



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

Name(s) Torren Heine; Colin Potter	Project Number J1912
Project Title To Free or Not to Free: Calcium Carbonate Levels in Egg Shells	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Our objective is to find out how much calcium carbonate is in the egg shells of free-range versus cage-raised chickens.</p> <p>Methods/Materials Eggs from several sources of cage-raised and free-range chickens were carefully washed, dried and powdered. 10 two-gram samples from each source were reacted with 1M HCl for 24 and 48 hours and titrated to determine the HCl used by the calcium carbonate. The data was averaged and compared.</p> <p>Results The free-range shells were roughly 25% higher in calcium carbonate than the cage-raised shells in all tests.</p> <p>Conclusions/Discussion Our hypothesis was wrong. We thought that the cage-raised egg shells would have more calcium than the free-range. The ability of the chicken to absorb calcium from its diet depends on different factor such as the form of calcium, the levels of vitamin D, exposure to sunlight and the presence of other needs for calcium in the chicken. The results suggest that other factors besides the levels of calcium in the diet have a big effect on the calcium carbonate percentage in chicken egg shells. Chicken farmers might have fewer broken eggs if these factors are more carefully considered.</p>	
Summary Statement Our project is to determine if a correlation exists between the diet of cage-raised versus free-range chickens and the percentage of calcium carbonate in their shells.	
Help Received High school science teacher (Colin's dad) provided equipment and chemicals, Colin's mother helped with typing and backboard layout.	