



**CALIFORNIA STATE SCIENCE FAIR  
2010 PROJECT SUMMARY**

<b>Name(s)</b> Sara E. Murphy	<b>Project Number</b> <b>J0514</b>
<b>Project Title</b> <b>The Metronome of a Chemical Reaction</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The objective of this project was to test the effect of temperature on the rate of a chemical reaction. I thought that reaction rates would increase with increasing temperature. <b>Methods/Materials</b> Sodium Thiosulfate, Potassium Iodide, Potassium Bromate, Hydrochloric Acid, distilled water, and 2-3 drops of soluble starch were mixed to start the chemical reaction. When the reaction reached a certain point, the solution would turn blue. To compare the speed of the reaction at different temperatures, the time taken to reach the color change was measured with a stopwatch (in seconds). All of the reactants were cooled or heated to the appropriate temperature before they were mixed to ensure accuracy. The experiment was conducted at three temperatures: room temperature (19.5 degrees Celsius), in an ice bath (4.5 degrees Celsius), and in a heat bath (30.5 degrees Celsius). <b>Results</b> The results of the experiment showed a distinct relationship between temperature and the rate of a chemical reaction. There was at least a 20-30 second difference between the averages of times at each temperature. Times recorded at the higher temperatures were significantly lower (faster rates) than those recorded at lower temperatures. <b>Conclusions/Discussion</b> The results proved my hypothesis correct. I thought that the rate of a chemical reaction would increase with increasing temperature, and this is what my results demonstrated. This occurred because as temperature increases, so does the speed of the constantly moving molecules. This is associated with an increase in their kinetic energy, therefore leading to an increase in the energy of their collisions. A higher percentage of these collisions then have the minimum amount of energy needed to break chemical bonds, thus initiating the reaction and increasing its speed.	
<b>Summary Statement</b> My project tested the relationship between chemical reaction rates and temperature.	
<b>Help Received</b> My father, James Murphy, provided me with the materials needed (from Santa Monica College).	