CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)

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Project Number

35698

Project Title

Bernoulli's Principle in Action

Abstract

Objectives/Goals

In our daily life, Bernoulli#s principle is being applied. We will understand how Bernoulli#s principle works and its importance in everyday life. This project will show us how Bernoulli#s principle applies in flight.

Methods/Materials

Bernoulli#s principle is displayed and put to the test in our homemade wind tunnel. We used foam to make wings and metal rods to support them in the wind tunnel. The scale is used to measure the force of lift in grams that the wing is creating. In our project, we made four different wing profiles. They are made to compare and contrast different models and see which has the greatest lift. To generate the wind, we used a brushless motor with an eleven inch propeller, in the twelve by twelve inch wind tunnel to generate the required wind speeds 4, 5 and 6 meters per second. We used cables to connect the motor to the electronic speed control and the power supply. We used an anemometer to measure the wind speed.

Results

We found out that airplanes are able to fly due to lift, weight, thrust and drag. Each of these counteracts each other. Drag counteracts thrust, and weight counteracts lift. This explains Bernoulli principle which states that as the velocity of a fluid increases, the pressure exerted by that fluid decreases. Since a wing has a larger distance on the top due to the curve, air has to travel faster therefore making the pressure decrease. The air will have to travel faster over the top of the wing leading to a loss in pressure. The difference in pressure is what creates the upward force called lift. These results are important in helping us understand the principles of flight and how Bernoulli#s principle plays a role in flight.

Conclusions/Discussion

Overall most of our wing profiles generated a fair amount of lift that could be used to actually fly a radio controlled aircraft or be scaled up with different materials to fly a full scale aircraft. We have learned how to make our own wing profiles out of just foam, glue, and a razor. We also learned to build our own wind tunnel that can operate smoothly and test our wing profiles. With our wind tunnel,we can test wings with different humidity and wind speeds or even different models. We can test racecars. The racecar wings are just like aircraft wings, but upside down. Our tests show the wing profiles generate lift. An upside down version of that on a sports car will keep it on the ground.

Summary Statement

What is Bernoulli#s Principle, how it applies to our lives and how we can test the principle to prove to ourselves that it works

Help Received

Parents help with photo taking;Parents helping with handling power tools; Science teacher guidance, Electronics recommendation from hobby shop at Aero Micro

Preliminary