Lesson 5: Wind Experiment

Materials

* Thames & Kosmos Wind Power 2.0 kit
  + Windmill with Short Blades
* Mulit-Speed Fan (3 speeds)
* Wind Power Experiment Handout

Procedure

The Windmill with Short Blades will be used for all variations. Set up the fan approximately 100 cm away from the windmill with the fan blades in line with the windmill blades. Align the blue gear on the input (attached to the fan blade shaft) with the blue gear on the output (attached to the generator shaft) – this will make the gear ratio 1:1.

**Variation 1:**

* Set up the Windmill with Short Blades with six blades attached. Turn the fan on high speed and observe the brightness of the LED bulb.
* Change the fan speed to medium and observe whether the LED bulb is brighter or dimmer. Record your observations.
* Change to fan speed to low and observe whether the LED bulb is brighter or dimmer. Record your observations.

How does the brightness of the LED correlate with power generation?

How does the wind speed correlate to the power generation? Why do you think this is?

**Variation 2:**

* Set up the Windmill with Short Blades with six blades attached. Turn the fan on high speed and observe the brightness of the LED bulb.
* Set up the Windmill with Short Blades with four blades attached. Turn the fan on high speed and observe whether the LED bulb is brighter or dimmer. Record your observations.
* Set up the Windmill with Short Blades with three blades attached. Turn the fan on high speed and observe whether the LED bulb is brighter or dimmer. Record your observations.
* Set up the Windmill with Short Blades with two blades attached. Turn the fan on high speed and observe whether the LED bulb is brighter or dimmer. Record your observations.

Make sure that you arrange the blades at equal intervals each time. How does the number of blades correlate to the power generation? Why do you think this is?

Teacher Notes

There are many other variations that can be tested based on time and student interest.

* The fan speed variation can be tested on the Windmill with Long Blades
* The angle of the blades can be adjusted
* The gear ratio can be changed (line up different gear combinations)

Measuring the brightness of the LED bulb can be difficult to quantify. A mulitmeter can be used to measure voltage changes for the different configurations if a more precise measurement is desired.