



**CALIFORNIA STATE SCIENCE FAIR  
2005 PROJECT SUMMARY**

<b>Name(s)</b> <b>Kiel T. Lewis</b>	<b>Project Number</b> <b>J1914</b>
<b>Project Title</b> <b>Effects of Orientation of Chicken Eggs to the Earth's Geomagnetic Field</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> My objective was to discover the effects of change in orientation of chicken embryos to the Earth's geomagnetic field.</p> <p><b>Methods/Materials</b> First, I obtained 2 incubators and several believed-to-be-fertilized chicken and bantam eggs and followed the industry procedure for incubation. All eggs were aligned with the Earth's geomagnetic field and I separated them into two groups, Control (labeled #C#) and Rotating (labeled #R#). I rotated #C# eggs along the length of their vertical axes and #R# eggs along the length of their vertical axes and turned them 180° causing them to change orientation with the Earth's geomagnetic field about every 3 hours until the 18th day of incubation. After about 21 days, I recorded the results of the hatching process including weighing and looking for any deformities and recorded these observations by group. After 3 days, I repeated the examination of the chicks and recorded the results.</p> <p><b>Results</b> In Test 1, the percentage of total hatched for the rotating group was 36% compared to 64% for the control group. The average weight was greater in the rotating group, but the average weight increase was less than that of the control group. The hatch rate for the rotating group was 33.3% versus 58.3% for the control group. In Test 2, the percentage of total hatched for the rotating group was 46% compared to 54% for the control group. The average weight and average weight increase was less in the rotating group compared to the control group. The hatch rate for the rotating group was 66.6% versus 70.0% for the control group.</p> <p><b>Conclusions/Discussion</b> In conclusion, chicken health and development is not improved by increased stimulation of the orientation of the developing embryo to the earth's geomagnetic field. In fact, less stimulation resulted in a higher average hatch rate and short-term growth rate. In general, there were no other considerable differences in the physical well being of the subjects. The possible reason for these results is the additional stimulation of the #R# or Rotation group in each test. The additional stimulation may have jostled the embryo in it earliest stages of development. The eggs might be best off by being in the #C# group for the first few days and in the #R# group for the rest of the incubation period to reach optimal conditions for the embryos. In both tests, the total number of eggs coincided with or exceeded the approximate industry hatch rate of 50%.</p>	
<b>Summary Statement</b> My project is determining the effects of a chicken embryo's change in orientation with respect to the Earth's geomagnetic field.	
<b>Help Received</b> Mother turned eggs when I was not available to do so; Newbury Park Feed and The Trading Post gave advice; the King family and The Trading Post provided eggs	