



**CALIFORNIA STATE SCIENCE FAIR  
2011 PROJECT SUMMARY**

<b>Name(s)</b> Nicholas F. Eisenhauer	<b>Project Number</b> <b>J1909</b>
<b>Project Title</b> <b>A Research Study Investigating the Effects of Electromagnetic Fields on Phaseolus vulgaris</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of this study was to examine how Electromagnetic Fields (EMFs) affect the growth of Phaseolus vulgaris (contender bush beans).</p> <p><b>Methods/Materials</b> Sixteen contender bush bean seeds were planted in sixteen labeled pots of equal size and with equal amounts of the same soil. The pots with the planted seeds were put inside a greenhouse with grow lights to control the lighting and a thermostatically controlled heater to control the temperature. Each pot was placed at 10.16 cm increasing intervals away from a transmitting device, which constantly emitted a 1.5 watt FM radio signal at a varying frequency of 0.9 to 1.3 GHz (approximately equivalent to the frequency and power output of three cell phones). The electromagnetic field strength was measured using a Cornet# ED-15B Electrosmog meter at each interval. All bean plants were given the same watering regime. Measurements of plant height (using a ruler) and stem diameter (using calipers) were taken each week for 8 weeks. At the end of the 8 week growing period, the plants were dug up, the soil carefully separated from the roots, and final weight was recorded for each plant.</p> <p><b>Results</b> Of the 16 seeds planted, 2 plants (numbers 6 and 10) failed to sprout. There was no significant difference in plant stem diameter among the 14 sprouted plants. Average plant height and weight for the 7 plants closest to the transmitter was significantly greater than the average height and weight of the 7 more distant plants.</p> <p><b>Conclusions/Discussion</b> These results indicate that EMFs may have a significant effect on plant growth (at least in contender bush beans), but further study is needed to determine if this is a positive or detrimental effect. Furthermore, the mechanism causing the effect is unknown, and study is needed to determine why Electromagnetic Frequencies affect plant growth.</p>	
<b>Summary Statement</b> A study investigating the effects of Electromagnetic Frequencies on plant growth in Phaseolus vulgaris.	
<b>Help Received</b> Mother provided money to purchase materials.	