

# 10 Experiments

*...before you add glue!*



## 10 Experiments



1. Make all four turbine blades point in a clockwise direction, as seen from above the wind turbine, looking downward. (See Step 5 of assembly instructions). Hang in a windy location. Which direction does the wind turbine spin? Why?
2. Reverse the direction of all four turbine blades. Hang in a windy location. Which direction does the wind turbine spin? Did the rotation direction change?
3. Change locations of the wind turbine with all four blades positioned in the same direction. Place the turbine in three locations that have different wind speeds, or use a fan\* with at least 3 speed settings. Name one location or one speed setting as "Light Wind", the next as "Medium Wind", and the last as "Strong Wind". Hang the turbine where each wind speed will affect it. What did you observe? How was the turbine affected by each wind speed? How quickly did the turbine rotate faster/slower as wind speed changed? Did the turbine become unstable at the fastest speed? How could you modify the turbine to be more stable? \*Note: Do not place the fan too close to the turbine. When produced from a fan, wind is much less linear and more turbulent and circular, like a tornado being directed at the wind turbine. Place the fan further away so the wind can change to a linear direction.
4. Reverse direction of only the top two turbine blades. Hang in a windy location. What did you observe? Did the turbine spin? What was the wind speed...Light, Medium or Strong? Did a change in wind speed seem to make any difference?
5. Position all four turbine blades in the clockwise direction. Reverse direction of only one top blade and one bottom blade. Hang in a windy location. What did you observe? What was the wind speed...Light, Medium or Strong? Did a change in wind speed seem to make any difference?
6. Remove the top turbine blades. Position the bottom two blades in the clockwise direction. Hang in a windy location. What did you observe? Did a change in wind speed seem to make any difference?
7. Remove all wind turbine blades, add two wind turbine blades to only the top level. Hang in a windy location. What did you observe? Did a change in wind speed seem to make any difference?
8. Add all four wind turbine blades and position them all in the same direction. Reverse the direction of only one blade. Hang in a windy location. What did you observe?
9. Double-up the wind turbine blades so that they are all on the same level, bottom or top level. On one side of the square dowel, place two wind turbine blades about two inches apart, one right in front of the other, and do the same on the other side of the square dowel. Remember to point blades in a clockwise direction. Hang in a windy location. What did you observe?
10. Remove all four wind turbine blades. Use the ruler provided on the assembly instruction page. Using a pencil, pen or marker, write a number on each round dowel at each inch, where the number "1" is closest to the square dowel. Place all four blades at the one inch location. Remember to point blades in a clockwise direction. Hang in a windy location. Position blades at two inches, then hang again in the windy location. Repeat until the blades are positioned at the end of each round dowel. What did you observe? Did the wind turbine spin faster with the blades closer or further from the square dowel? Calculate speed of rotation: place a large "X" on the outer side of one blade. As the wind turbine spins, count how many times you see the "X" as it spins by in 15 seconds. Multiply this number by four to calculate the **Revolutions Per Minute (RPM)** the wind turbine spins. Repeat this process placing the blades at different "inch" markers.

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