



**CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY**

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Project Title The Effect of Enzyme Concentration on the Reaction Rate	
Abstract Objectives/Goals Enzymes are organic catalysts that speed up reactions by decreasing the activation energy needed to start the chemical reaction. Therefore, my hypothesis is that as the enzyme concentration increases, the speed of the chemical reaction will also increase. Using the 0% enzyme concentration should lead to the disk not rising because of the lack of reaction between the distilled water and hydrogen peroxide. Methods/Materials The manipulated variable is the enzyme concentration, while the responding variable is the amount of time it takes for the paper disk to rise to the top of the hydrogen peroxide solution. First, extract the catalase enzyme from the potato. Then dip a construction paper disk into different solutions that consist of either 2.5 ml, 5 ml, 7.5 ml, or 10 ml enzyme and enough distilled water to have a final volume of 10 ml. Afterwards, place the paper disk into a solution of hydrogen peroxide. Using a stopwatch, measure the time it takes for the paper disk to rise to the top of the hydrogen peroxide solution. This measurement is a way of recording the speed and efficiency of the rate of reaction. For each enzyme solution, take results from ten trials. Results The results show that as the enzyme concentration increases, the time for the disk to rise decreases. The distilled water, or 0% enzyme concentration, leads to no chemical reaction at all. According to the statistical results, or standard deviations, the results of this experiment are reliable. Conclusions/Discussion The highest catalase enzyme concentration was able to speed up the reactions by quickening the process of the disk rising. When absorbed in an enzyme concentration, the disk would rise, but when dipped into the 0 ml enzyme concentration, or distilled water, there was no reaction between the water and hydrogen peroxide, causing the disk to sink. This experiment can prove that increasing the amount of the enzyme concentration results in a faster reaction.	
Summary Statement This experiment focuses on how catalase enzyme concentration affects the reaction rate while using a substrate of hydrogen peroxide.	
Help Received Project reviewed by teacher.	