



**CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY**

Name(s) Jennifer K. Rodstein	Project Number J1817
Project Title Rememba' Mpemba! The Mpemba Effect	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My Hypothesis- If hot and cold water are placed in the freezer at the same time, under the same identical conditions, except temperature, then the hot water will freeze solid before the cold water will. My goal was to prove that the Mpemba Effect can occur, which is the phenomenon that hot water can freeze faster than cold water.</p> <p>Methods/Materials I heated 4 cups bottled water. I measured 2 Tb or 36 mL of cold 10 C bottled water into a 1/2 cup plastic container. When the hot water reached 100 C I scooped 2 Tb into an identical 1/2 cup plastic container. I drew a line at the water level and continued heating in the microwave to achieve 100 C. If water was lost I added boiling water to the line and continued heating. I then put the 100 C and the 10 C water in the freezer and recorded observations and temperatures every 10 min. Materials- 2 identical: 1/2 cup containers, Celsius thermometers; bottle water; freezer; stove; microwave; tablespoon; pot; timer.</p> <p>Results The hot water did freeze faster than the cold water. The hot water's temperature dropped significantly in the first 10 min. of freezing, due to evaporation, dissolved gases, convection currents, surroundings, and supercooling. I had 3 successful trials. In my 7 previous trials the hot water did not freeze before the cold water. I had to develop my own procedure, temperatures, and materials to find the correct conditions and variables to make my experiment work successfully! The hot water froze solid at 80 min. and the cold at 90 min.</p> <p>Conclusions/Discussion I was able to support my hypothesis and prove that the Mpemba Effect can occur. I learned about the job of a scientist by continually repeating trials and adjusting variables until I was able to create a successful experiment! Many things can be learned from my experiment including supercooling, when water freezes below 0 C; ice lattices that form when water tries to become solid but the molecules do not know how yet; and the 5 main causes of why the Mpemba Effect occurs.</p>	
Summary Statement My project was testing the Mpemba Effect, if initially hot water can freeze faster than initially cold water.	
Help Received Teacher gave project guidelines	