KidWind PROJECT

KIDWIND Challenge

Rules and Guidelines

www.kidwind.org/challenge

Partners:

WindENG 2009

NYSERDA

WIND ENERGY

KidWind Challenge 2009

Rules and Guidelines

The following rules may be amended and/or modified up to the day of the competition:

LOCATION

Regional competitions will be held in Buffalo, Albany, Central NY & NYC Area. Dates and locations for each event are posted at www.kidwind.org/challenge. Events will last most of the day depending on entries. Food and snacks will be provided as will other information related to residential and utility scale wind energy development in New York State.

DIVISIONS

There are two divisions for the 2009 Wind Turbine Challenge

Middle School	Grades 6-8
High School	Grades 9-12

PRIZES

Prizes will be awarded to the top three winners of each division at each location. Prizes will be awarded based on the scores determined by the Judges. Local judge decisions are final.

High School Division		Middle School Division	
1st PLACE	$300	1st PLACE	$300
2nd PLACE	$200	2nd PLACE	$200
3rd PLACE	$100	3rd PLACE	$100

Other prizes may be awarded depending on donations from local companies and organizations.

REGISTRATION PAGE

You must register for an event in order to attend. Registration also makes you eligible to receive a set of turbine building materials at reduced cost. Head to www.kidwind.org/challenge to register.

MATERIALS AVAILABLE

In an effort to help teachers and students compete in this challenge the KidWind Project is offering, on a first come, first serve basis, basic wind turbine materials at a subsidized cost. To be eligible for these materials you must be registered for a regional competition. Once registered, you will find information about ordering.

Team Kit ($15 including shipping):

- (2) Competition Generators (Mabuchi RF-500TB-10750)
- (3) Resistors (1w 10 ohm, 30 ohm, 50ohm)
- (1) Simple Digital Multimeter
- (1) 12 Hole Crimping Hub
- (20) Dowels

You will be responsible for all other materials needed to build your turbine — towers, blades, gearing etc.

Teachers Kit ($100 including shipping)

You need to register at least 3 teams for the competition to be eligible to receive these materials at the reduced costs.

Enough materials for 20 teams (40 – 80 students)

- (25) Wind Generator Motor
- (10) Resistors (1w 10 ohm, 30 ohm, 50ohm)
- (4) Simple Digital Multimeter
- (20) 12 Hole Crimping Hub
- (200) Dowels

PARTICIPANTS

Any student grades 6-12 is eligible to enter a team for the competition. Home school participants are welcomed as well.

Teams can have 1-10 participants.

Each team must have an advisor/mentor. The advisor/mentor will be responsible for registering the teams for the competition and managing the teams' progress. Only the students are required to attend on the day of competition. IMPORTANT: Teams that register and fail to show up will impact your schools ability to enter teams in the future. Make sure students are serious about their entry!

Schools that have a large number of teams signed up for the competition may decide to hold a local competitions to reduce the number of teams heading to a regional event. Schools that do this will not be penalized if all the teams do not show up.

The KidWind Project will not be providing or be responsible for supervision of the students.

WIND TURBINE DESIGN CRITERIA

Power must be generated solely by the wind from the wind tunnel once testing commences.

You must use a specific DC motor as the sole power generator for your wind turbine. (Kidwind offers these motors at reduced prices for students and teachers who are registered for the event.)

You can attach whatever you want to the generator (eg. gears, bearing, supports etc.).

Your wind turbine must be free standing -- a tower/stand will not be provided!

Your turbine (tower, nacelle, and blades) must be able to fit into the wind tunnel and must also be able to operate in the 48" x 48" x 24" internal dimensions of the wind tunnel. It is highly recommended to make your design fit with lots of room within these dimensions.

A (securing mechanism) will be protruding from the floor of the wind tunnel for the purpose of securing your wind turbine in the tunnel. Make sure your device can be secured to this device.

Accessible wire connections will be required from your generator. These will be used to attach a 10 watt 50 ohm resistor in the circuit on competition day.

There are no budgetary restrictions for your windmill designs. Keep in mind that part of the judging

is the economical use of resources. Please use resources responsibly.

