



California Science Center
CALIFORNIA STATE SCIENCE FAIR
2001 PROJECT SUMMARY

Your Name (List all student names if multiple authors.) Scot C. DeWitt	Science Fair Use Only
Project Title (Limit: 120 characters. Those beyond 120 will be ignored. See pg. 9) Electromagnetic Fields: Bad to the Bone?	J0609
Preferred Category (See page 5 for descriptions.) 6 - Electricity & Electronics	Division <input checked="" type="checkbox"/> Junior (6-8) <input type="checkbox"/> Senior (9-12)
Abstract (Include Objective, Methods, Results, Conclusion. See samples on page 14.) Use no attachments. Only text inside these boxes will be used for category assignment or given to your judges.	
<p>Objective: The objective of this project was to determine whether cellular phone EMF(electromagnetic field) waves can set up pressure waves in a piezo solid.</p> <p>Materials and Methods: A 3'x 3' foam core board with foil backing on one side to prevent contamination of signal was used for this experiment. A port was created in the middle of the board to hold the piezo device being tested. A ruler was mounted horizontal to the piezo port on the paper side of the board. For each experiment, the leads of a piezo device were fed through the board port and were attached to a 10:1 probe, on the foil side of the board. The probe was attached to a 100mhz oscilloscope, set at 5 millivolt sensitivity. Each piezo device in the port was mounted perpendicular to the board. A Motorola i1000 digital cell phone was activated and held one inch from the piezo device. The cell phone was then moved father away, one inch at a time, with an oscilloscope reading taken every inch. This procedure was also used with a gaussmeter coil to map the magnetic field emitted from a cell phone. Each experiment in this procedure took five trials each for accuracy.</p> <p>Results: All piezoelectric materials produced voltage in the 5mv range consistantly when exposed to the electromagnetic field of a digital cell phone antenna.</p> <p>Conclusions: Experimental data supported the hypothesis that digital cellular phone EMFs can set up pressure waves in a piezo solid. After proving the digital phone electromagnetic field exists, and studying the piezoelectric effect, experiments with the oscilloscope confirmed the hypothesis that digital cellular phone EMFs can set up pressure waves in a piezoelectric solid. These findings lead one to believe that an electromagnetic field can create a pressure wave in bone;a piezoelectric material.</p>	
Summary Statement (In one sentence, state what your project is about.) To determine whether cell phone EMFs can create pressure waves in a piezoelectric solid.	
Help Received in Doing Project (e.g. Mother helped type report; Neighbor helped wire board; Used lab equipment at university X under the supervision of Dr. Y; Participant in NSF Young Scholars Program) See Display Regulation #8 on page 4. Mother helped import graphs to this report:private companies donated piezo sensors for experiments	