Model Wind Turbine Competition
Grade 6-10 Students

WIND POWER is the fastest growing energy source in the world. In 2015, the total installed wind power capacity worldwide exceeded 450 gigawatts (GW), which represented a massive increase over the previous decade. Although a relative newcomer to wind farm development, Canada's energy industry has grown rapidly since 2000, with installed capacity increasing by an average of 51% annually. Canada's current installed capacity is 11,205 megawatts (MW).

In British Columbia, many sites on Vancouver Island have been identified as having good wind resource potential, with predicted average annual wind speeds of 6 to 8 m/sec. A full 50% of all new energy generation is to come from clean sources, a target chosen voluntarily by British Columbia's electricity distributors.

Accordingly, Skills Canada-BC would like to encourage students in Grades 6 - 10 across the province to use their knowledge, skills, leadership, teamwork and ingenuity to design and build a working model wind turbine in a one-day competition.

Eligibility

The winning team from a regional competition is eligible to register in the Provincial Competition. Once all the regional gold medal teams are registered and if space is available then teams will be accepted on a first-come, first-serve basis. Extra teams will be placed on a waitlist and will be notified if there is space available.

Teams may consist of up to 4 students in grades 6 – 10.

Each team must have one teacher/advisor.

Check the website www.skillscanada.bc.ca in February for details on registration.

The Challenge

Teams of one to four students from the same school will design, construct, and test blades for a model wind turbine. The students will be given specific materials to construct the wind turbine and will have approximately **2.5 hours** of building time at the competition site. You can practice and bring design sketches, but the turbine will be built on-site, not pre-built.

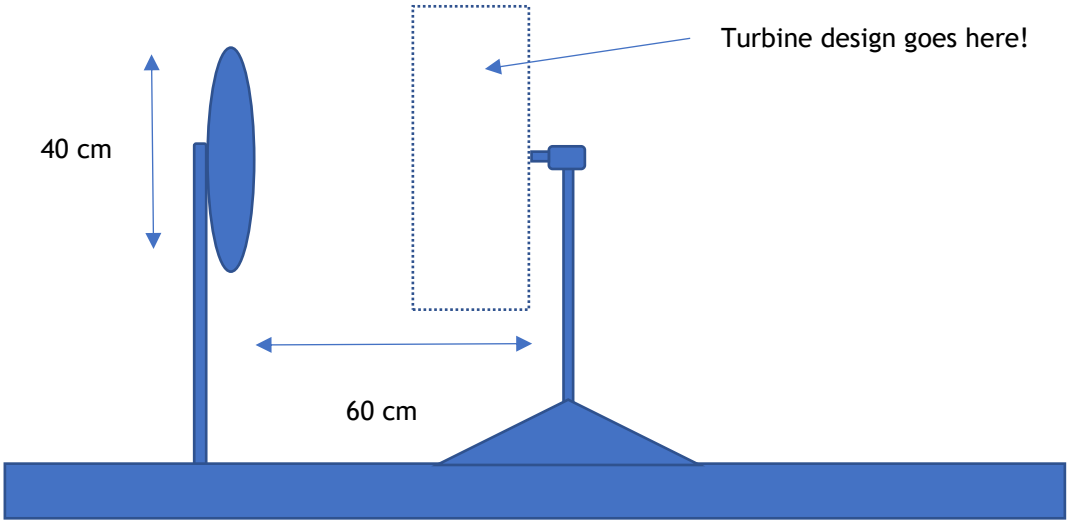
MATERIALS

The following items ***will be supplied by the sponsors*** for wind turbine construction on the day of competition:

Item	Quantity
• Balsa wood, 4" x 36" x 1/8" (10.2 cm x 91.4 cm x .32 cm), sheet	1
• Tape, masking, roll	1
• Hot glue gun(small) and glue sticks	1
• Propeller mount, max 12 hole, adjustable	1
• Wooden dowels, 1/4" diameter	max 12
• Utility knife, retractable	1
• Scissors, pair	1
• Geometry set	1
• Sandpaper	1 sheet

TESTING

Student turbine blade designs will be fitted onto an existing turbine tower, complete with axle and motor assembly. The air stream will be produced by a 48 W household fan of diameter 40 cm, set back 60 cm from the turbine assembly, lined up to match the height.



The model turbines will be judged by the wind-capture power-generating capacity, using the formula P = V x I where V = voltage and I = current as measured by a Vernier Energy Probe attached to the motor assembly over a one minute period with the fan on the highest speed setting. The wind turbine that has the highest peak rating in milliWatts (mW) will be declared the winner. Where a tie occurs, the lighter design will be considered the winner. Judges' decisions are final.

Advice For Teachers

Teacher advisors are allowed to provide guidance and advice **before** the competition starts and hosting a practice session is encouraged. The challenge is designed to test problem solving skills and involves a broad base of curriculum including covered prior to the competition:

- Turbine and blade design research
- Wind power/energy and geographical constraints
- Electricity generation theory and practice
- Construction principles: structure and strength
- Adhesives and bonding
- Leadership
- Teamwork
- Time management

Recommended Schedule for the Day

9:00am - 9:30am	Announcements/Instructions
9:30am - 12:00pm	Turbine Blade Construction
12:00pm - 12:30pm	Lunch (provided) (no advisor contact)
12:30pm - 1:15pm	Final Touch Ups
1:15pm - 1:45pm	Judging of Power Generation
2:00pm - 3:00pm	Awards Ceremony

For additional information:

Skills Canada British Columbia
(604) 432-4229 www.skillscanada.bc.ca