

Renewable & Alternative Energy Labs

WIND

Building your wind turbine:

1. Assemble the base by locking each of the three legs into the hub.
2. Unwrap the wires of the wind turbine nacelle assembly and feed the wires through the aluminum tower and through the assembled base.
3. Connect the tower to the base.
4. Connect the nacelle to the top of the tower, pulling the excess wire through the bottom of the base as needed.
5. Stand up your MINI Wind Turbine and push the Red Blade Set onto the shaft of the generator.

Testing your wind turbine:

1. Blow a fan towards your wind turbine or take it outside. Experiment with how different angles of the wind affects the electricity output.
2. Connect the stripped ends of the red and black wires to the Sound and Light board with the provided alligator clips. If the wind turbine is producing power, the light will light up and you will hear a sound!
3. Connect the stripped ends of the red and black wires to the multimeter to measure the output of
 - a) Place the black multimeter lead into the 'COM' port and the red multimeter lead into the 'VΩmA' port.
 - b) Set the multimeter dial to measure DC voltage at 20V range



For more experiment ideas and a complete list of grade-level specific activities, see <https://www.vernier.com/kidwind/> and <https://www.vernier.com/experiment/>

What is going on with wind energy in Alberta?

Built in 1993, Cowley Ridge (located near Pincher Creek) was Canada's first commercial wind farm. Now, Alberta has over 900 wind turbines,¹⁹ with a maximum generating capacity of over 4400 MW¹ and wind energy is the fastest growing form of renewable electricity generation in the province. In 2023, wind power made up about 19% of Alberta's Electricity generation.¹



What are some cool features of modern-day wind turbines?

- They adjust their position and blade angles according to the direction the wind is coming. This maximizes the amount of wind that's hitting the blades.
- Wind turbines are around 80m tall, where wind speeds are highest since there are no buildings, hills or trees causing obstructions.
- Each blade is around ~40m long (that's the length of about 4 school buses!). These large blades are able to capture the wind as efficiently as possible.
- Techniques to limit bird and bat mortality have been implemented at some wind farms, including ultrasonic boxes to deter bats, painting the blades black so they're more visible to birds, and using radar imagery to detect groups of bats and birds that are nearby and shutting off the wind turbines to allow them to safely fly through.

