



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

Name(s) Michael R. Davis	Project Number S0204
Project Title The Gauss Rifle: A Magnetic Linear Accelerator	
Abstract Objectives/Goals My project was to test the effect, on velocities produced, of different magnet spacing on a Gauss Rifle magnetic linear accelerator. Methods/Materials I built a magnetic linear accelerator out of a series of magnets and ball bearings. The magnets were secured to a channeled piece of wood, with two ball bearings following each magnet. Using 5 photogates I measured the velocities of the ball bearings after each magnet. After a minimum of eight trials I changed the spacing by two centimeters and repeated the experiment. Results By testing spacings between 5 and 13 centimeters I found that the velocities increased as the spacing decreased. As expected the velocity was greater after each magnet, except in the smaller spacings where the velocities after the fourth and fifth magnets were sporadic and significantly slower than the velocity after the third magnet. Conclusions/Discussion My experiment was fairly conclusive. However, because of the variations shown after the fourth and fifth magnets, I am going to build another model of the Gauss Rifle. This model would use magnets that are not secured to the wood, instead the magnets would hang above the track from springs. This may allow for better transfer of momentum, and therefore higher velocities.	
Summary Statement Comparing spacings on a Gauss Rifle magnetic linear accelerator.	
Help Received Used lab equipment at Willits High School under the supervision of Mr. Kirkpatrick.	