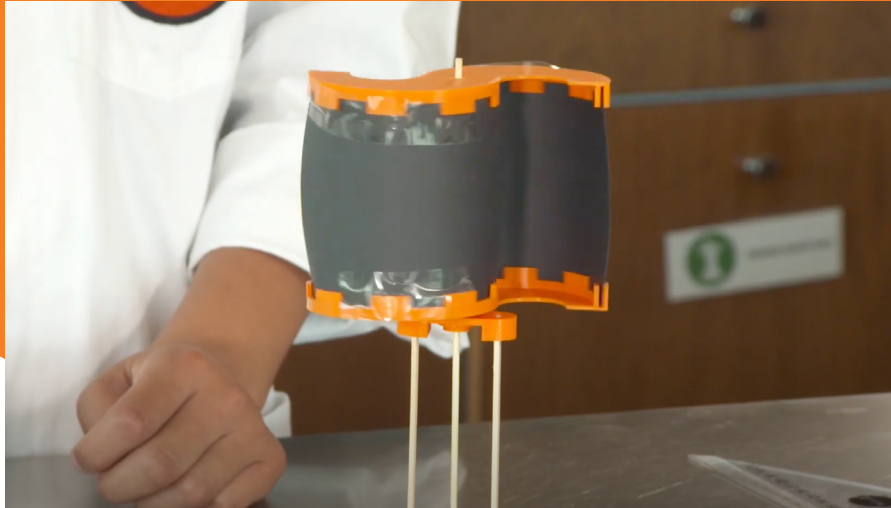


How to Make a Wind Turbine

A Step by Step Guide



Before you start

- Watch the 'How to Make Wind Turbine' video [here](#).
- Use a 3D printer and this [template](#) to print off the 3D printed bits.
- To find out more about 3D printing see our [3D tips and tricks](#) at school-gen.co.nz

What you'll need

- 3D printed turbine floor, 3D printed turbine roof, 3D printed tower upper axis support, and 3D printed tower lower axis support
- Ice-cream sticks x2 and scissors
- A wooden kebab skewer
- Some flat flexible material for the blades (like thick paper or thin plastic)
- Optional: ruler, sandpaper, tape, glue, a little block of wood and screw for mounting

GET STARTED

Step 1

First, we need to make some blades. These connect your turbine floor and roof to capture the wind and make your turbine spin. Work out how long you need the blade to be to fit along the inside of the turbine roof and floor. You'll need a blade for each side.

Step 2

Decide how high you want the blade to be, that's the distance between your turbine roof and floor (you can experiment with this).

Step 3

Trace the outlines of two blades on your flat flexible material and cut them out.



Did you know

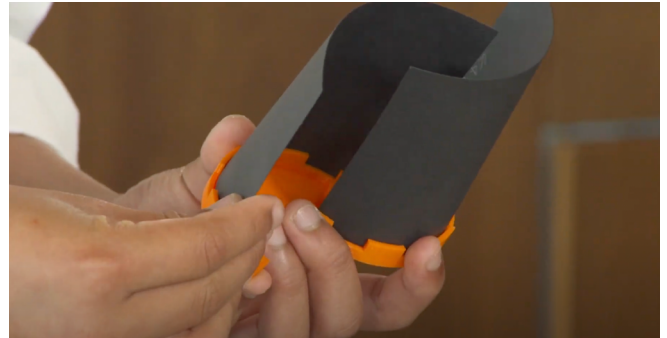
Wind turbines let us harness the energy from wind to create electricity.

Step 4

Slide one of the blades into the 3D printed turbine floor and move it around until it fits. Use some tape to hold it in place if you need to.

Step 5

Repeat the process with the other blade into the other half of the turbine floor.



Step 6

Now it's time to fit your turbine roof on top of your blades (this is easier if you ask a friend to help).

Step 7

Place your turbine floor on a flat surface and push down on the roof gently to make sure your blades are fitted properly.



Did you know

That about 5% of New Zealand's electricity is generated by wind turbines.

Step 8

Carefully push your kebab stick (pointy side first) through the hole in the middle of the turbine roof (this is called the centre axis). This will form the shaft of the turbine. If it won't fit trying sanding the kebab stick down or make the hole bigger with a drill bit.



Step 9

Keep pushing your kebab stick down through into the hole in the middle of the turbine floor and out the other side (this is now the shaft of your turbine). The turbine should feel like it fits tightly to the turbine, if it's too loose try adding a drop of PVA or Epoxy glue and give it some time to set.

Did you know

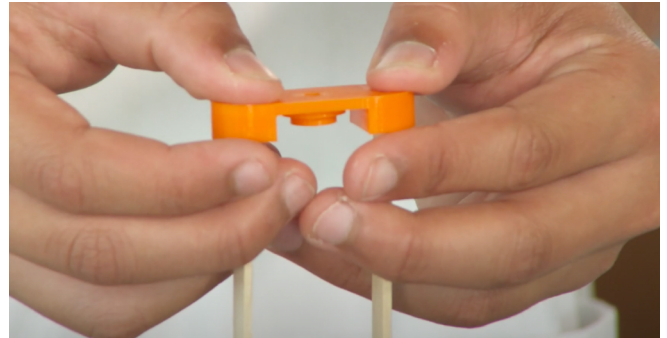
This type of turbine is known as a Vertical Axis Wind Turbine or VAWT for short.

Step 10

Now you've made your wind turbine and blades it's time to make the base. Grab your tower lower axis support (it's the bigger round bit) and slide your ice cream sticks on either side. If they don't fit you can sand them down.

