



**CALIFORNIA STATE SCIENCE FAIR  
2004 PROJECT SUMMARY**

<b>Name(s)</b> Mathew Lewis; Jeff Tola	<b>Project Number</b> <b>S0710</b>
<b>Project Title</b> Capacitance	
<b>Objectives/Goals</b> Can we build a capacitor to reflect our expected results of capacitance over displacement, and will theoretical science and mathematics hold true in our experiment?	
<b>Abstract</b> <b>Methods/Materials</b> Procedure: 1. with sheet metal saw, cut a 2, 50 millimeter x 20 millimeters; 2. solder wire to plates with soldering iron; 3. glue wooden blocks to sheet plates; 4. set up micrometer stage to move the plates parallel to each other; 5. attach other side of wooden block to micrometer stand; 6. attach wires to the capacitance bridge positive and negative terminals; 7. set up computer to record data on program of choice, exp. Microsoft excel; 8. produce your predicted values; 9. use shim stock to set the constant distance between the plates; 10. set plates so that no area overlaps between the two plates; 11. slowly move the micrometer so that the plates overlap by .5 millimeters and record, repeat until you reach 9 millimeters; 12. Set the plates up so that no area overlaps again; 13. modify capacitance bridge so that the capacitance starts at your predicted value; 14. repeat step 11; 15. while plates overlap by 9 millimeters modify capacitance bridge so that you have your predicted value first; 16. repeat steps 10 and 11; 17. analyze recorded data with mathematical equations.  Materials: 2: 2 millimeter thick metalsheets; 1: sheet metal saw; 1: computer; 1: boonton m7550 capacitance bridge; 5#: Wire; 1#: Solder wire; 1: soldering iron; 1: micrometer stage; 1: Shim stock (.38mm); 2: wooden blocks 15cm x 4cm; 1: bottle of glue.	
<b>Results</b> The First statistical tests that we conducted were t* tests. These tests indicate to us whether or not our data was in a sufficient confidence level. Unfortunately our test yielded unsatisfactory results. The first test had a t* of .127391, which gives an approximate confidence level of 20%, way below our wanted 90%. Our second test had t* of .476496, which gave a confidence level of approximately 40%. Our third test had a t* of .096199 which has a confidence level of approximately 15%.	
<b>Conclusions/Discussion</b> These three tests did not support our original hypothesis, however, they have allowed us to identify key problems that may have contributed to our large amount of error.	
<b>Summary Statement</b> To test theoretical equations in real life situations, in our case we tested capacitance.	
<b>Help Received</b> Father helped take results and set up equipment, Mr. Levy help us organize our project and gave insightful criticism before each fair, Mr. Easton helped with statistics	