



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Kaitlin M. Walker	Project Number S1012
Project Title A pHantastic Way to See How Exercise Affects CO(2) Production	
Abstract Objectives/Goals To explore the effects that different types and durations of exercise have on the production of CO(2) in humans. To demonstrate how when people exercise, they burn adenosine triphosphate (ATP). During the process of burning ATP, muscles need oxygen and get rid of CO(2). When CO(2) is combined with H(2)O, it produces carbonic acid. By measuring the pH level of the H(2)O, we see how exercise affects the amount of CO(2) produced. Methods/Materials 60 subject were tested, 10 female and 10 male, in three age brackets. (13-19, 21-50, and 51-80 yrs) A baseline or control pH measurement was taken from H(2)O samples, prior to exercising. Then, each subject exercised for 5 minutes and blew into a straw submerged into H(2)O for 30 seconds. PH level was measured. Procedure was repeated three times. IV was different types of exercise, duration, and mean number of minutes exercised each week. DV was the amount of carbonic acid produced after exercising. Results Hypothesis was supported. When people exercise, they burn ATP, expend energy, and exhale CO(2), as a result of cellular respiration. Whe CO(2)is combined with H(2)O it forms carbonic acid and lowers the pH of the H(2)O sample. 97% of subjects produced measurable carbonic acid following exercise. There was evidence that they were burning ATP. This increased to 88% following the second set of exercises. Conclusions/Discussion The duration of exercise had an impact in reducing pH levels, however, the type of exercise engaged in did not impact the results. The 51 to 80 age group produced the most dramatic decreases in the pH level, as they exercised. The actual pH level never exceeded 4.5, regardless of the amount of exercise performed. The number of minutes that a person exercised each week did not impact carbonic acid production while exercising, as I predicted that it would.	
Summary Statement An exploration of the effects that different types and durations of exercise have on the production of CO(2) in humans.	
Help Received The Ventura Adult Education exercise group participated as subjects in the 51-80 age group.	