



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Caitlin R.S. Merrill	Project Number J1321
Project Title Temperature Tincture: The Effects of Temperature on Bacterial Pigmentation	
Abstract Objectives/Goals I really enjoyed my project this year. In my project, I tested how temperature affected the pigmentation of four different bacteria. From my research, I knew that the bacterium <i>Serratia marcescens</i> alters its color at different temperatures, and I wanted to explore this. I also wanted to see if this applied to other pigmented bacteria. Methods/Materials My project consisted of qualitative tests. First, I gathered my types of bacteria. I used <i>Serratia marcescens</i> , <i>Rhodospirillum rubrum</i> , <i>Micrococcus luteus</i> , and <i>Sarcina aurantiaca</i> . Next, I made agar from a powder. I then sterilized it and poured it into plates. After that, I made nutrient broth for the bacteria to grow in. I also sterilized this. I then inoculated the broth with the bacteria and let it grow for a few days. Next, I began my first set of tests. Using a pipette, I put each of the four bacteria onto two different plates. I then spread the bacteria with a bent glass tube. I let these incubate for two days and then observed them. I recorded the colors and drew images of the plates. I repeated this process eight times, doing tests at 25, 28, 31, 34, 35, 36, 37, 40, and 43 degrees Celsius. Results Analyzing my results, it appears that <i>Serratia marcescens</i> is a pretty special bacterium. All the other pigmented bacteria I tested held the same coloration, whereas <i>Serratia marcescens</i> lost its red pigmentation at 37 degrees Celsius. Conclusions/Discussion The pigment in <i>Serratia marcescens</i> is called prodigiosin. Once the growth temperature of <i>Serratia marcescens</i> is raised to 37 degrees, the pigment stops being produced. It is believed that an enzyme used in the production of prodigiosin is affected by the temperature so that the pigment is no longer made. As you can see, my project came up with some pretty interesting results.	
Summary Statement I tested how temperature affects the pigmentation of <i>Serratia marcescens</i> , <i>Rhodospirillum rubrum</i> , <i>Sarcina aurantiaca</i> , and <i>Micrococcus luteus</i> .	
Help Received I used the lab equipment of Ocean View Junior High School under the supervision of Mr. Brent Susman.	