

NAME _____

DESIGN TEAM NAME _____

Turning Turbines- *Blade Design Contest*

A. Your group has been challenged to design blades for your class's wind turbine. Your goal is to make a set of blades that would be the most effective at generating power using the wind turbine. Your team must design the shape of your blade, select materials to make that shape most effective. Once your blades are ready test them for approximately thirty seconds and record the highest voltage produced during that time.

1. Draw the shape of your blade design below; make observations about your design especially of the materials you used.

of Blades _____

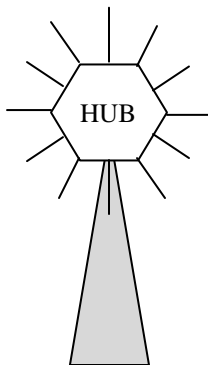
Length _____ cm

Width _____ cm

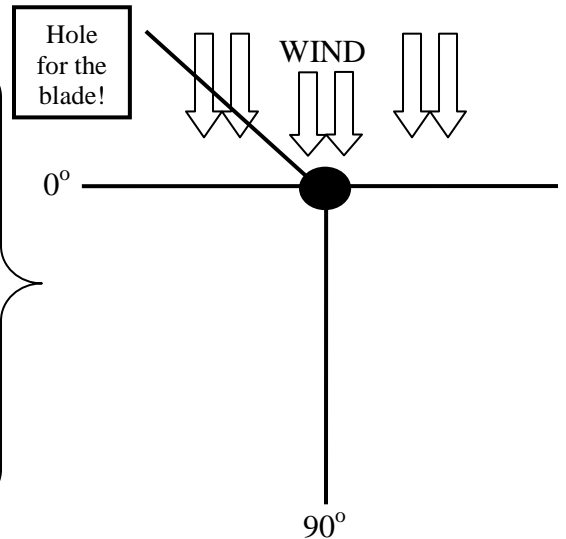
OBSERVATIONS:

2. Now decide upon the arrangement of your blades on the turbine hub (especially the angle at which the blades are turned to best "catch" the wind!). First, mark the positions of your blades around the hub on the diagram below. Then, draw a line or use one of the lines provided to show the approximate pitch/angle of one of your blades in the diagram on the right (as if you were looking down on the turbine and the blade was inserted in the black hole). Make any additional observations in the box above that might help you later describe your blades' effectiveness.

12 possible blade positions around the hub! Where are you positioning your blades? Draw them in!



When the blade is flat, face to the wind, the angle/pitch is 0° . When the blade is twisted so its edge is pointing back toward the gears, the angle/pitch is 90° .



3. Now test your blades' effectiveness in the turbine! Run for about 30 seconds and record the highest volt reading you observe during that trial.

TRIAL 1 = _____ VOLTS

4. Did your blades generate electricity? _____

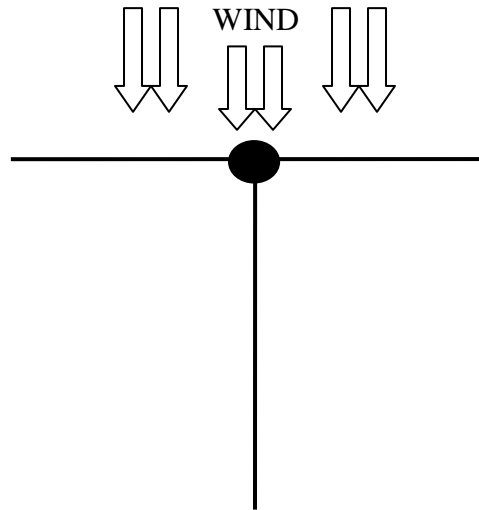
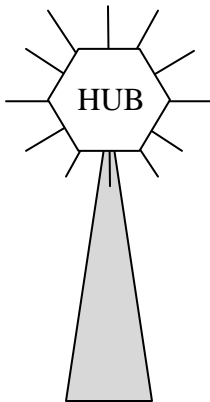
B. Scientists and wind farmers are always adjusting their blades and turbines to increase their effectiveness at generating electricity. Now make any adjustment your design team might think would improve your blades' effectiveness and test again!

1. Describe below the adjustments you made to your blades. If your design team added blades and/or changed the shape draw the new shape below, and be sure to mark the new positions on the diagram below. Draw the angle/pitch of your blades for the second trial. Did your blades generate a negative volt reading in the first trial? What can you adjust to get a positive reading this time?

of blades _____

Length _____ cm

Width _____ cm



NOTES ON ADJUSTMENTS:

2. Now test your blades' effectiveness in the turbine! Run for about 30 seconds and record the highest volt reading you observe during that trial.

TRIAL 1 = _____ VOLTS

3. Did your blades generate electricity? _____

4. Did your blades perform better after your design team made the adjustments? Why or why not?

C. Share your results with the class! Compare voltage generation to see whose design was most effective!

1. Which design was the most successful? Write about why you thought this design was the most successful. What were some differences with your design team's blades? What was their spacing, and angle/pitch? Did it differ from yours? *If your design team had the most effective blades write about why you think they worked so well.*

2. Did your design team ever get a negative volt reading? What was happening with the turbine to result in a negative reading? Why do you think that was? What did your design team do to fix this? Did it work?

3. Does the wind always blow from the same direction? If you were a wind farmer and used the wind to generate as much electricity as possible how would you make sure your turbines were positioned to harvest the most wind? If you were a wind farmer getting negative voltage readings, or not maximizing electricity generation, what adjustments could you make to your blades or turbines to change that?

4. Write two things you learned about wind farming, wind turbines or electricity generation from wind energy.
