

Name: _____

Date: _____

Environmental Science

Renewable Energy

Blade Design Challenge

Blade design and engineering is one of the most complicated and important aspects of current wind turbine technology. Today engineers are trying to design blades that extract as much energy from the wind as possible throughout a range of wind speeds. Plus these blades need to be durable, quiet and cheap.

Challenge: Each team will design a set of that generates the maximum amount of electricity at low and high wind speeds using the least amount of materials. You may use any of the following construction materials: *Balsa Wood Sheets, Cardboard, Tissue paper, Paper/plastic cups, Index cards, String, Toothpicks, Popsicle sticks, Tape*

Competition: During the competition each set of blades will be tested for 30 second at high and low wind speeds. The highest voltage produced will be recorded. The team with the highest *average* output voltage WINS!

Design Constraints:

- Blades must not be more than 20" long
- Blades can not have any "sharp" points
- Must keep track of the materials you use on your data sheet
- May only use construction materials specified above

Design Questions:

1. How many blades do you plan to place on your hub?
2. How long are you going to make these blades?
3. What characteristic do you think has the most impact on how much energy your blades will produce?
4. What materials are you going to use? Why:
5. Test your first design. What modifications are you going to make to the final design? Why are you going to make these changes?

Final Design:

1. How many blades did you use?
2. What was the length of the blades?
3. What was the width of the blades?
4. What materials did you use?
5. What was you high wind voltage?
6. What was your low wind voltage?
7. What was you average voltage output?
5. Draw a sketch of your blade shape.

