

<b>Lesson 5</b> Wind Speed and Direction	
<b>Level</b> Key Stage 3	<b>Time required</b> 1 hour
<b>National Curriculum Links</b> Science, PHSE, Maths (view scheme of work for full details of links)	
<b>Aims</b> <ul style="list-style-type: none"> <li>The students will discover how the wind speed and direction affect the wind turbine's output</li> </ul>	
<b>Resources required</b> Pen, record sheet (one per group), Wind Turbine Kit, electric fan, safety goggles	
<b>Web search keywords</b> Wind speed wind turbine, wind direction wind turbine, weather vane, direction of wind turbine, wind turbine facing wind, wind turbine tail plane	

## Introduction

Using all the information the students have gathered so far, ask them to set up the Wind Turbine Kit as efficiently as possible. Set up a fan (ideally 15" diameter) as described in the activity sheets.

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)

## 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

This experiment requires a variable-speed fan, ideally with three speed settings: low, medium and high.

Set the fan to the lowest (slowest) setting and record the wind turbine's voltage output in the chart.

Repeat the experiment with the fan speed set to medium, then with the highest (fastest) setting.

## Task 2

Set the fan to the highest (fastest) setting.

Record the voltage output in the chart.

Now gently swing the turbine head  $45^\circ$  by moving the tail fin (see diagram). Hold the turbine head in this position and record the voltage. Observe how the voltage changes as the turbine head is moved to the new position.

Finally swing the turbine head so it is almost  $90^\circ$  to the fan (see diagram). Hold the turbine head in this position and record the voltage. Again, observe how the voltage changes as the turbine head is moved to the new position.

## Conclusion

Ask the students to discuss their conclusions.

# KS3 Lesson Plan

Record sheet

(Task 1)

	Wind speed		
	Low	Medium	High
Voltage			

(Task 2)

	Rotor facing fan	Rotor 45° to fan	Rotor 85° to fan
Voltage			

Observations during experiment