



**CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY**

Name(s) Nicholas W. Tan	Project Number J0122
Project Title Planes, Birds, and "V" Shapes	
<div><div>Objectives/Goals The objective is to determine if planes will save fuel when flying in a "V" shape formation. My hypothesis is "If planes fly in a "V" shape like birds, then they will save fuel."</div><div>Methods/Materials A wind tunnel was created from a cardboard box, air conditioner filter and electric box fan. Each model plane was placed on a digital scale in the wind tunnel at a measured distance from the filter. The weight of each plan was recorded with the fan turned off and on. The three planes were then arranged in a "V" shape and the weight of each was recorded with the fan turned off and on. I compared the weight of each plane by itself and when it was in the "V" shape.</div><div>Results When tested by itself, each individual plane decreased in weight no matter the distance from the fan or the fan speed. While in the "V" shape, I observed the weight of the lead plane did not change. However, the side planes in the "V" shape weighed slightly less (up to half a gram) than while they were flying by themselves.</div><div>Conclusions/Discussion In my experiment, it appears that a plane flying in the "V" formation weighs less than when it is flying by itself (up to half a gram). A lighter plane does not need to provide as much lift and thrust--the factors that oppose weight during flight. Since thrust is created with fuel and the plane does not need as much thrust when flying in the "V" shape, the plane will consume less fuel. This experiment can provide us with a concept of how planes can save fuel.</div></div>	
Summary Statement Use a wind tunnel to determine if planes flying in a "V" shape formation will consume less fuel.	
Help Received Borrowed digital scale(s) from my science teacher; Mom purchased model planes, procured cardboard box, and helped assemble display board	