



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Gary Berwick; Derrick Duran	Project Number J0504
Project Title Masses of Gasses: What Veggies Create	
Abstract Objectives/Goals Our project is based on acids and bases reacting together to create gases. We wanted to see if fresh, frozen, or canned vegetables would produce the most gas when mixed with an acid (vinegar) and a base (baking soda). According to research, we found that fresh vegetables will produce the most gas because of the natural enzymes, whereas frozen or canned are changed by the freezing and canning process. Methods/Materials We first obtained fresh, frozen, and canned vegetables that were all alike using corn, peas, green beans, and carrots. The vegetables were grinded up in a food processor and poured into separate 2 liter bottles. We then added 2 cups of vinegar and capped each bottle and allowed to stand for 30 minutes. After 30 minutes we added 1/4 cup of baking soda. When the carbon dioxide bubbles formed we then placed a round balloon over the bottle and observed it fill with the gas. Results After 4 experiments the canned vegetables filled the balloon with the most carbon dioxide gas. We took the average circumference of all four experiments and converted it to the metric system to formulate the following answers: Canned vegetabls =8259.62 cent.cub., Fresh vegetables=6647.08 cent.cub., Frozen vegetables=3473.48 cent. cub. Conclusions/Discussion The natural enzymes did not help the fresh vegetables create the most gas. Instead, the preservatives were more dominant and helped the canned vegetabls create the most gas. Preservatives in the canned vegetables were salt and water. Salt is a form of sodium and baking soda is sodium bicarbonate. The two chemicals combined produced the bigger reaction. Frozen vegetables produced the least amount of gas because the freezing process stops the formation of bacteria and molds from growing to help create the bigger reaction.	
Summary Statement My project focus is mixing acids, bases, with fresh, frozen, and canned vegetables to see which would create the most carbon dioxide gas.	
Help Received Mrs. Berwick helped type our graphs, Mrs. Duran helped with supplies and use of her home, Mr. Jared Derksen, Math Chairperson at Racho Cucamonga High School helped with the math calculations.	