

Wind Power Generation Competition Rules

(A simplified version of Wind Power event in Science Olympiad)

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rev. 3

1. Description:

A student or team of up to 3 students (a Team), using the regular 2-liter soda bottle, build a blade assembly (Wind Turbine) that consists of any kind of propeller, pinwheel or rotor attached to a standard 12 cm CD disc, which will be used to capture wind power to generate electricity.

2. Event Supervisor (ES) will provide:

- 20" multispeed box fan(s) to be used as wind source – using the **High** and **Low** wind settings
- Support stand(s) that allow for vertical and horizontal adjustments of the Wind Turbine
- Motor/Generator mounted to the support stand, with adaptor to attach/mount the standard 12 cm CD
- Load resistor between 5 – 25 ohms wired in parallel with the Motor/Generator that must be the same value for all teams for official measurements.
- Device to measure voltage across the load resistor.

3. Construction:

- No modification to the standard CD is allowed, except to affix the blades to it by hot glue. The blade material must be from the standard 2-liter soda bottle.

4. The Competition:

- The fan is mounted on a table to serve a wind source.
- There will be **two** measurements per team, one for **High speed** and one for **Low speed**
- Official voltage measurement is 30 seconds during the Setup & Testing Period **per each wind speed**
- Setup & Testing Period per each wind speed:** Student/Team must compete the setup and device testing in no more than:
 - 3 minutes per wind speed for **High School** Division
 - 4 minutes per wind speed for **Middle School** Division
 - 5 minutes per wind speed for **Elementary School** Division
- During their testing period, per Division time length, teams must attach their Wind Turbine to the motor/generator mount and position it the way they want.
 - The closest distance between the fan and any part of the Wind Turbine is 5cm
 - At the request of the students, the Event Supervisor must turn On or Off the fan during the setup to allow the student to better position the Wind Turbine relative to the fan.
 - Teams are allowed to adjust, modify, start and stop the rotation of the Wind Turbine, and reposition the support stand during the testing period.
 - No voltage measurements are allowed or seen by the competitors during the testing period.
 - Modification is not allowed during this 30 second measurement period.
- No later than the last 30 second of their Setup & Testing Period, the Event Supervisor (ES) will start the voltage measurement. Team may request to start testing before the last 30 seconds.

5. Scoring:

- If the Wind Turbine stops turning for a period of 10 or more seconds during the measurement period, or has any pieces that detach from the Wind Turbine, the Final score will be multiplied by **0.9 – 10% penalty**.
- If the Wind Turbine falls off from the generator, the Final score will be multiplied by **0.8 – 20% penalty**.
- If the CD is modified, except affix the blades to it, the team is **disqualified**.
- Final Score:**
 - Low Speed Score:** The **Low Speed Max value** / **Highest Low Speed value of ALL Team in the Division**
 - High Speed Score:** The **High Speed Max value** / **Highest High Speed value of ALL Team in the Division**
 - Final Score = Low Speed Score + High Speed Score – any penalty**
- Ties breaker:** 1st – Highest **High Speed** voltage. 2nd – Highest **Low speed** voltage