



**CALIFORNIA STATE SCIENCE FAIR  
2005 PROJECT SUMMARY**

<b>Name(s)</b> Edward Y. Hsi, II	<b>Project Number</b> <b>J1515</b>
<b>Project Title</b> <b>The Invisible Force: Will Magnetic Levitation Help Reduce Friction?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The purpose of this project is to test if magnetic levitation would reduce friction and understand how magnetic forces can be applied to train technology.</p> <p><b>Methods/Materials</b> A magnetic track laid with ceramic magnets and bordered by magnetic side rails, along with a conventional track, were placed on a board. For the maglev train, three neodymium magnets were glued to each side panel while the base had 16 neodymium magnets to provide it with enough repelling magnetic force to levitate on the track. A standard train was the control. The track was then tilted at three different heights and the trains were timed based on the seconds it took to reach the other end.</p> <p><b>Results</b> The results of the trials at all three heights showed that the conventional train traveled faster and thus my results concluded my hypothesis was wrong as the conventional train had less friction.</p> <p><b>Conclusions/Discussion</b> My hypothesis was proved wrong as the conventional train had less friction and traveled a lot faster. The magnetic levitation train might have gone faster if the magnetic strip was doubled. The use of a longer track might also have allowed the magnetic train to build more momentum and the use of a force to propel the trains might also have resulted in less friction on the magnetic levitation train.</p> <p>In conclusion, magnetic levitation has practical application to today's technologically-advanced world as maglev trains glide above magnetically charged-tracks at high speeds and the trains have less wear and tear as there are no tracks to create the friction. The downside is whether these magnetic waves are harmful to people. This experiment allowed me to see the potential for maglev trains and its impact on the future of high-speed trains.</p>	
<b>Summary Statement</b> The use of magnetic forces to levitate a train was compared to conventional trains to see if it could reduce friction and allow a maglev train to travel faster in an effort to improve train technology.	
<b>Help Received</b> My mother took photos and helped time some of the trial runs. Home Depot personnel also gave tips and suggestions on assembly. My teacher, Kevin Soule, taught me how to set up the display board and the notebook.	