

A2 ACTIVITY 3: THE POWER OF THE WIND — MAKING YOUR OWN GENERATOR

Background

In this activity, students investigate how the power of the wind can be harnessed to generate electricity.

Students build their own wind generator. The propeller is connected to a Lego motor with an LED. When the blades of the propeller move, energy is fed to the connected motor. The motor converts **rotational energy** into **electrical energy** to make the light go on.

By going through these steps themselves, students experience first-hand the process of feeding one kind of energy (**motion**) into a generator, and getting another (**electricity**) out. The experience helps them to visualise the concepts of **energy conversion** and the **conservation of energy**, and to appreciate the power of the wind. When the propeller moves, they can see what a simple rotation can achieve. A little propulsion will cause the LED to light up, indicating that sufficient energy has been harnessed.

Students then use their acquired skills and knowledge to investigate the questions posed in **A2.3 WORKSHEET C: THE POWER OF THE WIND — WHAT DO YOU THINK?**

Suggested approaches:

- The following link contains a wealth of information on wind energy:
[EPA Wind Energy – Powering the Future.](#)
 - As a lead-in, students could be set a short research project on wind energy before constructing their own windmill. The following links may be useful:
[Wind Energy Activities](#)
[SEAI's Wind Energy information.](#)
 - Before construction the students could watch the video on the following links:
<https://vimeo.com/20705049> – English version
<http://vimeo.com/28864041> – Irish version
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Equipment required:

- 9V Lego motor or similar, with matching cable
- LED with connecting leads
- Aluminium can
- Ruler
- Permanent marker or CD pen (to write on can)
- Scissors
- Glue gun
- Sandpaper
- Protective gloves (for cutting the can)
- Support rod for windmill
- Hand fan or hairdryer (low watt preferable)

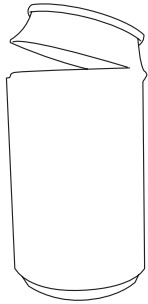


Figure 3: Cutting the top from the can

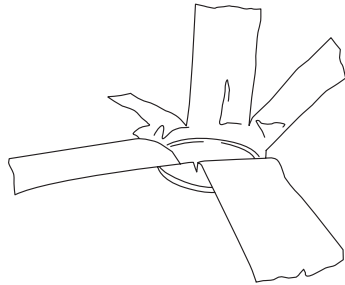


Figure 4: Cutting the blades

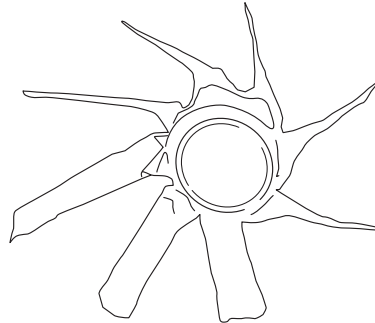


Figure 5: Angling the blades

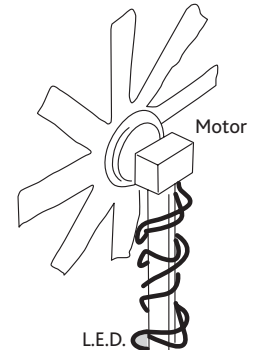


Figure 6: Assembled windmill

What to do:

1. Measure and note the circumference of the can.
2. Wearing the protective gloves, cut the top off the can.
3. Use the marker to make three evenly spaced lines in the side of the can – these will be the blades for the propeller.
4. Cut along the lines.
5. Fold down and carefully angle the blades.
6. Using the glue gun attach an 'axle' for the motor onto to the top of the can and attach the motor to it.
7. Set up a support rod for the motor-windmill structure and connect the LED as shown in the Figure 6.
8. Gently fan the blades. As they move, the LED should light, indicating that electricity is being generated. Investigate using the hairdryer or fan and vary the distance of the blades accordingly.

Having constructed and used the windmill the students are now presented with various questions. Using **A2.3 WORKSHEET C: THE POWER OF THE WIND — WHAT DO YOU THINK?** the class can be divided into groups with each group assigned some questions from the worksheet that they could be asked to investigate. They can then be asked to present their findings to the class. In **A2 ACTIVITY 4: EXPLORING THE WIND TURBINE** students examine the commercial aspect of investing in wind farms.

There is also a version of this activity on page 66 of Science on Stage 1 & 2, available at http://www.scienceonstage.ie/resources/SOS1&2_booklet_Ireland.pdf.