



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

Name(s) Danielle A. Robinson	Project Number S0105
Project Title A Stroke of Propulsion	
Abstract Objectives/Goals The objective of my project was to determine which of the four competitive swim stroke exerts the most propulsion. I believe the breaststroke will have the most propulsion despite it being the slowest of the competitive swim strokes. Methods/Materials Informed consent was obtained from six male and six female competitive swimmers ranging in age from 15 years old to 27 years old with varying heights, weights and abilities. Each swam the competitive strokes on four different days in the same pool. The order of the competitive strokes was rotated on each test day. A stretch cord was secured to the swimmer's waist and tethered to one end of the pool with two 20 Newton Scales attached. A measurement was recorded. Results Eleven out of the twelve swimmers tested were found to exert more force while swimming the breaststroke. One male swimmer recorded a higher freestyle measurement. My theory why the one swimmer recorded a higher freestyle measurement is he is new to the sport and is still learning how to swim the other strokes technically correct. Conclusions/Discussion Most predicted freestyle would have the most propulsion because it is the fastest stroke. The quicker speed of recovery of the other strokes and less drag compared to the breaststroke help explain why they are faster. However, the breaststroke utilizes the legs to "push" the water while the other strokes used the arms to "pull" the water. This information can help coaches better understand the mechanics of the sport and help swimmers perfect their technique. Also, safety instructors may want to recommend utilizing the breaststroke when informing the public how to efficiently reach shore safely in case of a water accident since the breaststroke will propel them quicker through the water.	
Summary Statement To determine which competitive swim stroke has the most propulsion.	
Help Received My swim coach suggested how to test my hypothesis; Friend helped take pictures as I recorded the data; Friends took data and pictures while I was tested; La Sierra University loaned me the Newton Scales.	