



**CALIFORNIA STATE SCIENCE FAIR  
2005 PROJECT SUMMARY**

<b>Name(s)</b> <b>Daniel Bliman; Carl Lindner; Sherman Ng</b>	<b>Project Number</b> <b>S0204</b>
<b>Project Title</b> <b>How Much Energy Is Lost to Friction?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The purpose of this project is to find out exactly how much energy friction exerts on the motor. It was hypothesized that friction should constitute most of the resisting energy of the motor.</p> <p><b>Methods/Materials</b></p> <ol style="list-style-type: none"><li>1. 400 watt Power Supply, to supply Hard Drive with clean and stable power.</li><li>2. Stripped Hard Drive, to test the motor.</li><li>3. Tachometer, to read RPM on Hard Drive.</li><li>4. Reflective tape, for Tachometer to have accurate readouts.</li><li>5. Black construction paper for Hard Drive. This would enable us to put reflective tape on the paper and get accurate RPM.</li><li>6. Tape, to keep black construction paper attached to Hard Drive.</li><li>7. Screw driver set, to strip the Hard Drive, and to attach the black construction paper.</li><li>8. Compass, to make Circular disks to place on the Hard Drive.</li><li>9. Ruler, to measure certain dimensions of the motor, and to get the radius for the black construction paper to be attached to the Hard Drive disk.</li><li>10. D.M.M.( Digital Multi Meter ), to measure voltages and current usage of the motor.</li><li>11. Stopwatch, to measure the time needed to stop the motor.</li><li>12. Calculator, to calculate the kinetic energies.</li><li>13. Scale, to weigh each part of the motor</li></ol> <p><b>Results</b> Work/second = 9.84 joules/4.94 seconds = 1.99 joules/second or 1.99 watts The results showed that for every second the motor runs, friction in the motor exerts 1.99 joules of energy in the backward direction.</p> <p><b>Conclusions/Discussion</b> After running all the tests and experiments with the motor, our hypothesis proved correct; most of the energy acting against the motor came from friction as the energy of friction represented 82.5% of all the energy acting in the backward direction. Every single set of data supported my hypothesis as all of the trials produced results that were not far from the mean value.</p>	
<b>Summary Statement</b> This project attempts to calculate the amount of energy lost to friction in a motor	
<b>Help Received</b>	