



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Angel Magana	Project Number J0509
Project Title Tie-Dye Milk: Bipolar Effect	
Objectives/Goals My objective was to learn if the fat content in milk will change the bipolar effects of the soap.	
Abstract Methods/Materials Five varieties of milk and Dawn Soap were gathered together (regular whole milk, lactose free whole milk, 2% and nonfat milk and Silk a milk substitute). Also collected were a large dinner plate, food coloring, and cotton swabs. I poured one type of milk (repeated each time for all varieties of milk) on to the dinner plate to entirely cover the bottom of the plate, about a 1/4 of an inch thick. I then put one drop of every color of food coloring (red, green, yellow, and blue_ in the center of the plate, but I made sure none of the colors were touching. I then got a dry cotton swab and I kept one end dry and the other I dipped in Dawn soap. Then I placed the dry end in the milk to see if the dry end would effect the milk. After, I placed the cotton swab that was dipped in soap in the center of the plate and in the middle of the colors.	
Results The milk with the highest fat content, regular whole milk, produced the best swirling of color. The color quickly expanded and continued to expand after five minutes. The lactose free spread, but would not go over the dry spot it created. Nonfat and 2% milks spread out as well and the Silk slowly moved, but did not reach the edge of the plate.	
Conclusions/Discussion My conclusion is the soaps and the milk's bipolar characteristics makes the milk go everywhere when you put the soap on it. When the soap on the cotton swab is dropped into the milk the soap weakens the milks chemical bonds which causes them to go everywhere. Then the soap molecules chase the milk molecutes until it links up with the milk molecules and the food coloring shows this process.	
Summary Statement The purpose was to find out if the fat content of the milk would produce the best swirling of color.	
Help Received My teacher purchased the different varieties of milk and gathered the other materials for the project.	