



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

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| Name(s) Emin Abranians | Project Number J0101 |
| Project Title Airplane Lift: Wing Curvature Generates Lift | |
| Abstract Objectives/Goals Does the airplane wing curvature generate lift? I hypothesize that wings with more curvature will generate more lift. Methods/Materials Three methods were used to verify the objective; mathematically, computer simulation, and by wind tunnel experiment. Three wings with different curvature were built to test this hypothesis in a wind tunnel. Each wing was attached to a Styrofoam airplane model and each model was tested separately. The objective of this experiment was to keep all parameters constant except wing curvature. Results Drag and lift equations indicated increase in lift pressure as wing curvature was increased. Computer simulation and pressure plots from top and bottom of the airplane wing confirmed this hypothesis when wing camber and thickness was varied while keeping angle of attach constant. It was determined by wind tunnel experiment that more curvature on the wing created more lift. For example, three wing models built for this experiment generated the following different pressures under constant weight, air velocity, air density, temperature, angle of attack, and wing surface area: <ol style="list-style-type: none">1. Flat wing - no curvature generated 15.88 gm pressure.2. Medium wing curvature # 10cm`radius generated 106.50 gm pressure.3. High wing curvature # 20cm radius generated 122.19 gm pressure. Conclusions/Discussion Mathematical equations, computer simulation, and measured data from wind tunnel experiment supported the hypothesis that more lift was generated by increasing the aircraft wing curvature. | |
| Summary Statement Airplane wing curvature generates lift. | |
| Help Received Uncle helped building airplane wind tunnel and provided engineering support. | |