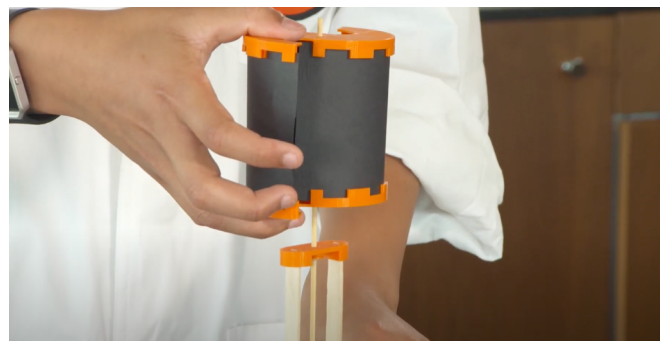
Step 11

Place your upper axis support on top, push down gently to make sure it's secure.



Step 12

Now it's time to slide your kebab stick into the hole in the middle of the upper tower axis support and down to the bottom. If it doesn't reach the bottom you'll need to trim your ice cream sticks until it does. Make sure you leave a little bit of room so the turbine floor isn't touching the upper tower axis support or it won't spin!

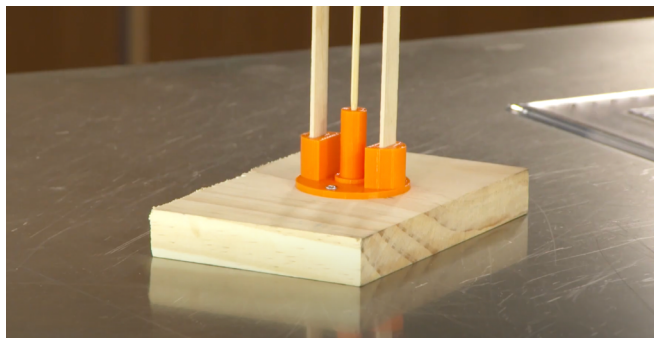


Step 13

Now you've made your turbines, blades and tower support it's time to test it. Hold it on a flat surface and blow gently to check your kebab stick is spinning freely, sand the end if you need to.

Step 14

So that you don't need to hold it (and to stop it from falling over) you can screw your tower support onto a small block of wood.



Did you know

That the first wind farm in New Zealand was built by Genesis Energy in 1996.

Finished? What's next

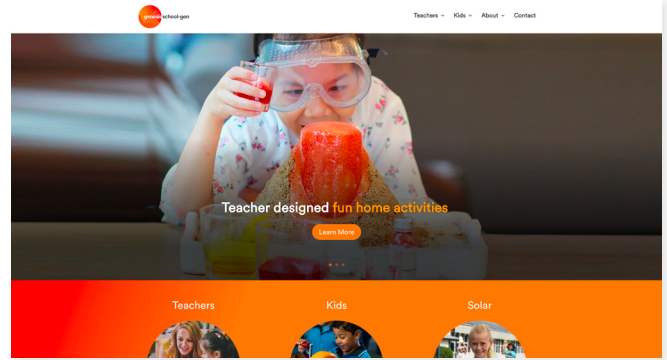
Visit schoolgen.co.nz to check out other projects you can do.

We've also pulled together some cool challenges to get you thinking and innovating! The easiest ones are at the top of each list, the harder ones at the end are for budding scientists and engineers.

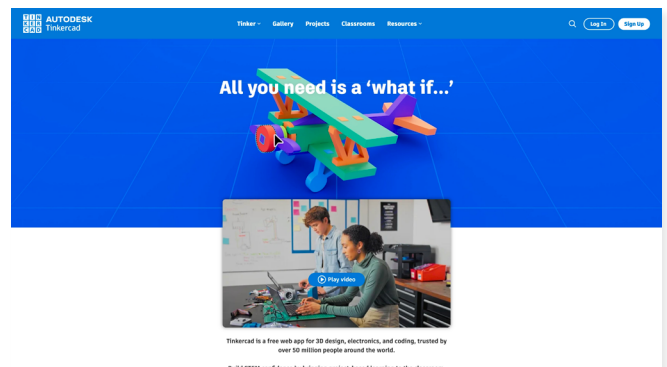
More minds are better than one so get a team together and start throwing some ideas around and come up with a plan of attack.

For designing things, we recommend (and use) [TinkerCad](#) or [Sketchup](#).

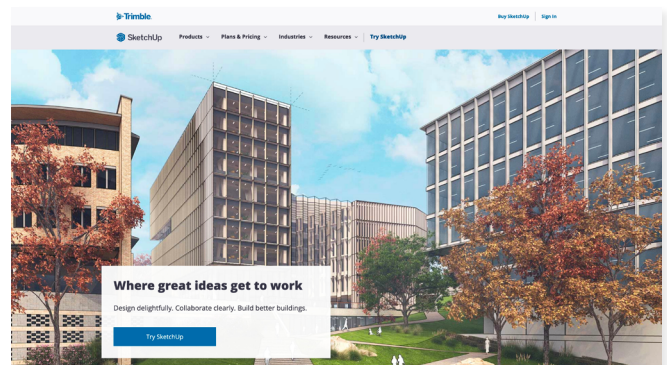
- Make a map of the windiest places in your backyard using the turbine as a measuring tool - is it on an open field, or up on a hilltop?
- Make taller and shorter blades to test how they perform in the wind - what is the best height?
- Design and 3D print two blades to fit the turbine (as they will be quite thin, consider ways to make it stronger).
- Harness the energy of the spinning turbine to lift a small weight.
- Make or improvise your own generator to generate electricity.



schoolgen.co.nz



[TinkerCAD](https://tinkercad.com)



[SketchUp](https://sketchup.com)