

Wind Turbines

On SCOPE's Eco Science episode, Julia made pinwheel wind turbines using different kinds of materials!

Here's how you can do it at home:



What you need:

Sticks of balsa wood

Plastic needles

Beads

Scissors

Ruler

Different kinds of materials. E.g. paper, cardboard, aluminium foil, baking paper, foam.

What to do:

1. Cut one piece of material into a 15cm x 15cm square.
2. Fold the material in half and then fold it in half the other way. You should now have four diagonal creases.
3. Cut 2/3 of the way down each of the creases towards the middle.
4. Make a hole in each corner of the square and one hole in the centre.
5. Add a bead to the front of the needle, thread the needle through each corner hole and then through the centre hole.
6. Add a few beads to the end of the needle and then pin the needle to the top of a stick of balsa wood.
7. Repeat this process using the other materials.

It's time to test how each pinwheel catches the wind.

8. Stand in front of a fan and record how each pin wheel spins. You will find some spin wheels spin very fast, others change shape, and some don't spin at all!

What's happening?

Why do some of our wind turbine pinwheels spin fast, while some don't spin at all? Well it's all about the weight and flexibility of the materials used to form the blades.

If the blades are made from weak and flimsy material (like baking paper or aluminium foil) then they will change shape or crumple from the force of the wind. So, the blades will no longer have defined angles, and the wind won't be able to lift and turn the pin wheel.

The best results came from using strong, lightweight, and flexible materials (like the cardboard and foam). This is because the wind can easily turn the light material, but the blades are strong enough so that the angles don't change.

The pin wheel is a representation of a wind turbine which uses wind to generate electricity! Winds are caused by the uneven heating of the atmosphere by the sun. Real wind turbines usually have three long steel blades specially designed by scientists and engineers to capture as much wind as possible. The blades rotate 10 to 22 times per minute, converting the kinetic (or moving) energy into electricity, which is then stored in a generator. The electricity that is produced is a renewable source, and the entire process does not create any carbon dioxide.

To put it simply, a wind turbine works the opposite way of a fan. Instead of using electricity to make wind, wind turbines use wind to make electricity!

