



**CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY**

Name(s) Joey D. Krauskopf	Project Number 36089
Project Title Slanted or Straight: Which Will Save Your Life?	
Abstract Objectives/Goals My project explained how best to protect armored vehicles, the problem is making the armor strong but keeping the vehicle maneuverable. Spaced armor (pairs of parallel armor plates) is a solution. Methods/Materials I used balsa wood armor plates and a BB gun to test this question. I tested five different angles and shot ten BB pellets for each angle to determine the average penetration of the BB pellet into a Styrofoam. Results My results supported my hypothesis, when the plates were set at 60°, the lowest average penetration was achieved. These results confirmed the importance of the obliquity effect. However, plates at 0° and 15° did not match my hypothesis. I noticed that I failed to control a key variable: wood grain. Conclusions/Discussion Because of this I decided to run another data set and control for this. My data then did match my hypothesis. This means that when asking the question, Slanted or straight: which will save your life? The answer is slanted!	
Summary Statement My experiment tested which angle of spaced armor (pair of parallel plates) was the most effective and showed that projectile penetration was the least at 60 degrees due to obliquity.	
Help Received My mother helped me design the project and my dad let me use his workshop to design the rig and let me conduct experiments in the garage. I also consulted with Dr. Matt Richter about the forces involved with this project.	