



**CALIFORNIA STATE SCIENCE FAIR  
2005 PROJECT SUMMARY**

<b>Name(s)</b> <b>William Deardorff; Truman Do; Aaron-James Lao</b>	<b>Project Number</b> <b>J0105</b>
<b>Project Title</b> <b>Propel Yourself! Do Blade Angles and Number of Blades on a Propeller Change the Speed of a Hovercraft?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> This investigation was aimed to find out whether blade angles and the number of blades of propellers affect the speed of hovercrafts. Different combinations on blade angles and number of blades were also investigated to find its effect on the moving vehicle.</p> <p><b>Methods/Materials</b> Aluminum sheets were selected from recycled cookie canisters and were used to construct the propellers. Propellers with two, three and four blades were drawn out onto the metal sheets and were cut using scissors. Each blade measured 4.5 cm in length and 1.5 cm in width. A hole of 3 mm in diameter was bored using a power drill. They were bent to create angles at 15, 30, 45 and 60 degrees. To create the angles, the propeller was held down at the center and was placed horizontally on the flat surface next to the triangle. It was bent until the angle of the blade matched the angle of the triangle. A total of 24 propellers, two for every combination, was placed onto the toy hovercraft and tested. Then, the two propeller combinations were tested onto the hovercraft. A string railing was set up, and the hover car was turned on. The forward button on the controller was held down, and the time it took to travel 3 meters was recorded. Similar steps were done using different numbers and blade angles. Data were gathered and analyzed.</p> <p><b>Results</b> The propeller with two blades and bent at 15 degrees worked the most efficiently, while the propeller with four blades that were bent at 60 degrees were the least efficient. When testing how the degree that a blade is bent, the results showed that the propeller with the 15 degrees angle moves the fastest, and the 60 degrees blade did not move. The 30 degree blades moved the second fastest, while the 45 degree blades moved the second slowest. The propellers with two blades worked the most efficiently, while the propellers with four worked the least.</p> <p><b>Conclusions/Discussion</b> From the results and analysis, the conclusion was that as the degree at which a blade is bent increased from 15 degrees, it became gradually less productive. As the number of blades increased from two blades, it also became less productive. The results showed that the propellers with two blades bent at 15 degrees worked the most efficiently. This is because the angle that it was bent at created stronger wind pushing backwards. The propellers with four blades that were bent at 60 degrees were the least efficient. This was because its blades were positioned at an angle that was bent too far to create enough force to move the hovercraft.</p>	
<b>Summary Statement</b> This project is about how the angle and number of blades on a propeller effects the propulsion created.	
<b>Help Received</b> Mother helped purchase materials. Father cut boards for the device to make the angles. Mr. Saramosing, teacher, encouraged us.	