While it is legal to use gears and other drive components that are manufactured you may not use pre-packaged wind turbine kits available from retail companies. The wind turbine blades must be made by your team (eg. you cannot use fan blades or other pre-manufactured blades)

Your turbine can be vertical or horizontal axis.

NO METAL BLADES ARE ALLOWED!

Do not hide the generator on your design such that a judge cannot view it and determine its validity.

TESTING CONDITIONS

Wind turbines will be tested in the wind tunnel with a wind speed of 5 m/s --- PLEASE NOTE wind at 5 m/s through a wind tunnel is surprisingly powerful…test your device for high winds!

The internal dimensions of the test chamber are : height 48" , depth 28", width 48".

To secure the turbines to the chamber, there will be anchor points in the floorboard 6", 9" and 12" from the center, at 0, 90, 180 and 270 degrees. The bases of the turbines must have 5/16" holes through which a bolt may be inserted and tightened into one or more of the anchor points from above.

You will be given 3 minutes to setup your turbine in the wind tunnel. Make sure you practice setting up your wind turbine in 3 minutes before the competition date.

In order to receive full marks for wind turbine functionality your wind turbine design must be able to start once the wind tunnel is activated with no external assistance.

The wind tunnel will be constantly running during testing. Average power will be calculated after 60 seconds of operation.

Once the wind tunnel is up to speed (5 m/s) and the 60 second timer is started, testing will not be stopped. If your windmill slips, breaks apart, or falls over during the testing period the power score will still be averaged across the total 60 seconds.

If your windmill slips, breaks apart, or falls over before the 60 second timer is started you will be given 10 minutes to setup your windmill again. A third setup time will not be granted.

ATTENDANCE REQUIREMENTS

In order to be considered for the competition all members of your team must be present on the competition day unless:

- Some or all of your team members are unable to attend because of a scheduling conflict with a school sanctioned trip (a signed note from the Teacher Advisor is required).
- A team member cannot attend due to illness or family crisis (a signed note from the Teacher Advisor is required).

EVALUATION

POWER EVALUATION (70% of Score)

Average power (milliamps x voltage) will be calculated (70% of the evaluation, score is relative to the rest of the competitors).

DESIGN EVALUATION (20% of Score)

A panel of judges will examine your wind turbine design. You must be prepared to discuss/ defend the design choices you incorporated. The design criteria you will be judged on include the choices/mechanisms by which you maximized power output, the craftsmanship of your design, creativity, and environmental choices (e.g. did you use recyclable materials, can you easily take your windmills apart after the competition and reuse the parts?).

The judging will be performed right before the testing of your design in the wind tunnel.

TEAM DESIGN STATEMENT (10% of Score)

Judges will also assess a design/results statement presented by each team.

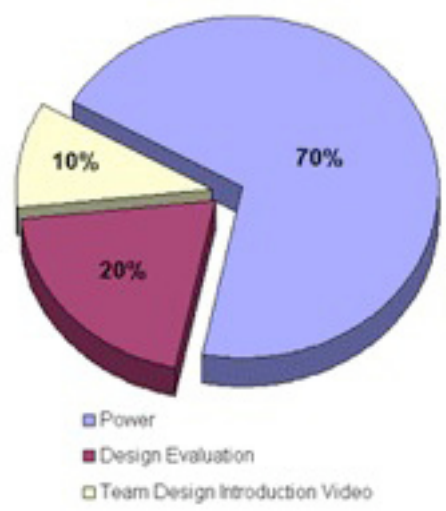
This requirement can be satisfied by:

- Writing a short report (maximum 3 pages)
- Making a short video (maximum 2 minutes)
- Making a poster (36" x 24")

In this statement contestants should introduce themselves and their wind turbine. Some things to consider include:

- City and school they hail from
- Innovative & creative parts of their design
- Problem areas they had with the design

The evaluation of the statement will be based on quality, enthusiasm, and creativity. Enthusiasm & humor is encouraged — especially in the video.



This statement may be uploaded to the competition page or mailed to KidWind 20 days prior to your competition date. Failure to submit this statement will make you ineligible for the challenge.

2093 Sargent Avenue, St. Paul, MN 55105
www.kidwind.org ✦ Phone:877.917.0079
Fax: 208.485.9419