Team Name: GaleForce1
School Name: Benicia High

1. a) We are using a KidWind Generator
2. b) DC: Is your power output conditioned to be DC and below 30V and 1A?
    i. □ Yes
3. Does your turbine fit in the 3'x3' wind tunnel?
    i. □ Yes
4. Do you have wires at the bottom of the wind turbine?
    i. □ No
5. Are your wires labeled + and -?
    i. □ Yes
6. Do you have a gearbox?
    i. □ Yes
    ii. If so, what is your gear ratio: 12.5
7. What was your maximum voltage output?
    a. 4.9V
8. If your turbine was under a load at the time of testing the voltage, describe the load.
    a. Our turbine was under a 30 ohm resistor.
9. What materials did you use?
    a. PLA, M4 screws, bearings, wooden dowel, DC motor, metal rod, KidWind kit.
10. What was the optimal pitch of your blades?
    a. 5 degrees
11. Detail any use of airfoils in your design.
    a. NACA 23012
12. Detail any computer software you used to design/print/build your blades.
    a. Fusion 360, Bambu Studio
13. Detail any advanced manufacturing used to create your wind turbine (i.e. laser cutting, 3D printing, etc.).
    a. 3D printing
14. Describe any mechanisms or capacitors you have used to store electricity.
    a. □ No mechanisms or capacitors used.
15. Detail any microcontrollers integrated into your device. Describe the goal and the benefit of your microcontroller(s).
    a. □ No microcontrollers used.

Process: We used the NACA airfoil database to find an airfoil that met our project requirements. We used NACA 23012 because it seemed to be the most efficient blade for the scale of our project, wind speed, and angle of attack. It had the highest lift to drag ratio. We imported the NACA blade into fusion as a canvas and then made a 2D sketch from the canvas. We made a loft between the top airfoil and the bottom airfoil to model the peg holes.

Cites and Sources

Bambu 3D printer
Fusion 360
Bambu Slicer
NACA: https://ntrs.nasa.gov/citations/19930091603

The team contributed together in completing each portion of the project report.