



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Andrew D. Durkee	Project Number S0105
Project Title The Effect of Winglets on Low Aspect Ratio Wings	
Abstract Objectives/Goals The purpose of this experiment is to observe if there are any effects of winglets on a low aspect ratio wing, particularly dealing with wingtip vortices. Methods/Materials A low aspect ratio wing was constructed and fitted with winglets with heights of 5, 7.5, and 10 cm. Based on the background research and previous knowledge, it was hypothesized that the addition of winglets on a low aspect ratio wing will improve the lift to drag ratio over that of a low aspect ratio wing without winglets. The wing was then placed in the wind tunnel test bed and force instruments were set up to analyze the lift and drag of the wing with each of the different sizes of winglets. Results The 10 cm winglet had the highest lift, followed by the control, 5 cm, and 7.5 cm winglets. The drags were relatively insignificant. Conclusions/Discussion It was concluded that the winglet needed to be large enough in order to prevent the wingtip vortices from reducing lift. Further experimentation may include testing how much noise the most efficient winglet makes compared to a high aspect ratio wing.	
Summary Statement This project investigated the effects of different sized winglets on low aspect ratio wings, particularly in terms of lift and drag	
Help Received Mother helped with the board. Father helped build the wind tunnel	