



**CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY**

Name(s) Paulina R. Shearer	Project Number J1319
Project Title Visualizing the Effect of Various Materials on the Magnetic Field	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The project objective was to determine how ferrous and nonferrous materials affect the magnetic field, if at all. In addition, I wanted to capture a visualization of this effect.</p> <p>Methods/Materials The materials utilized were various ferrous and nonferrous materials, two large magnets, one bottle of iron filings, and a custom-built Plexiglas, cardboard, wood, and paper box. I added iron filings to the box, positioned a magnet underneath, and placed some material covering over the magnet. I then activated a pager motor I had attached to the bottom of the box in order to vibrate the paper so that the iron filings would align with the magnetic field. I gathered quantitative results - photographs of the resulting field for each material - and converted them into a table.</p> <p>Results My data did not support my hypothesis. Both ferrous and nonferrous materials affected the magnetic field. In fact, I saw something entirely unexpected. The thickness of the material obstructing the magnet seemed to determine the effect on the magnetic field. These results were determined by closely examining the photographs of my data.</p> <p>Conclusions/Discussion My hypothesis was that ferrous materials would affect the magnetic field more than nonferrous materials. However, when I performed my experiment, the resulting data did not support my hypothesis. I found that both ferrous and nonferrous materials affected the magnetic field. I also found that the thickness of the materials used in my experiment seemed to have the most influence over the results. For example, cast iron blocked out all the magnetic field lines for both magnets. Thin plastic, however, had little to no effect whatsoever on the magnetic field. Yet thick plastic seemed to have the same effect as cast iron. To further this investigation, I would focus specifically on testing material thickness.</p>	
Summary Statement My project is about determining how ferrous and nonferrous materials affect the magnetic field, if at all, and if I can see the extent of this effect.	
Help Received I received help from my father with understanding circuitry, creating my poster, and building my box (power tools use, spray painting, prototyping box ideas).	