



**CALIFORNIA SCIENCE & ENGINEERING FAIR  
2018 PROJECT SUMMARY**

<b>Name(s)</b> Spencer T. King	<b>Project Number</b> <b>J1012</b>
<b>Project Title</b> <b>Magnetic Levitation: Reducing Train Friction with Track</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The purpose and objective of this project is to see if magnetic levitation (maglev) trains are faster and more efficient than conventional trains. The hypothesis is that the repelling magnets will reduce the friction of the wheels, enabling the magnetic train to move faster than the conventional train.</p> <p><b>Methods/Materials</b> While many designs were tested, the final design of this experiment compared the speed of a train with both magnets and wheels, when it was on a conventional track, and when it was on a magnetic track. The strength of the repelling magnets was too strong for the guide rails: weight was added to make wheels touch the track, and create a friction reducing train using magnets.</p> <p><b>Results</b> The time it took the train to travel the length of each track, which were the same lengths, was recorded. The results consistently indicated that when the train was on the magnetic track, it traveled faster than when it was on the conventional track, when the same force was applied to both trains.</p> <p><b>Conclusions/Discussion</b> This project demonstrated and proved why magnetic levitation trains are faster than conventional trains, which is because of reduced friction. While there are maglev trains in countries such as Japan and Germany, maglev trains are not widespread. If they were, they would help save energy and decrease the waste emissions of transportation. This is because maglev trains do not use fossil fuels, but rather electricity that can be derived from natural and renewable sources, such as solar, wind, and water energy.</p>	
<b>Summary Statement</b> I created a train that was compatible with both a magnetic track and a conventional track to show that the magnetic track helps to reduce friction and increase the speed of the train car.	
<b>Help Received</b> My dad assisted in the cutting of the grooves in the board that the track magnets were placed in because it required a special saw blade and the blade needed to be tilted at a certain angle in order to cut the right sized grooves.	