



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Zainab M. Umarji	Project Number J0422
Project Title Enzymes: Nature Helpers	
Objectives/Goals The purpose of my experiment is to learn about enzymes and what they do in the human body.	
Abstract	
Methods/Materials Materials 1. Apple sauce. 2. Balance for weighing the apple sauce. 3. Pectinase. 4. Paper coffee filters 5. Plastic spoons 6. Two 2 mL syringes 7. Two small funnels 8. Two 100 mL baby bottles 9. Water bath 10. Distilled water 11. Timer or clock Add 2 mL of pectinase to one jar of apple sauce and add 2 mL of water to another jar of apple sauce. Stir at the exact time and with the same speed. Repeat method several times to get accurate results. Do the method with light stirring, heavy stirring, and without stirring. The purpose of the light stirring is just to mix the enzymes around a little bit. The purpose of the heavy stirring is to fully mix the enzymes with the apple sauce and do the experiment without stirring so the enzymes can mix with the apple sauce by themselves. These methods were used for more accurate results. Place two jars of apple sauce in a hot water bath for ten minutes. Repeat the method mentioned earlier. Record observations.	
Results My results showed that adding pectinase to the apple sauce produced juice very quickly. The results also showed me that not only does the pectinase react quickly but it produces much more juice as well. The jars placed in the hot water bath had the most interesting results. Some of the experiments proved denaturing of the enzyme while others proved how heat can be a catalyst.	
Conclusions/Discussion The pectinase reacted quickly with the apple sauce and made more juice than the control (water) which proves that my hypothesis is correct. To learn more about the effect of enzymes, I interviewed Dr. Mohamed Umarji Pharm. D. I learned from him how the knowledge of enzymes can lead to better health. He mentioned that depending on the disease, medicines may add to the effect of enzymes or may decrease the effect of enzymes. Shockingly, I found out that taking certain medications and drinking grape fruit juice is very dangerous. Even more shocking to me was the reason for this effect. Grape fruit juice blocks the enzymes that remove medications from the body. Because these medicines are not removed from the body, the medicine becomes concentrated in the body leading to dangerous side effects.	
Summary Statement My project is about how bacterial enzymes react in the human body.	
Help Received My father helped me do my experiments and allowed me to interview him. My mother helped me decorate my board and my science teacher for encouraging me to do my project.	