



**CALIFORNIA STATE SCIENCE FAIR  
2011 PROJECT SUMMARY**

<b>Name(s)</b> <b>Madison H. Martin</b>	<b>Project Number</b>  31482
<b>Project Title</b> <b>Double or Triple Scoop: How Different Blade Sizes and Types Affect a Savonius Wind Turbine's Energy Output</b>	
<b>Objectives/Goals</b> I conducted this experiment to determine which size blade and type of blade would generate the most electricity in a Savonius wind turbine. My first hypothesis is if I build a wind turbine, then it will generate electricity to light the LED. My second hypothesis is if I use the 4-inch double blade, then it will generate more electricity than the 2-inch or 3-inch double blades. My third hypothesis is if I use the 3.5-inch triple blade, then it will generate more electricity than the 2.5-inch or 3-inch triple blades. My fourth hypothesis is if I use triple blades, then they will generate more electricity than double blades. <b>Abstract</b> <b>Methods/Materials</b> I built a Savonius wind turbine and tested six different blades. Each blade was made from plastic soda bottles and cardboard. The rotor for each blade consisted of sixteen rare earth magnets. The stator on the base consisted of eight coils of copper wire in a clockwise direction. I measured the voltage of each blade by setting the multimeter to 200 volts to light the LED. <b>Results</b> The 4-inch double blade produced a higher total average of 2.47 volts, compared to the 2-inch double blade total average of 1.99 volts and the 3-inch double blade total average of 2.31 volts. The 3.5-inch triple blade produced a higher total average of 2.75 volts, compared to the 2.5-inch triple blade total average of 2.07 volts and the 3-inch triple blade total average of 2.38 volts. <b>Conclusions/Discussion</b> My first hypothesis is true because each wind turbine produced various voltages to light the LED bulb. My second hypothesis is true because the 4-inch double blade had a greater total average than the 2-inch and 3-inch double blades. My third hypothesis is true because the 3.5-inch triple blade had a greater total average than the 2.5-inch and 3-inch triple blades. My fourth hypothesis is true because each triple blade had a total average greater than each double blade. The wind turbine with the 3.5-inch triple blade had the highest energy output compared to the other blades. Savonius wind turbines produce clean renewable energy and help slow the increase in greenhouse gases and pollution. Further work should be conducted outside to examine how different climates affect a Savonius wind turbine's energy output.	
<b>Summary Statement</b> I built a Savonius wind turbine and tested six different blades to determine which size blade and type of blade would generate the most electricity.	
<b>Help Received</b> My father and I shopped for project materials; My mother helped me untangle copper wire.	