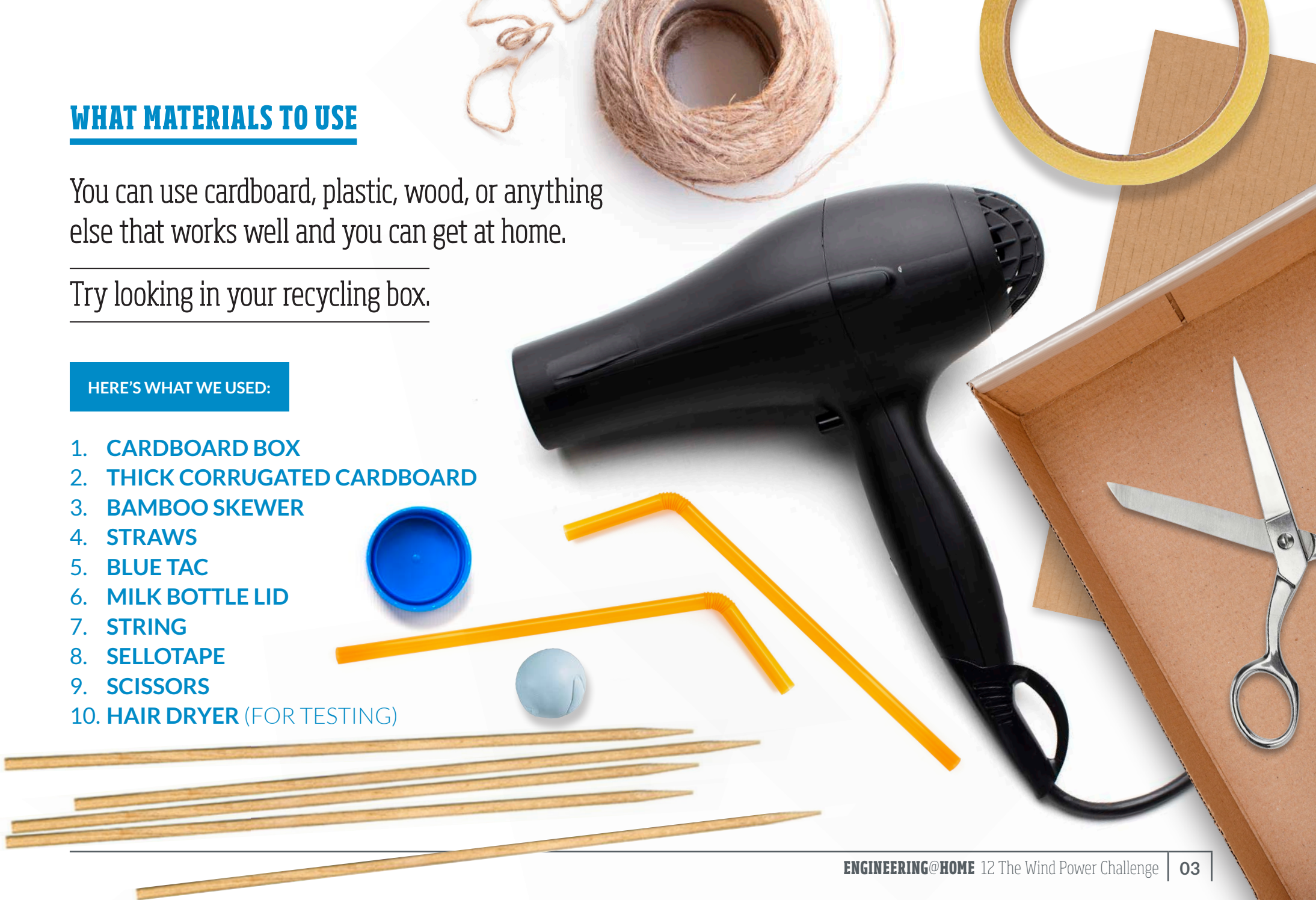
WHAT MATERIALS TO USE

You can use cardboard, plastic, wood, or anything else that works well and you can get at home.

