



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

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Project Title Effect of Shielding on Potentially Harmful 60 Hz Magnetic Fields	
Abstract Objectives/Goals In last year's project, I measured the 60 Hz magnetic field emissions from various appliances found in my home. The strength of these emissions was found, in many instances, to be in excess of 5 milligauss (mG) at typical distances. Based on epidemiological studies, prolonged exposure to 60 Hz magnetic fields in excess of 5 mG should be avoided because of potential health effects, such childhood cancer. This project investigates the following: is it possible to reduce exposure to Extremely Low Frequency (ELF) magnetic fields emitted by electrical household appliances by appropriate shielding? Methods/Materials To answer this question, I performed high-resolution measurements of the spatial distribution of 60 Hz magnetic fields associated with shielded home appliances using different shielding configurations (i.e., shape, number of layers, etc) and materials. Results The results show that materials with high magnetic permeability are ideal materials for shielding ELF magnetic fields and that, even with moderate shielding, the spatial boundary around the appliance where a subject is considered exposed can be significantly reduced. Conclusions/Discussion Candidates such as mu metal alloys (80% Ni, 20% Fe) or low carbon steel seem to be good options for designing a new-generation of household appliances with low 60 Hz magnetic emissions. These materials are available in thin foils that can easily produce snug fitting shapes around an appliance to serve as a magnetic barrier. However, a more affordable solution may be to use magnetic paint that can be easily applied on plastic and other surfaces.	
Summary Statement This project investigates ways to reduce 60 Hz magnetic emissions from household appliances in order to reduce human exposure to such fields which have been linked to potential health effects.	
Help Received Father supervised measurements and helped type report.	