



# CALIFORNIA STATE SCIENCE FAIR 2010 PROJECT SUMMARY

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<b>Project Title</b> <b>Stroke</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> This project examined the effects of stroke on a reciprocating engine. I am doing this experiment because I have always been curious why some engines have very long strokes, such as tractors, and others have very short strokes, such as formula 1 cars. I tested the long-stroke, medium-stroke, and short-stroke designs. I anticipated the short-stroke would produce the most milliamps because it can achieve the highest speed (rpms). I also anticipate that the long-stroke engine will produce the least amount of power because it cannot develop as many rpms as the short and medium strokes.</p> <p><b>Methods/Materials</b> I built the engine using a 7/8" brass pipe for a cylinder "block". A carriage bolt served as a piston and another carriage bolt served as a valve. Various lengths of stainless steel rods served as connecting rods. A steel flywheel with several holes drilled in it was used to alter the stroke between long, medium, and short strokes. The engine is connected to an electric generator, which powers an amp meter to measure power. An air compressor running at 30 psi powers the engine. Each stroke was tested 6 times for 30 secs each time. Power outputs were recorded at peak milliamps to evaluate horsepower. The milliamps were also measured during startup to evaluate torque.</p> <p><b>Results</b> The results were: the long-stroke engine produced the most power at 337.5 milliamps with an average of 56.25 milliamps. The short-stroke engine produced the second most power at 298.5 milliamps with an average of 49.75 milliamps. The medium stroke engine produced the least amount of power at 290.5 milliamps with an average of 48.42 milliamps. My hypothesis was incorrect. I rejected my hypothesis based on the long-stroke engine producing the most power.</p> <p><b>Conclusions/Discussion</b> I would recommend an engine with a long-stroke for most applications because it produces more low-end power than the short-stroke or medium-stroke engines. However I would recommend an engine with a short-stroke for applications that require high speed because the short-stroke can reach a higher speed than an engine with a long stroke. If I were to continue this experiment I would strengthen the engine to run at a higher speed or create an engine that runs off gas or diesel and retest my hypothesis.</p>	
<b>Summary Statement</b> The effect of stroke on the power output of an engine.	
<b>Help Received</b> Mother - proofreading Grandfather - supplied materials; helped weld	