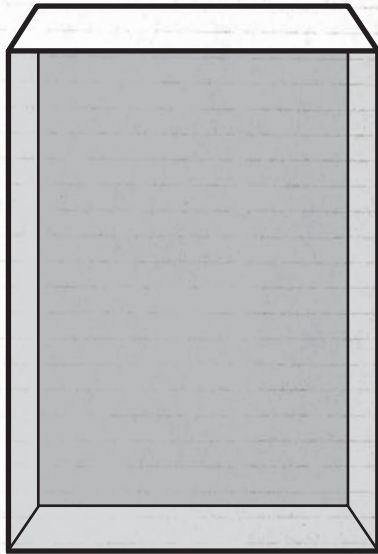
Try looking in your recycling box.

HERE'S WHAT WE USED:

1. **CARDBOARD BOX**
2. **THICK CORRUGATED CARDBOARD**
3. **BAMBOO SKEWER**
4. **STRAWS**
5. **BLUE TAC**
6. **MILK BOTTLE LID**
7. **STRING**
8. **SELLOTAPE**
9. **SCISSORS**
10. **HAIR DRYER (FOR TESTING)**

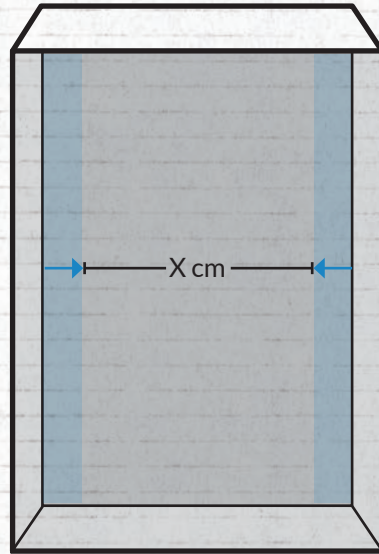


INSTRUCTIONS MAKING YOUR LIFT 1 OF 4



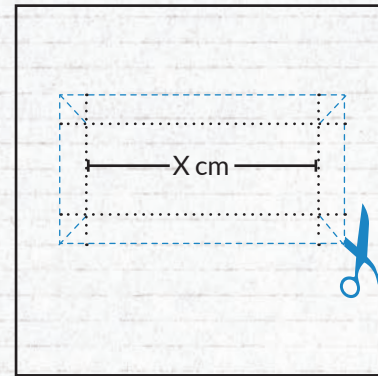
1.

Take your large cardboard box and stand it up portrait. If it is not a shoe box you will have to cut out the front panel so you can see in. This will form the housing frame for your lift.



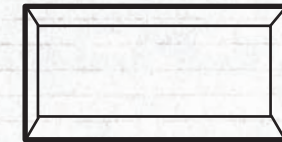
2.

Your lift carriage is going to need to fit inside the large box comfortably so measure the space inside the box.



3.

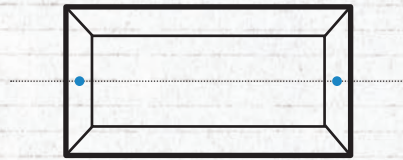
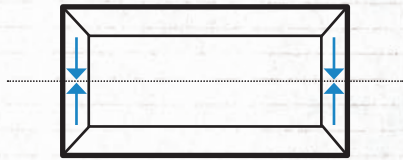
On a separate piece of cardboard, draw out your lift carriage. Give it an extra border on each side to create the walls of your carriage.



4.

Cut out the carriage and fold up the walls.

INSTRUCTIONS MAKING YOUR LIFT 2 OF 4



5.

Before you stick the walls in place, find the half way point along the two short sides of your carriage walls and make a mark here.

6.

Cut a small hole in the centre of the walls at the marked point.

