



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Sara K. Spaventa	Project Number J0518
Project Title Why Are the Apples Brown?	
Objectives/Goals I would like to receive an award for either first, second, or third place as I did in the County Science Fair! I would like all of my hard work recognized by the judges, other contestants and audience and I hope that all of my interviews go very well.	
Abstract Methods/Materials The materials I used were Fuji apples, strips to test the pH of the substances used, a dropper, plastic food wrap, glasses, a thermometer, a browning chart, pens, knives, a cold area such as a freezer, a warm area similar to an oven, a camera, plastic gloves, a small table to place all of the apples on, a timer, and substances that ranged in different pH levels which were lemon juice, orange juice, water, soda (sprite,) mineral water, cranberry juice, and baking soda. The method I used was to first get each substance and then to take the pH strips and test the pH of each liquid, then to line up the slices of apples on the table, then to use the dropper and put an equal amount of drops of each substance on each individual apple, then to set a control apple aside, then to set the timer, then to record how long it takes for each apple slice with each different substance on it to turn dark brown.	
Results My results were that lemon juice is the best preservative to put on apple slices and that cranberry juice is the worst. The order of the preservatives from best to worst goes from lemon juice, to soda, to mineral water, to water, to an apple slice with nothing on it (control,) to orange juice, to baking soda and ending with cranberry juice. My results for the second experiment were that the best temperature to put apple slices at is a warm temperature such as 100 degrees Fahrenheit, then at room temperature, then a temperature of 39 degrees Fahrenheit, and ending with the worst temperature to put apple slices at when wanting to preserve them which is a freezing temperature such as 32 degrees Fahrenheit.	
Conclusions/Discussion I came to the conclusion that lemon juice is the best substance to put on apple slices when wanting to preserve them because it is high in citric acid. It also has Vitamins A, C and E in it. These are good because it lowers the pH level of the apple causing it to turn brown slower. It is best to put apple slices at a hot temperature because if you put it at a cold, the ice breaks down the cell walls of the apple and introduces the enzyme called "polyphenol oxidase" to air which is what turns the apple brown.	
Summary Statement My project is about what the factors that are affecting apple slices turning brown and what the best ways are to help preserve the apple slices.	
Help Received Mother helped buy supplies; Science teacher helped set up the board.	