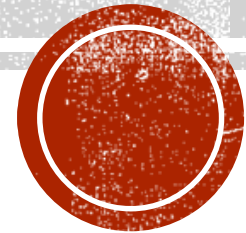


# TEAM SHURIKEN



Online Competition KidWind Challenge



# TURBINE DESIGN

- Our turbine is designed to minimize friction to ensure a high efficiency
- We used only parts we needed in the design, to ensure that no materials were wasted in building this turbine
- We created a gear ratio of 7 in order to maximize the speed at which the generator turns without increasing friction



# BLADE DESIGN



- The design of our blades is based on a Japanese throwing weapon: the Shuriken
- We hypothesized that the pointed edge would allow the blade to easily rotate
- We also created a chamfered and filleted edge on the blades to create an effect similar to an airfoil on the wing of a plane
- We used three blades to maximize the efficiency and decrease the weight of the blade attachment
- Our blades are made of balsa wood to make them easier to produce and lighter, with a swept area of  $3,421\text{cm}^2$



# IMPROVEMENTS

- When we first designed our turbine it had a higher gear ratio of 49, with an additional 84 tooth gear and 12 tooth gear, however when we attached the generator to our driven gear we found that the added friction, coupled with the low torque of the gear ratio made it very difficult for the turbine blades to rotate



# RESULTS

Variable	Value
Turbine Rotor Swept Area (cm <sup>3</sup> )	3,421
Turbine Fan Speed (m/s)	1.71
Resistor Value (ohms)	99
Turbine Power (Watts)	0.154
Available Power (Watts)	1.052
Turbine Voltage (Volts)	3.84
Efficiency	14.6%

