



**CALIFORNIA STATE SCIENCE FAIR  
2017 PROJECT SUMMARY**

<b>Name(s)</b> <b>Anjo Pagdanganan; Matthew Sanchez</b>	<b>Project Number</b> <b>J1020</b>
<b>Project Title</b> <b>The Gauss Rifle: Magnets and Momentum</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of our project is to determine how the amount of stages in a Gauss Rifle affect the speed of the projectile launched.</p> <p><b>Methods/Materials</b> A stopwatch, a measuring tape, a calculator, a wooden rail, packs of cylindrical neodymium magnets, and ball bearings were used for this project, along with a prop that raised the rail up by two degrees. Gradually the amount of stages in the Gauss Rifle were increased until resources were exhausted. The first stage was used as the control group.</p> <p><b>Results</b> The speed of the projectile launched increases as the amount of stages in the Gauss Rifle increases. We found that the speed plateaus gradually as well.</p> <p><b>Conclusions/Discussion</b> After several trials, our hypothesis of the speed of the projectile increasing or decreasing in correlation to the amount of stages was proven to be true. However, we also showed that the speed slowly plateaus, showing that either the pull force of a magnet will only accelerate objects if they are going slow enough; or that inevitably friction and air resistance will limit the speed. We think our results will be useful as a study on how magnets accelerate projectiles.</p>	
<b>Summary Statement</b> In our Gauss Rifle, we found that if you increase the amount of stages, the speed of the projectile launched increases as well, eventually reaching a plateau.	
<b>Help Received</b> None, apart from parents who bought supplies. Matthew and I designed, built, and conducted the experiments with the Gauss Rifle ourselves.	