



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Rachael S. Frank	Project Number J1908
Project Title Average Cracking Weight of Eggs: Fresh vs. Store Bought, Side vs. Standing	
Objectives/Goals To determine if a fresh egg or store bought egg has a stronger shell and to see if the shell can take more weight on it's side or standing in order to determine the best method of packaging.	
Abstract	
Methods/Materials Materials - 30 fresh eggs 30 store bought eggs sparklets water bottle, one plastic popcorn container (empty), ball bearings, gram scale, tin foil, water Methods - A egg cracking machine was constructed by cutting a plastic container in half to create a sleeve and piston when placed inside each other. The egg was placed either on it's side or face up and secured in position with a tinfoil stand. The piston was filled with ball bearings and then the water bottle was placed on top of the piston. Water was slowly added to the empty water bottle until the egg cracked. The weight of the water, the piston, the water bottle and the ball bearings were recorded on the gram scale as the cracking weight of the egg. The experiment was repeated 15 times each for fresh:side, fresh:standing, store bought:side, store bought:standing.	
Results Fresh:standing held the most weight, Fresh:side held the second most, Store Bought:standing the third and store bought:side the fourth.	
Conclusions/Discussion Fresh eggs have a stronger shell and can hold nearly twice the weight before cracking. This is consistent with my research which showed that the age of an egg will determine shell strength and also the diet of a chicken will determine shell strength. My fresh eggs were laid by my own chickens and were tested on the day they were laid. Also, they were fed a natural diet of table scraps and whole grains. The fresh eggs had a very narrow range at how much weight the eggs held before they cracked. The store bought eggs had a wide range of shell strength showing they may have different levels of freshness and store bought eggs are fed commercial feed which includes chemicals and other unnatural additives. The position was not as important as I thought in shell strength, My research showed that the double arch structure of the egg redistributes the weight across the entire egg nearly as well standing as when it is stored on it's side.	
Summary Statement Determining the shell strength of eggs based upon their freshness and position.	
Help Received Father assisted in my study by pouring the water. Mother helped with hot glue gun on display board.	