Team GFWGEFTADGAFF
(“Wind Gang”)

Jason Young
Macy Kenworthy
Hayden Johansen
& Cody Weisz

Mt. Edgecumbe High School – Mr. Hunter
The design process...
Our Blade Design(s)...

- We constructed research and determined a design with 5 evenly spaced, curved blades.
- We encountered multiple difficulties: the hub lacked the sufficient space for 5 evenly spaced blades and we couldn’t draw even curves on the blades by hand.
- We came to the conclusion to go for a more simple design and keep only 3 blades.
- After testing multiple angles for our blades we discovered that a 15° angle provided the most efficient energy production.
Our Blade Design(s)...

- After testing our first blade multiple times, we decided it wasn’t good enough and we wanted something better, so why not try something bigger? After increasing the dimensions of the blade, we had a bigger blade. We tested it multiple times at 15° and learned that over all, it was a better blade. In this case, bigger was better.
Our Blade Design(s)...

Just when we thought we were done designing, we came up with another idea. What if we made the bases of the blade bigger? Would it catch more wind? So a couple of us set out to design a new blade with a wider base, but we kept all the other dimensions the same. After testing with our gearbox, we automatically knew that this bigger base just might do the job.
After spending time thinking up a way to improve our output, Jason came up with a gear box that didn’t get the job done. The problem with this more complex gear box was our blades were too light and the teeth on a blade we were using were bad, and one of the bigger gears was crooked. So, after all this testing and experimenting, he engineered a much simpler gearbox consisting of 2 gears but outputs a substantial amount of energy.
DATA ANALYSIS:
We attempted a series of different angles and widths for both our wings; however, Jason’s revolutionary classroom Lego-gear design amplified and perfected our output expectations for the lab.

<table>
<thead>
<tr>
<th>Blade #1</th>
<th>Angle</th>
<th>Output</th>
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<tbody>
<tr>
<td></td>
<td>21°, 15°, 14° CC</td>
<td>.424V</td>
</tr>
<tr>
<td></td>
<td>15° CC W/ gear</td>
<td>1.092V</td>
</tr>
<tr>
<td></td>
<td>20° CC</td>
<td>.458V</td>
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<th>Blade #2</th>
<th>Angle</th>
<th>Output</th>
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<tbody>
<tr>
<td></td>
<td>15° CC</td>
<td>.509V</td>
</tr>
<tr>
<td></td>
<td>15° C</td>
<td>1.721V</td>
</tr>
<tr>
<td></td>
<td>15° CC W/ gear</td>
<td>2.050V</td>
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<tr>
<th>Blade #3</th>
<th>Angle</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>15° CC W/ gear</td>
<td>2.33V</td>
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Where the Magic Happens
Conclusion: Hayden, Cody, Macy, and the leader behind the design, Jason, created a blade to reach levels in the high 1000mV on average. Throughout the competition we enjoyed testing the different wing sizes and designs. The hardest part out of the competition was constructing the gear box and blades. However, our mission was achieved with uplifting results. Reaching over 2 volts, our blade design surprised our entire group along with the spectators. Although there was a lot of conflict with design, degree, and amount choice in the group we still managed to have fun with the entire project.

Equipment:
- Cardboard
- Engineering Notebook
- Pencil
- Ruler
- Tape
- Cutting board
- Scissors
- Degree Indicator
- Hot Glue/Glue Gun
- Wood sticks
- Gears
- Hub
- Motor
- Internet
- Fan
- Safety glasses
- PVC pipe
- Electricity meter
- Wire
- Clamps
What We Learned

• We learned a lot about efficiency. We learned that we need to be efficient with our time, as well as our resources.
• We observed our classmates and saw where they had trouble and tried to avoid the same problems.
• If we had more time, we would test more blades and angles and spend our time working on a more efficient gear box.