



**CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY**

Name(s) Justin S.T. Fitzmaurice	Project Number J0914
Project Title Electromagnetic Propulsion Systems: Railguns	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this experiment is to determine which of three rail compositions (copper, brass, or aluminum) would fire a projectile from a rail gun the furthest distance. A rail gun uses an electrical current to accelerate a projectile along a pair of metal rails.</p> <p>Methods/Materials Five prototype rail guns were constructed using a range of power sources and rail configurations, all resulting in a lot of sparking but no movement of a projectile. The sixth configuration produced movement, at which point three rail guns were built for this experiment. Each gun used a different rail material: copper, brass, and aluminum. The guns were each fired ten times, and the distances that the projectile travelled were measured and recorded.</p> <p>Results The rail gun that utilized copper rails consistently fired further than the gun that employed brass rails. The gun with aluminum rails fired the shortest distance.</p> <p>Conclusions/Discussion The test results indicate that rail guns using copper rails fire a projectile further than guns that use brass or aluminum rails, presumably because copper is the best conductor of electricity of the three metals.</p>	
Summary Statement The objective of this experiment is to determine which of three rail compositions (copper, brass, or aluminum) would fire a projectile from a rail gun the furthest distance.	
Help Received Dad helped with the long process of trial and error with the many iterations of rail guns construction.	