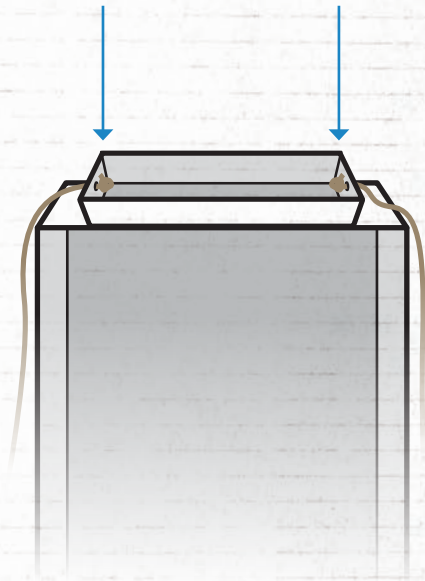
7.

Cut two pieces of string long enough to cover the height of the large box with some extra for tying knots in the ends.

8.

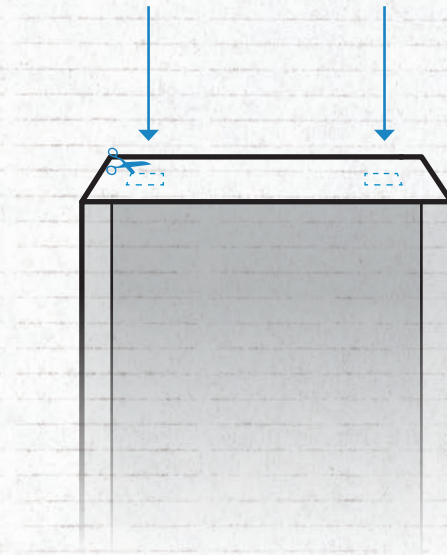
Tie one end of each piece of string through the holes in the carriage walls.

INSTRUCTIONS MAKING YOUR LIFT 3 OF 4



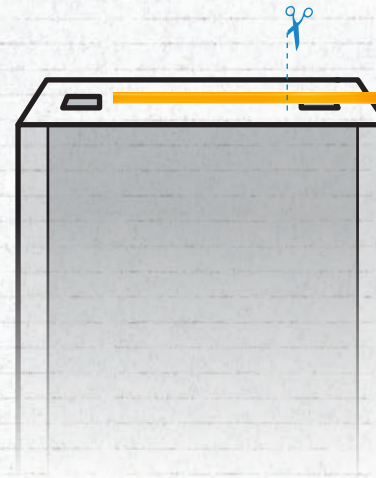
9.

Take your carriage and sit it on the very top of the large box, make a mark on the top of the box where the pieces of string are tied.



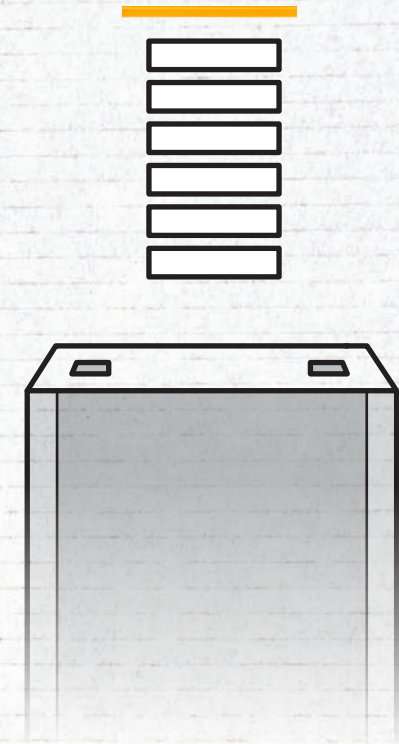
10.

Cut out a small window (roughly 1x1cm) at the points marked on the top of the box.



11.

