



**CALIFORNIA SCIENCE & ENGINEERING FAIR
2018 PROJECT SUMMARY**

Name(s) Trisha D. Prajapati	Project Number J0120
Project Title That's Cool! Which Fan Blade Characteristics Affect Airflow?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of my experiment was to determine what fan blade characteristics affect the amount of airflow.</p> <p>Methods/Materials Using homemade items, I made a fan and an anemometer. I made the fan using a DC motor, an electric circuit with a switch, and a 9V battery. I made different kinds of fan blades. First, I made fan blades using a plastic water bottle. I made fans with 2 blades, 3 blades, and 4 blades. Then, I made fans using PVC window blind panels which I cut into the same size and shape as the plastic bottle blades. Using the PVC blades, I made different fans with pitches of 0 (perpendicular to axis of rotation), 45, and 90 (parallel to axis of rotation) degrees. Lastly, I made fan blades half the width of the previous PVC blades (3 cm v. 6 cm). Next, I made an anemometer using 3-ounce paper cups and straws. The anemometer had a diameter of 21 cm. I attached the fan blade to the fan motor and placed the anemometer 18 cm from the fan. I ran the fan for one minute and counted the number of revolutions of the anemometer. I did 10 trials for each type of fan blade. I calculated the air velocity of each type of fan blade. I used air velocity as a surrogate for air flow.</p> <p>Results The 3 blade fan had the most air velocity at 0.694 m/s. The 2 blade fan had the least at 0.432 m/s. The fan blade with a pitch of 45 degrees produced the most airflow with a speed of 0.618 m/s. The wider fan blade produced more air velocity compared to the narrow fan blade (6 cm v. 3 cm). The wider width produced an airspeed of 0.692 m/s compared to the narrow width with a speed of 0.490 m/s. The material of the fan blades did not have a significant effect in my experiment.</p> <p>Conclusions/Discussion Based on my experiment, 3 blade fans produced more airflow than 2 and 4 blade fans. Fan blades with a pitch of 45 degrees produced more airflow than fan blades with 0 or 90 degrees. Lastly, the wider the fan blade, the more airflow was produced in my experiment. I can conclude that a fan with 3 blades at a pitch of 45 degrees and wide fan blade width produced the most airflow in my experiment. In the future, I hope to continue my project using different types of fan materials and more scientifically accurate equipment to help determine the ideal fan blade design.</p>	
Summary Statement The goal of my project was to determine what fan blade characteristics affect the amount of airflow produced.	
Help Received My father helped building the fan, and my mother helped with my poster.	