



**CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY**

Name(s) Krystal Y. Chung	Project Number J0402
Project Title Hot Potato! Cold Potato! Does Temperature Affect the Reaction Rate Between Catalase and H(2)O(2)?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals In this experiment I wanted to test whether temperature causes any change in the overall rate of reaction between the enzyme, Catalase, and hydrogen peroxide. My hypothesis was that the enzyme will break down the hydrogen peroxide faster when it is hot.</p> <p>Methods/Materials To begin this experiment, I prepared a Catalase, enzyme mixture from potatoes and distilled water in a blender. After pouring 3% hydrogen peroxide into beakers; I placed an enzyme soaked, filter discs into the solution and recorded how long it took for the disk to rise to the surface. I completed the same series of 20 tests using hydrogen peroxide at 3 separate temperatures. I used a temperature of 0 degree Celsius to test a cold reaction, 22 degree C for room temperature, and 70 degree C for hot. In order to maintain a constant 70 degree temperature, the hydrogen peroxide was heated over a gas stove top on top of an upside down, cast iron pot with holes drilled in the sides for air circulation.</p> <p>Results It turned out that the heated hydrogen peroxide did in fact react the quickest with the enzyme, Catalase. The hottest temperature, which was 70 degrees Celsius, reacted at 4.7 seconds on average. The coldest, 0 degrees, reacted in 11 seconds on average. While the rate of the room temperature, 22 degree, hydrogen peroxide was in the middle at 7.5 seconds.</p> <p>Conclusions/Discussion The results of this experiment prove that my hypothesis was correct. The reason that the filter discs rose, is because when the enzyme solution reacts with the hydrogen peroxide then the byproduct, oxygen, escapes in the form of bubbles which get trapped in the filter disc holes causing it to rise to the surface. The activation energy in this experiment varied with the different temperatures of the hydrogen peroxide. The hotter temperatures had more energy because it came in the form of heat.</p>	
Summary Statement My project is about reaction rates between Catalase and H(2)O(2) and how they change due to temperature.	
Help Received Borrowed equipment from Dr. Shevinsky; Dad helped with drilling and wiring.	