



**CALIFORNIA STATE SCIENCE FAIR  
2012 PROJECT SUMMARY**

<b>Name(s)</b> Megan E. Dean	<b>Project Number</b> <b>J0305</b>
<b>Project Title</b> <b>Internal Ballistics: How Do Different Gun Powder Loads Affect Performance in a Rifle Match Competition?</b>	
<b>Objectives/Goals</b> The objective of this project is to determine if there is an ideal gun powder load that produces the best results in a bench rest rifle match competition.	
<b>Abstract</b> <b>Methods/Materials</b> Five different gun powder loads of 25 grains, 26 grains, 27 grains, 28 grains, and 29 grains were loaded into fifteen cartridges each. Each load was fired using a rail gun at targets 50 yards down range. Three 5-shot groups were fired for each of the loads of gun powder. Velocity data was collected using a chronograph for each group. Using a caliper, each group size was measured and documented. The data was analyzed to determine the results.	
<b>Results</b> The 29 grain gun powder loads produced the smallest average 5-shot group size. As the loads increased from 25 grains to 29 grains the velocity of the bullets increased and the average group size decreased.	
<b>Conclusions/Discussion</b> My investigation showed that the powder load made a big difference in group size on my targets. In a bench rest competition the smallest 5-shot group wins. The lightest load was 25 grains and produced an average group size of 0.161 inches. The 26 grain load produced an average group size of 0.152 in. The 27 grain load produced an average group size of 0.141 in. I noticed there was a consistent 0.010 in. decrease from load to load. When I shot the 28 grain load this decrease changed to 0.030 in. The average group sized dropped to 0.109 in. The smallest average group size was achieved with the 29 grain load. The average group size was 0.091 in. The average velocities of the bullets increased by approximately 120 ft/sec as the loads were increased from 25 to 28 grains. The velocity only increased by 100 ft/sec as the load increased from 28 to 29 grains. Due to cartridge size 29 grains of gun powder was the most I could safely fit into the cartridge.	
<b>Summary Statement</b> This project is about determining how different gun powder loads affect performance in a bench rest rifle match competition.	
<b>Help Received</b> Mother helped type the report. Grandfather help load cartridges. Grandfather helped set up gun and Chronograph.	