

Wind Power

Moving air can be used to power an object's movement. All you need is the right shape to capture the wind.

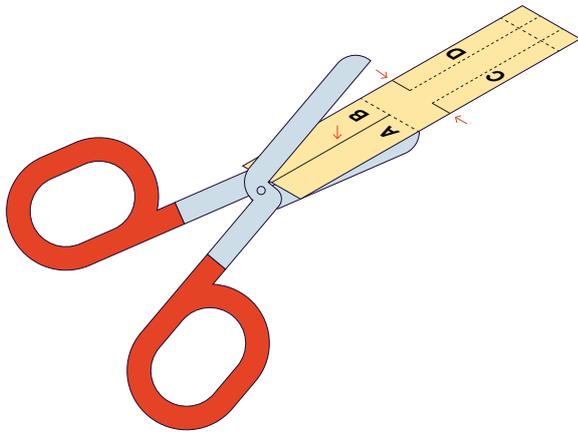
Get this stuff:

- An A4 copy of the 'miniturbine' template
- Blank A4 sheet of paper
- Pencil or pen
- Ruler
- Scissors
- Stop watch
- Chair or high place
- Paperclips (various sizes)

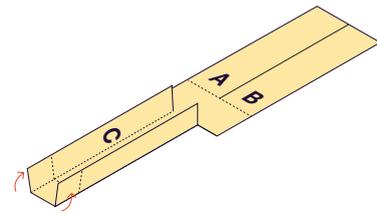
Safety

- Scissors have sharp points and blades. Make sure those using scissors are comfortable and responsible with their use.

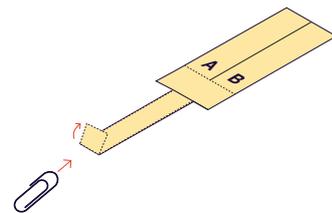
Do these things:



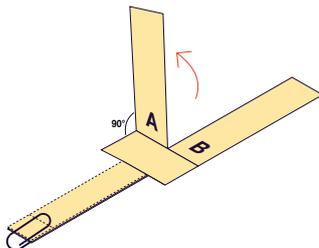
1. Choose one of the three miniturbine sizes. Use the scissors to neatly cut around the bold lines.



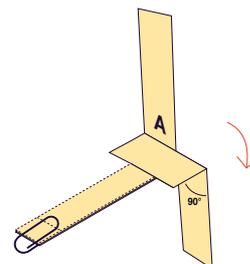
2. Fold along the dotted lines. Flaps C and D fold over one another to form the miniturbine's body.



3. Fold the bottom flap up and secure it in place with one of the three paper clips.

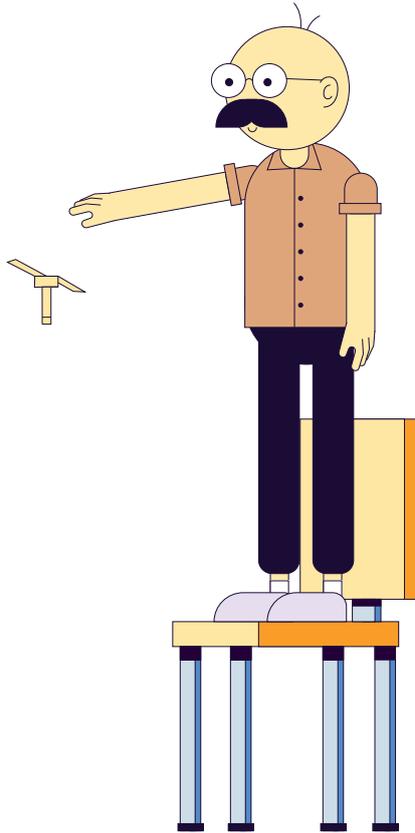


4. Fold flap A down so it forms a 90 degree angle with the body.

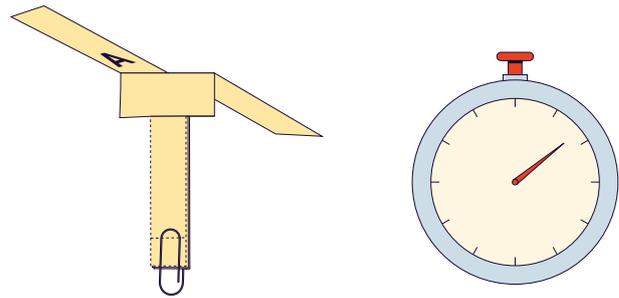


5. Fold flap B in the other direction to flap A, so it aligns and also forms a 90 degree angle with the body.

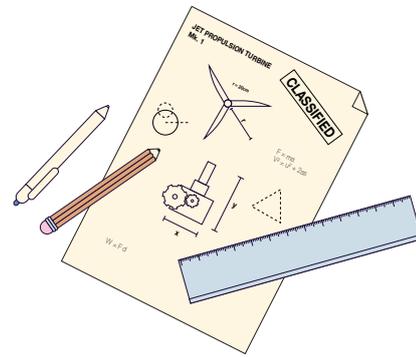
MAKING A MINI TURBINE



6. Carefully stand on a chair, or near a high place such as a balcony. Hold the miniturbine with the tail towards the floor, and let go.



7. Use a stopwatch to time how long it takes to fall to the ground.



8. Use a pencil and a ruler to design your own miniturbine. Try making it a different length. Can you think of another design?

What's going on?

In simple terms:

Pulled down by the mass of paper and paperclip, the wind turbine's blades are dragged down against the still air. This resistance against the blades and body of the turbine becomes thrust, causing it to spin.

In more complicated terms:

As air hits the falling blade, it moves in complicated ways. This movement, called turbulence, is hard to measure easily, but we understand enough to know it causes something called drag as it slides against the surface of an object.

Some of this drag causes air to slide down the blade towards the body of the falling turbine. As it hits the paper, it pushes against it, turning it around.

The size and shape of the blades, size of the body, and the mass all determine how quickly the paper falls and how many times it spins around before hitting the ground.

How do we use this?

Turbines are finned, spinning objects that turn when pushed by a fluid such as air or water. Some turbines need to turn slowly, but with great strength. Others need to turn quickly.

Making a turbine out of strong, lightweight materials and designing them into different shapes help them to turn efficiently under a range of conditions. Wind turbines need to be large, tall, and to turn easily to move powerful magnets that create electricity. Many are formed out of lightweight carbon composites for strength and to make them low weight.

MAKING A MINI TURBINE - TEMPLATE

