



**CALIFORNIA STATE SCIENCE FAIR  
2002 PROJECT SUMMARY**

<b>Name(s)</b> Christopher D. Masson	<b>Project Number</b> <b>J0512</b>
<b>Project Title</b> <b>The Effect of Temperature, Concentration, and a Catalyst on the Rate of the Iodine Clock Reaction</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The objective was to measure the effect of various things on the rate of a chemical reaction known as the Iodine Clock reaction. <b>Methods/Materials</b> The reaction known as the Iodine Clock reaction was used to study the rates of reaction. The Iodine Clock Reaction uses Potassium Iodate as solution A and Sodium Sulfite, Sulfuric Acid, and Soluble Starch as solution B. When these solutions were mixed, the solution will turn blue after a short time (measured with a stop watch). The solutions were heated or cooled and the rate of reaction recorded. The Molarity of each solution was raised to different concentration and the rate of reaction recorded. A catalyst for the reaction (Copper II Sulfate) was added to solution A, solution B, and both solutions and the rate of the reaction was recorded. <b>Results</b> As temperature went up the rate of reaction increased. When the Molarity of the solutions were raised without compensating by adding more acid, the rate of reaction decreased. When Concentration was raised with more acid present, the rate of reaction increased. When a catalyst was added to solution A and both solutions, it increased the rate of reaction, and when it was added to solution B only, it had no effect on the reaction. <b>Conclusions/Discussion</b> It was found that the rate of reaction varies directly with temperature. The reason why the concentration increase without acid decreased the reaction rate was because the Iodine Clock reaction is actually many different reactions. First, the Sodium Sulfite reacts with the Potassium Iodate to make Iodate ions, Potassium, and also during this process some Iodide ions are made. Under acidic conditions Iodate reacts with Iodide to make Iodine, then immediately the Iodine reacts with the Sodium Sulfite until there is no more Sodium Sulfite. Then the Iodine reacts with the water and the Soluble Starch and that is what forms the blue complex. The more acid the quicker the Iodate and the Iodide ions react with each other and the quicker the Sodium Sulfite is used up. Therefore when the Sodium Sulfite concentration went up there was more to use up even though there was the same amount of acid for each concentration. When additional acid was added, the reaction happened almost instantaneously. The catalyst in solution A and both solutions increased the rates of reaction by lowering the activation energy of the reaction therefore allowing more molecules to react at a given time.	
<b>Summary Statement</b> My project is about the rates of chemical reactions and how chemical reactions work.	
<b>Help Received</b> Used Viewpoint School labs, Dad helped with board	