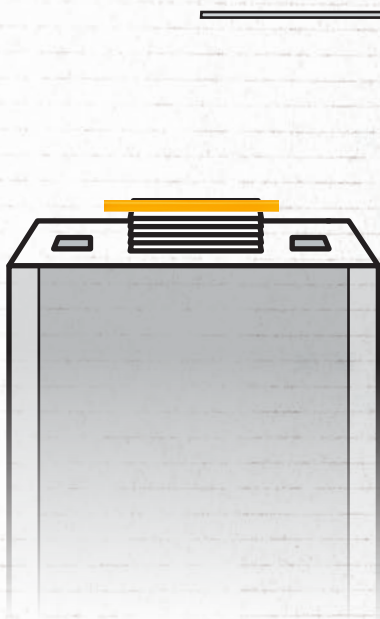
Take a straw and place it between the two windows, (you may need to trim the straw to fit).



12.

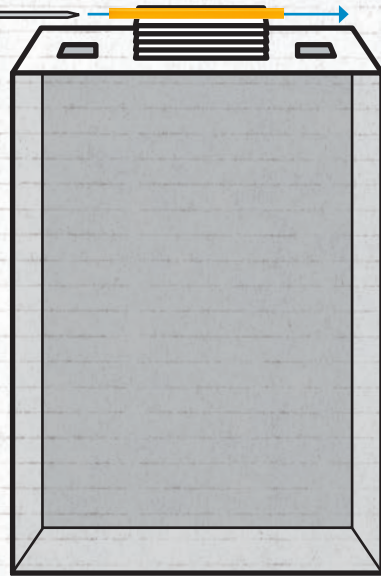
Using some spare cardboard, cut a handful of rectangles slightly shorter than the straw, stick these on top of each other to create a platform for the straw to sit on.

INSTRUCTIONS MAKING YOUR LIFT 4 OF 4



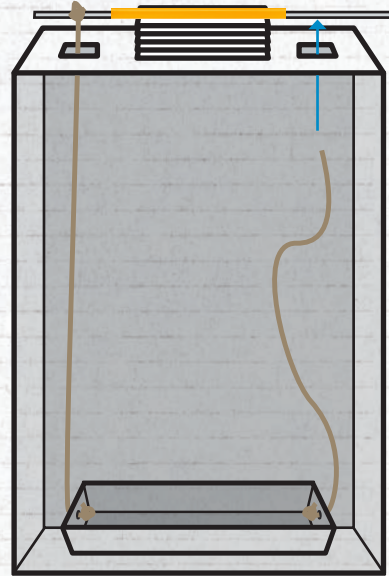
13.

Sellotape the straw in place on the platform and stick this to top of the box in between the two windows.



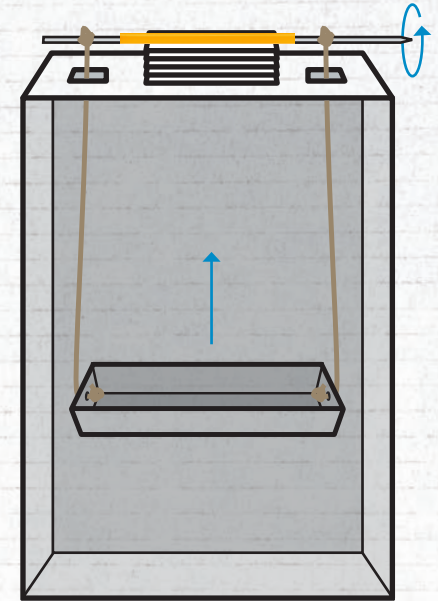
14.

Thread the bamboo skewer through the straw and place your carriage inside the box. This is the axle of your wind turbine.



15.

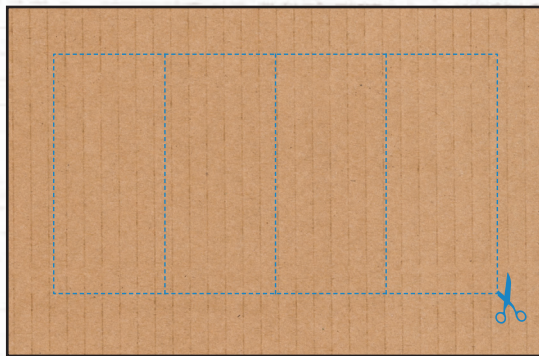
Lift the string to the top of the box and thread each piece through the window above it and tie tightly to the bamboo skewer.



