



**CALIFORNIA STATE SCIENCE FAIR  
2011 PROJECT SUMMARY**

<b>Name(s)</b> <b>Dane Adams; Derek Hanes</b>	<b>Project Number</b> <b>S0301</b>
<b>Project Title</b> <b>Secret to Stealth</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> When one sees the B2 bomber, or the F-117, they might notice the abnormal shape of these aircrafts. One might also notice that they are always black or dark colored. Do these shapes and colors make these planes harder to detect? Radar and sonar are used to detect objects that can't be seen by the naked eye. This test is designed to reveal which shapes and colors make a plane stealthy.</p> <p><b>Methods/Materials</b> In this project, a cardboard box was used. 20 pieces of paper, 5 red, blue, yellow, white and black were folded into four shapes: cylinders, crumpled cylinders, V-shapes, and W-shapes. The box was painted black. A lux meter, light meter, was used to measure the light. Each shape was individually tested. They were placed in the box in a room pitch black dark. A hole was cut for the flashlight. The lux meter sensor was placed inside the box. The light was turned on and the number (amount of light reflected back) was recorded. The LED flashlight was turned off after each test.</p> <p><b>Results</b> After all testing, the black W-shape reflected the least amount of light, 0.05 lux. The rest of the shapes are as follows: black V- .2, red W- .35, black cylinder- .4, black crumpled- .5, red cylinder- .6, red V- .6, red crumpled- .7, blue crumpled- .7, blue V, .7, blue W- .775, blue cylinder- .8, yellow crumpled- 1.4, yellow V- 1.4, yellow W- 1.4, yellow cylinder- 1.5, white cylinder- 2.7, white crumpled- 2.7, white W- 2.8, white V- 3.4. Black overall was the best color; reflect in an average of 0.2875 lux. White was the worst color; reflecting an average of 2.85 lux.</p> <p><b>Conclusions/Discussion</b> Black was the most effective. This is understandable because black absorbs almost all light. Also understandable is that white was the least effective because white reflects almost all light. The W-shape was the best shape because of its angles. The angles scattered the light in other directions, not at the sensor. Maybe that's why the B-2 bomber is flat and black. Maybe that is why the F-117 is black and blocky shaped. Pilots say that these two planes are very hard to fly because they are not very aerodynamic. Is the trade off in aerodynamics for stealth, and maneuverability for undetectability worth it? In fact, most stealth aircraft are meant to carry large payload, and were not equipped for air to air combat, so maneuverability was not one of the main concerns. The trade off is definitely worth it.</p>	
<b>Summary Statement</b> To test which shape and color make an aircraft stealthiest.	
<b>Help Received</b> Mother helped with board; Dad bought lux meter; Mrs. Lewis edited abstract.	