



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Reed O. Hutcheson	Project Number J1611
Project Title Does Temperature Affect the Strength of a Magnet on a Magnetic Levitating Train?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My goal is to determine whether or not temperature affects the strength of a magnet on a magnetic levitating train. I believe that the magnets that have been cooled will be the strongest as demonstrated by its ability to levitate the most weight.</p> <p>Methods/Materials First I built two magnetic levitating trains and one magnetic track. The trains were built out of balsa wood and magnetic strips. I then built a container to hold the train and the track. One side consisted of a Plexiglass wall so that observations could be made of the train. I heated one train in the oven at 200 degrees F for an hour, cooled one train in the freezer for an hour, and did nothing to the control train. Every train levitated above the magnetic track due to repulsive forces. I tested each one by putting Legos on them until both sides of the train were touching the track magnets below them, and no longer levitating. I then counted the number of Legos for each train observed.</p> <p>Results The magnetic levitating train that was cooled held the most Legos on average and therefore the cooled magnets were indeed the strongest.</p> <p>Conclusions/Discussion My conclusion is that magnets that have been cooled will in fact be stronger than magnets that have not been cooled. The Japanese super-cool the magnets on their magnetic levitating trains for this very reason. By super-cooling their magnets, resistance to conduction of electrical currents are decreased, resulting in more powerful magnets. This appeared to be true in my experiment as well.</p>	
Summary Statement My project is determining whether or not cooling the magnet will have the effect of strengthening the magnet on a magnetic levitating train.	
Help Received Mother for helping type the report and for getting me though this. Father for helping build the track. Step-dad for helping me with the research. My brothers for not breaking anything. My teacher for helping me find this project.	