16.

Test your lift by now spinning the skewer and your carriage should move up and down the cardboard box like a functioning lift!

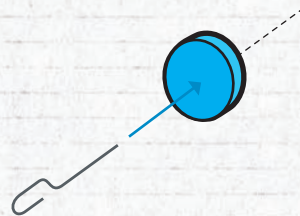
INSTRUCTIONS MAKING YOUR WIND TURBINE 1 OF 3



1.

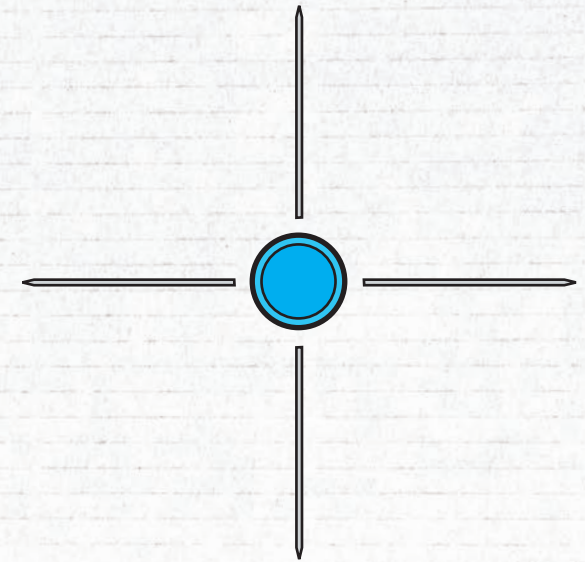
Cut identical blades out of thick corrugated cardboard, think about how many blades you want and the shape and design of these to make sure they will catch the air.

(Make sure the corrugated lines in the cardboard go along the blades, not across them)



2.

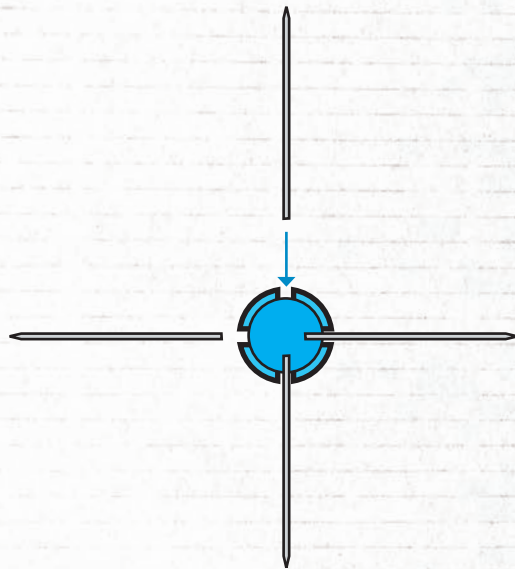
Take your milk bottle lid and poke a hole in the centre, you can use a paperclip to do this if the bamboo skewer is not strong enough.



3.

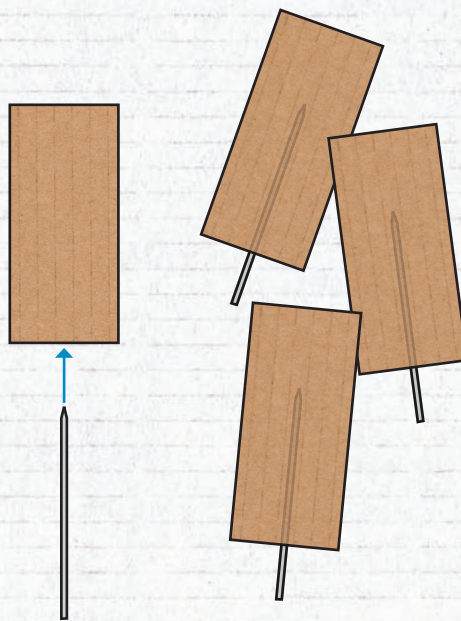
Take four more bamboo skewers and place these equally spaced around the bottle lid. You may need to trim these if they are too long.

