

<b>Lesson 2</b>	Introduction to Wind Power		
<b>Level</b>	Key Stage 2	<b>Time required</b>	1 hour
<b>National Curriculum Links</b>			
Science, PSHE, D&T, Maths, En1 (view scheme of work for full details of links)			
<b>Aims</b>			
<ul style="list-style-type: none"> <li>• The students will learn how the energy of the wind can be used to generate electricity and power simple electrical devices</li> <li>• They will experiment with the Wind Turbine Kit and use it to power simple circuits</li> </ul>			
<b>Resources required</b>			
Pen and paper, Wind Turbine Kit, electric fan, safety goggles			
<b>Web search keywords</b>			
Wind turbine, wind power, wind farm, how do wind turbines work			

## Introduction to Wind Power

Wind turbines use the wind's power to generate electricity. The wind turbine has blades that rotate in the wind; this rotation is transferred through gears to an electrical generator. The electricity travels down the cables inside the tower, and ultimately to the place where the electricity is needed.

## Wind Turbine Kit

Ensure the students are familiar with the Wind Turbine Kit and how it works before starting the experiments.

Instructions are included with the Wind Turbine Kit. These can be downloaded in PDF format from: [http://www.ecostyle.co.uk/products/wind\\_turbine\\_kit/wind\\_turbine\\_kit\\_activity\\_sheets\\_v2.15.pdf](http://www.ecostyle.co.uk/products/wind_turbine_kit/wind_turbine_kit_activity_sheets_v2.15.pdf)

Ask the students to set up the Wind Turbine Kit according to the instructions and connect the motor module to it. Set up a fan (ideally 15" diameter) as described in the activity sheets.

The polarity of the current generated by the wind turbine is dependant on which way the hub rotates. The LED and buzzer modules are polarity-dependant. If at first they fail to operate, reverse the plugs and try again. The motor module will operate regardless of polarity, but the direction in which it spins will depend on the rotational direction of the generator motor. The LED and buzzer modules will only when operate when properly connected.

## Risk assessment

Ensure the rotor blades are pushed firmly into the rotor hub. If the rotor blade spokes become loose, squashing the spoke slightly with pliers will achieve a tighter fit. Safety goggles should be worn by students operating the equipment and by those in the surrounding area.

## Task 1

Connect the wind turbine to the motor module. Make sure you have made a complete circuit.

Turn the fan on. If the fan has variable settings, set it to its highest (fastest) setting.

The blue propeller on the motor module will rotate. The faster the turbine rotor spins, the faster the propeller will turn.

Disconnect the motor module, and connect the red LED (light-emitting diode) module. The LED will illuminate. The faster the turbine rotor spins, the brighter the LED will become.

Disconnect the LED module, and connect the buzzer module. The buzzer module will sound. The faster the turbine rotor spins, the greater the pitch/volume of the buzzer.

## Task 2

Disconnect the wind turbine from any modules. Now connect the voltmeter/ammeter to the Wind Turbine. The black slide on the meter should be positioned to the left so that 'V' is displayed. Connect one blue plug into the central black socket, and the other plug into the '10V' red socket.

Turn on the fan to its highest setting. What voltage is being generated?

As previously mentioned, the polarity of the current generated by the wind turbine is dependant on which way the hub rotates. If the needle gives a negative reading, reverse the position of the blue plugs.