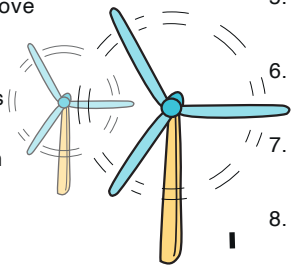
nanogirl's LAB

SUPER POWER: Wind Force!

CAPTURE THE WIND

HOW CAN WE CAPTURE THE FORCE OF THE WIND?

Humans have been using the force of the wind to power our machines for hundreds of years. Wind turbines have large blades with wide surface areas and are built in very windy places. When the wind blows across them the blades catch the wind which makes them spin. Your wind turbine has curved blades which help to capture and funnel the wind inside them. This means you can move your windmill just with your breath! Engineers use giant wind turbines to catch the wind and their turning action can generate renewable electricity.



Wind is made when the sun warms up the air. This warmer air starts to rise and colder air moves in to fill the space. This movement of warm and cold air is known as 'air currents' and the moving air is called 'wind'!

Types of energy, like wind, that we won't run out like wind are called "renewable energy" and we usually get them from the world around us. Solar power from the sun, and wave power from the ocean are other types of renewable energy.

LAB NOTES...

TO MAKE YOUR WIND TURBINE...

BUILD TIME 15 MINS

1. Watch Nanogirl making her wind turbine
2. Measure and cut a 10cm wide strip off the bottom of a piece of paper.
3. Roll it around a pencil to make a thin straw, then tape the edges into place. You can take the pencil out after it's secure.
4. Using scissors, measure and cut two pieces off the end of the paper straw. Each one should be 2cm long. Make sure they are taped securely, and put these aside for now. These will be your bearings.
5. Take your stiff card, draw around your bottle top twice, and cut the two circles out.
6. Poke a hole through the middle of each circle with your pencil. This is your spool
7. Work the pencil through one of the circles until it's about 2cm from the pencil end.
8. Cut a length of string as long as your arm, and tie one end onto the pencil just underneath where the card circle sits. Put tape over the knot to keep it in place on the pencil.
9. Now thread the second circle spool onto the pencil, leaving about a 2cm gap between the two circles. The string should be in between them. This is where the string will roll up.
10. On your thin card, measure and cut a 20cm long square.
11. Fold your card from corner to corner diagonally both ways, then open it up so the creases form a cross shape.
12. Mark the centre point of the cross with a pencil.
13. Starting on the outside, draw a 10cm line down each crease.
14. Cut along the four lines - there should be an uncut section left in the middle.
15. Use the pencil to poke a hole through your centre mark.
16. Attach to the blunt end of the pencil and push up against then tape to the spool circle.
17. Make the blades by bringing each corner of the card one by one to the middle and taping it in place close to where the pencil sticks out, but not actually stuck to the pencil.
18. Tape your ruler onto a table so that about half of it is sticking over the edge.
19. Take the two straw bearings that you cut earlier, and slide them onto the pointy end of the pencil.
20. Tape them onto the ruler spaced slightly apart.
21. Secure your small weight at the long end of the string, hanging down from the table edge.
22. Blow onto the curved blades and watch it pull up your weight!

YOU WILL NEED

- **Stiff card** .....
- **Thin card** e.g. cereal box card .....
- **Plain paper** .....
- **Scissors** .....
- **Pencil** (a long one, not a short stub!) .....
- **Tape** .....
- **Ruler** .....
- **String** .....
- **Bottle top** .....
- **Small piece of blue tack** .....
- **A small weight** .....

(like a tiny superhero!)

How fast does your windmill spin with your breath?

Can you get it to spin using other forms of moving air like taking it outside or using a hairdryer?

How much weight can your windmill lift? Experiment with different weights on the end of the string.

If you were a wind turbine engineer, where in your house is the best place to capture the wind?

If you made bigger wind blades with a larger sheet of card do you think it could lift more weight?