



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Shannon M. Gray	Project Number J0509
Project Title Which Solution, An Acid or Base, Will Weaken Calcium (Our Teeth)?	
Abstract Objectives/Goals The goal of this project is to determine which solution will weaken an eggshell, which represents our teeth, the most. Methods/Materials First I pierced the eggshells to remove the egg from inside. I then boiled the empty eggshells, for 2 minutes, with a teabag in order to stain the shells. I chose one eggshell and covered it with a fluoride solution for two minutes before cleaning it off. I repeated this every 12 hours for 2 days. Next, each eggshell was soaked for 2 days in a different solution. The solutions included: hydrogen peroxide (a base), vinegar (an acid), water, water mixed with fluoride, and a sugar-water solution. Finally, I used an egg crusher and a two-liter bottle to determine how many of ounces of liquid each eggshell could withstand before being crushed. I placed each eggshell into a vise-like egg crusher, placed the empty bottle on top, and began to fill up the bottle with water. When the shell would crush, I'd measure the amount of water inside the two-liter bottle. Results As of now, I found out that vinegar solution dissolved the eggshell before it could be crushed. The Water/eggshell crushed at 72.72fl.oz. The Hydrogen Peroxide/eggshell crushed at 20.72fl.oz. The sugar-water/eggshell crushed at 88.32fl.oz. The fluoride-water/eggshell crushed at 82.08fl.oz. Conclusions/Discussion My hypothesis that the sugar-water solution would decay the teeth the most was incorrect; the acid solution actually dissolved the eggshell while it was in the solution.	
Summary Statement I want to discover which solution will weaken the eggshells the most.	
Help Received My mother helped me research. My grandmother helped me put together my board. My dad helped me build the egg crusher.	