

## Multimeter

Using a multimeter, you can quantify the voltage and/or current your turbine is producing. Learning how to accurately measure the voltage and current for a range of situations will help you compare data when testing blades, comparing gearing, or changing any other variables on your Advanced Wind Experiment Kit. You will also need this information if you want to calculate the amount of power your turbine produces.

### Measuring voltage

Attach the wires from the generator to the multimeter. Polarity is not relevant at this point.

To check the voltage, use the dial on the multimeter and select DC volt (V) and set the number to 20.

Place your turbine out in the wind or in front of a fan and let it spin. It is normal for the voltage readings to fluctuate. Voltage output is often unsteady because of unbalanced blades or the inconsistent nature of the wind.

Voltage is related to how fast the DC generator is spinning. The faster it spins, the higher the voltage. When there is no load on the generator, it has little resistance and can spin very fast.

You can measure voltage with no load, but it is more realistic to place a resistor in the circuit and measure the voltage across the resistor. We commonly use 10, 30, 50 or 100 ohm resistors when measuring voltage on KidWind Turbines.

### Measuring current

To calculate your turbine's power output, you will need to measure current as well. To collect amperage data, you will need to place a load, preferably a resistor, in series with the multimeter so that the generator is forced to do some work.

When measuring current, you are monitoring how many electrons are being pushed through the wire by the turbine. We measure current from our turbine in milliAmperes. Recall that  $1\text{A} = 1000\text{mA}$

Build your circuit with a resistor and then place the multimeter in series. Set the meter to 200 or 20 mA, which is a typical range for our devices. If your turbine produces more amperage, you can turn the dial to a higher range.

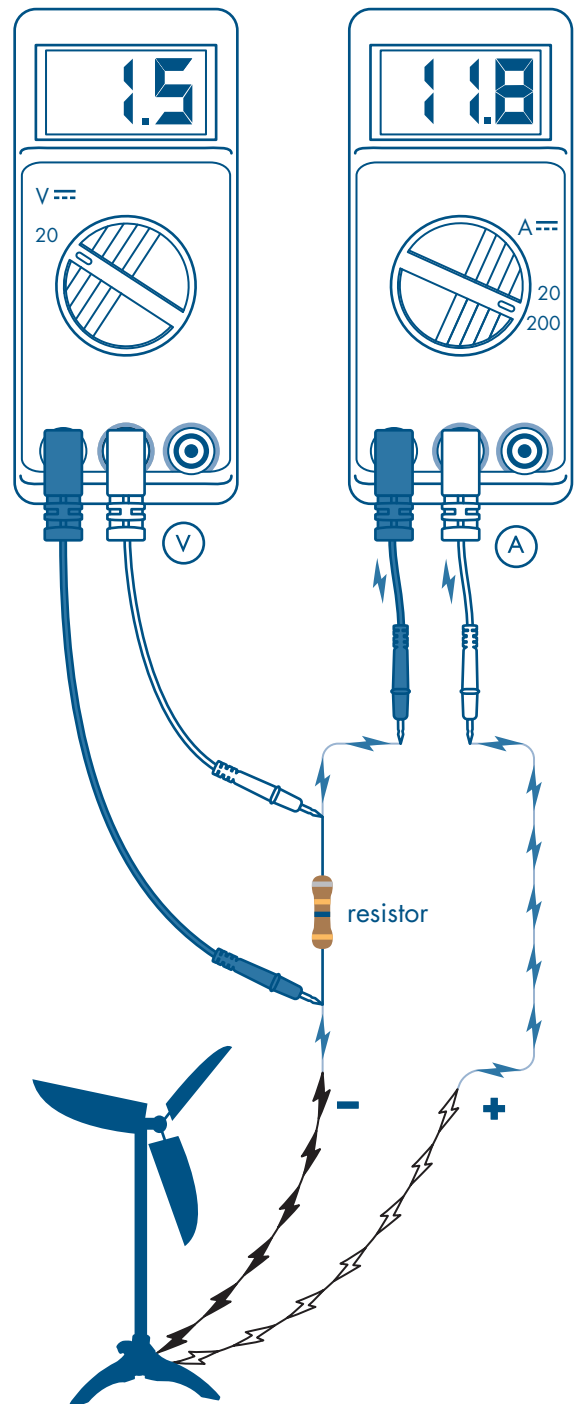
The current that your turbine produces depends on the load placed in the circuit and the torque your blades are generating.

### Measuring DC Voltage

This meter is measuring 1.5 volts.

### Measuring Current

This meter is measuring 11.8 mA.



### CHECK OUT LEARN WIND!

*For more information on using your multimeter—and much more—see the Learn Wind document.*