INSTRUCTIONS MAKING YOUR WIND TURBINE 2 OF 3



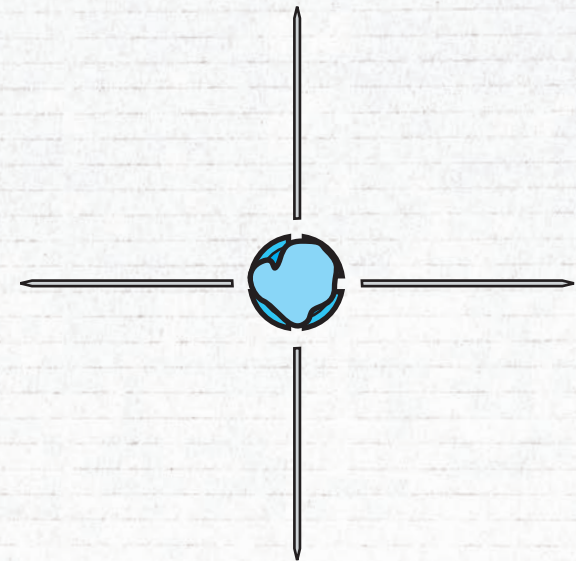
4.

Cut a slot in the walls of the bottle lid where the blade skewers will fit.



5.

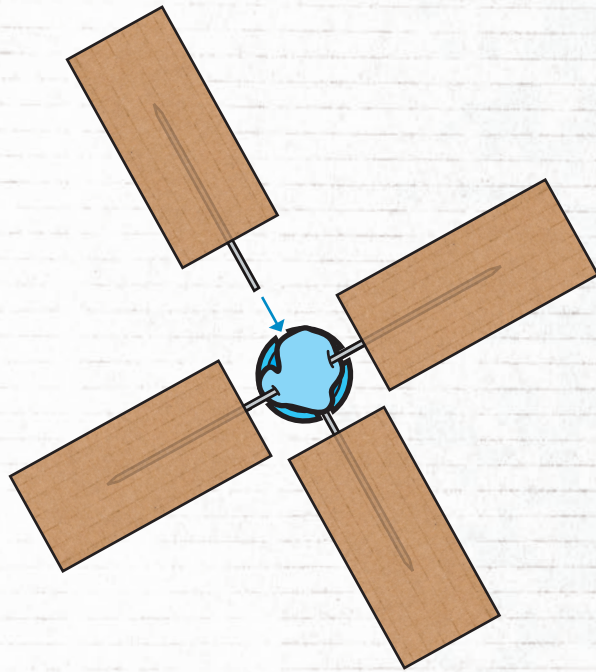
Place each cardboard blade on the end of each skewer, you should be able to push the skewer down the centre of the corrugated waves. If they're not quite the right size you can secure them in place with blue tac or Sellotape.



6.

Remove the skewers from the bottle lid and fill the lid with blue tac.

