



**CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY**

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Project Title Does Heart Rate Affect Memory?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Our objective was to find out if and how the heart rate of an athlete affected memory.</p> <p>Methods/Materials For our experiment, we designed three tests to observe the effects of increased heart rate levels on memory. For each test we created two sets of seven made up words. The words in the second set were rearranged versions of words in the first set. We used the girls on our soccer team as our test subjects. Before practice, we measured the heart rate of each player by taking their pulse for 15 seconds, and gave them the first list of words. We gave the athletes one minute to study the words, and after another minute, we told them to write down the all the words that they could remember. After this test, we let the girls practice soccer for one hour before repeating the memory test again, this time with the other set of words. We did these tests on two other days to collect the amount of data that we needed.</p> <p>Results The following percent of athletes had improved memory scores: 60% in Trial 1, 40% in Trial 2, and 80% in Trial 3. The following percent of athletes had the same memory scores: 20% in Trial 1, 40% in Trial 2, and 20% in Trial 3. The following percent of athletes had lower memory scores: 20% in Trial 1, 20% in Trial 2, and 0% in Trial 3. The majority of the athletes had improved memory scores after exercising and having a higher heart rate.</p> <p>Conclusions/Discussion Our science research experiment shows that an average athlete can remember more after exercising than before. When the heart rate increases, oxygen rich blood flows to the hippocampus (the part of the brain related to spatial memory), causing the memory level to increase. This helped the athlete do better on our memory test which lets us conclude that a higher heart rate can improve an athlete's memory. Therefore, our hypothesis that the athletes would remember less after exercise, when their heart rate is higher was incorrect.</p>	
Summary Statement Our project is about finding out how an increase in an athlete's heart rate could affect memory.	
Help Received Our parents helped conduct the memory test and purchase materials, Our soccer team members participated as test subjects.	