

Investigation 10a Make your own anemometer

Most of Ireland's electricity is produced from non-renewable sources of energy, such as coal, oil and gas. These are called fossil fuels and, in previous investigations, we discussed the damage they can do to our environment when we burn them.

The following investigations (10a, 10b, 11 & 12) can be carried out individually or as a group. They will enable students to investigate the potential to harness renewable sources of energy in and around your school and identify the best locations. The information collected could be displayed on a large coloured map of your school grounds.

Wind energy can be used to generate electricity. But you have to know how fast the wind is blowing before you can decide whether it is worthwhile to harnessing its power.

An anemometer is a device that tells you how fast the wind is blowing. Here's how you can build a model of an anemometer or wind speed indicator. A real one will be able to accurately measure how fast the wind is blowing. Yours will give only a guide to how fast it's blowing; it can't give you an exact wind speed.

YOU WILL NEED A scissors • Four small paper cups (like coffee cups) • A marking pen (any colour) • Two strips of stiff, corrugated cardboard - the same length • A ruler • A stapler • A drawing pin • A sharpened pencil with eraser on the end • Modelling clay • A watch that shows seconds •

- 1 Cut off the rolled edges at the top of the paper cups to make them lighter.
- 2 Colour the outside of one cup with the marking pen.
- 3 Cross the cardboard strips so they make a plus (+) sign. Staple them together.
- 4 Take the ruler and pencil and draw lines from the outside corners of where the cardboard strips come together to the opposite corners. Where the pencil lines cross will be the exact middle of the cross.
- 5 Staple the middle of the cups to the ends of the cardboard strips; make sure the cups all face the same direction.
- 6 Push the pin through the centre of the cardboard (where the pencil lines cross) and attach the cardboard cross, with the cups on it, to the eraser point of the pencil.
- 7 Blow on the cups to make sure the cardboard spins around freely on the pin.
- 8 Place the modelling clay on a surface outside, such as a porch railing, wooden fence rail, a wall or a rock. Stick the sharpened end of the pencil into the clay so it stands up straight.

Consider this

Using your watch, count the number of times the coloured cup spins around in one minute. By doing this you are measuring the wind speed in revolutions (turns) per minute. Anemometers, used by weather forecasters, convert the revolutions per minute into miles per hour (or kilometres per hour). Keep a record of the wind speeds for a few days.

Measure the wind speed at different times of the day. Is it the same in the morning, the afternoon and the evening? Move your anemometer to another location. Is it windier in other places? Do trees or buildings block the wind?



Tell Me More!

The anemometer you have built cannot tell the wind speed in miles per hour, but it can give you an idea of how fast the wind is blowing.

Wind speed is important for wind energy. Wind turbines, which are the machines that change the movement of the wind into electricity, need a constant, average wind speed of about 14 miles per hour before they can generate electricity. That's why wind farms, where there are a lot of wind turbines grouped together, are located in windy spots.

In Ireland most of our wind farms are located on the west coast where wind speeds are higher than the rest of the country. However, one of the biggest wind farms in Europe is being developed ten miles off the Wicklow coast, where the offshore sea winds are as strong as those found onshore on the west coast.

