Laura Mummery
Junior Division Energy & Transportation

*Blowin’ In The Wind*

My question is, will a wind turbine produce more power using blades with a larger or smaller surface area? I will hold the wind velocity; swept area; and the air density constant. The only variable in the power formula for wind turbines will be the performance of the blades themselves. I will measure the DC voltage from the wind generator which is an indication of the blade speed. I will build three different sets of wind turbine blades that have different surface areas. These are a triangular, thin curved blade, and wide curved blade. I will test each of these blades on the wind turbine with 2, 3, and 4 blades per style of blade, and vary the pitch of the blades. I think that a wind turbine that uses more blades that are wider and have more surface area will produce more power than a turbine that uses fewer blades that are smaller in area. The wide curved blade at a pitch angle of 10 degrees and using only 2 blades produced the most power at 1.83 volts. I also found that for each type and number of blades the maximum voltage occurred at either 5 or 10 degrees of pitch angle. A surprising result was that for the long triangular blades they were the most stable and produced very little vibration, even though they produced less power. In conclusion, the wider blade with greater surface area produced more power. I was right that the wider blade would produce more power.