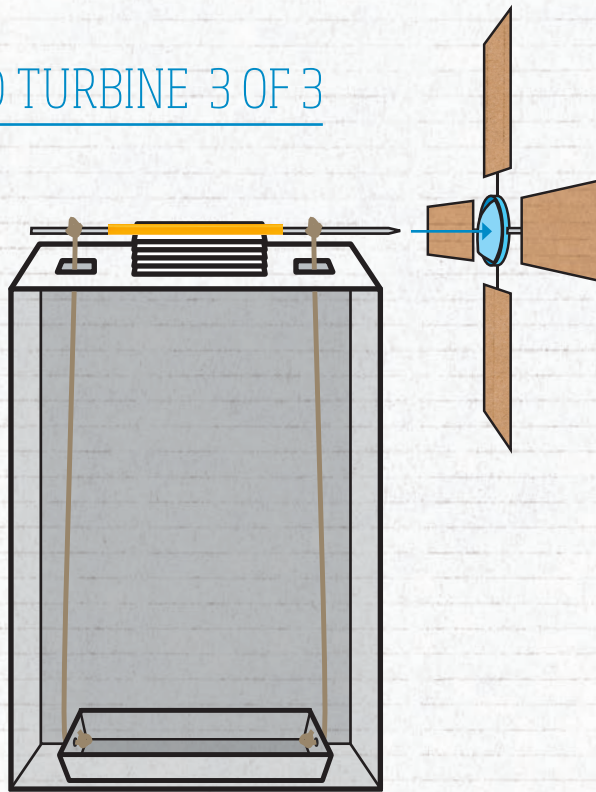
INSTRUCTIONS MAKING YOUR WIND TURBINE 3 OF 3



7.

Take each skewer with its blade on and push the skewer through the slot in the lid into the blue tac. Do this to all four skewers but don't push them all the way to the middle, leave a small space by the hole.

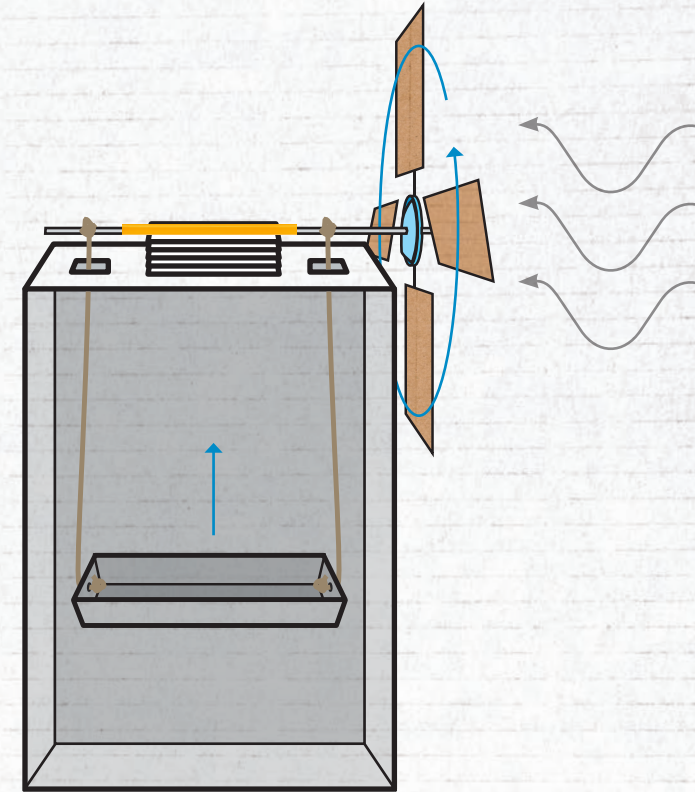
Press the blue tac to make sure the blades are all secure to the lid. This is your wind turbine.



8.

Take your turbine and push the hole in the middle of the lid onto the axle skewer on top of your lift.

Secure this in place with blue tac if necessary.



9.

Now when you spin your turbine blades you should see your lift move up and down. Test your turbine with a hairdryer or fan to see if you can use wind to power your lift!

You will need to adjust the angle of your blades to ensure they are catching the air as best as possible.

NEED A CHALLENGE?

If you complete your wind powered lift and want to challenge yourself further:

1. Try to put some objects on your lift and see if your turbine can generate enough energy to lift them!
2. Does adjusting the angle of your blades alter the performance of your lift?
3. Try creating some different shape and size blades and see what difference it makes.
4. Decorate your lift and make it stand out.
5. Film a video and send it to us!

Once you've got your wind powered lift performing at its optimum, film it in action and share your video on:



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