



**CALIFORNIA STATE SCIENCE FAIR  
2005 PROJECT SUMMARY**

<b>Name(s)</b> <p align="center"><b>Sean W. Hammett</b></p>	<b>Project Number</b> <p align="center"><b>J0209</b></p>
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<b>Project Title</b> <p align="center"><b>Project Canon Cannon: A Study of Projectile Range</b></p>
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<p align="center"><b>Abstract</b></p> <p><b>Objectives/Goals</b>  This project is an endeavor to discover the relationship between the amount of pressure put in the tank of an air cannon and the distance that the projectile flies. In my experiment, I fired a small rubber ball (approximately two and a half inches in diameter) at 45, 50, 55, 60, 65, and 70 PSI. The air cannon that I built and used had a three-inch styrene barrel, a solenoid irrigation valve (powered by three 9v batteries), and a two-inch, schedule 40 PVC tank that was shaped so that it doubled as a stand (see Fig. 2). I hypothesized that the relationship would be an exponential curve leveling off when higher pressures were reached.</p> <p><b>Methods/Materials</b>  <b>Materials</b>  - 1 air cannon (1 solenoid irrigation valve, 30" of 3" styrene pipe, 55" of 2" schedule 40 PVC, a 3" styrene end cap, a 2" T-bend, PVC, two 2" end caps, PVC, a 2" elbow bend, PVC, a 2" 45 degree bend, PVC, two 1" threaded to 1" non-threaded adapter, PVC, a 1" to 1.5" non-threaded adapter, PVC, a 1.5" to 2" non-threaded adapter, PVC, a tubeless tire input valve, a pressure gauge (reads to 70 PSI at least), a electrical box, three 9v batteries, 1 momentary push button, 1 on/off toggle switch, Approx. 10 ft. of wire, PVC glue and primer, Teflon tape)  - Drill 11/32"; - drill bit; - 1/8" tap drill; - soldering iron; - solder; - 1 spherical projectile (sized to the styrene pipe); - 1 bicycle pump/air compressor; - 1 tape measure, at least 300 ft.  <b>Methods</b>  - Assemble the air cannon as per Fig. 1 and Fig. 2. - Fire the air cannon several times at 45, 50, 55, 60, 65, and 70 PSI. - Record the distance of each shot.</p> <p><b>Results</b>  Distance (feet)  Trial 1 Trial 2 Trial 3 Trial 4 Average  45 psi 122 124 136 121 125.8  50 psi 152 147 145 151 148.8  55 psi 175 176 165 164 170.0  60 psi 199 195 184 188 191.5  65 psi 208 209 196 204.3  70 psi 241 231 224 232.0</p> <p><b>Conclusions/Discussion</b></p>
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<b>Summary Statement</b> This project examines the relationship between the distance a projectile travels and the pressure applied as the motive force.
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<b>Help Received</b> Father helped assemble the cannon.
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