



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

Name(s) Mihika A. Balaji	Project Number J1403
Project Title The Effect of Different Shielding Materials on Electromagnetic Emissions	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this experiment is to find commonly available household materials that can be used as effective shields on electromagnetic emissions from electrical and electronic devices.</p> <p>Methods/Materials Emission sources used were a TV remote and cell phone (radio waves), hair straightener and electrical outlet (electrical waves), and stereo speaker and streaming media stick (magnetic waves). Shielding materials that were tested were made of cardboard, tin and aluminum foil. A Trifield EMF meter that measures electrical, magnetic and radio waves was used to measure emissions. Trials were conducted to record EMF emissions from the above sources with and without the shielding materials to determine the most effective shield.</p> <p>Results For electrical waves, aluminum and tin performed equally well due to their conductive and reflective surfaces. For magnetic waves, the ferrous properties of tin blocked far better than aluminum or cardboard. For radio waves, the high conductivity of aluminum attenuated the best.</p> <p>Conclusions/Discussion Though aluminum and tin are both equally effective shielding materials, a shield made of aluminum is not desirable for phones since they hamper its operation. Hence tin is the most effective shield due to its production of magnetic field as well as its conductive and reflective surface. I was able to build a pouch made of cloth, lined on the inside with tin and a small amount of aluminum foil that effectively blocks electrical and magnetic waves, while still preserving radio wave transmission.</p>	
Summary Statement I determined and built an effective shield against electromagnetic emissions using common household materials	
Help Received My science teacher provided guidance throughout my project	