



**CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY**

Name(s) Daniel L. Polyakov	Project Number S0420
Project Title The Nose Knows: A Study of the Effect of Olfactory Stimulation on Memory Function	
Abstract Objectives/Goals The project objective was to determine if the smell of strong, pleasant odors can improve the ability of a subject to memorize and recall information through the stimulation of the olfactory system? Methods/Materials I tested the memory of the subjects randomly placed in four different groups, with the group having no odor during the memory and recall phase being the control group. The other groups had odor present either during the memory phase, the recall phase, or both. The memory phase was timed at 3 minutes, with the subject being presented with one of six different memory cards. The next phase called for the subjects to read a passage from Treasure Island. The recall phase involved the subject writing down on an answer sheet as many items it could recall from the memory card. Materials were scented aerosol air fresheners with orange, cinnamon or French vanilla scent; a stopwatch; six different laminated memory cards; six pages with an excerpt from Treasure Island, written by R. L. Stevenson; answer sheets; pencils; and a chart to maintain the data Results First, I looked at whether an odor had an effect on memory as compared with no odor. Group No. 1 (odor present during memory and recall phases) averaged 17.04 correct out of a possible maximum score of 25 correct. Group No. 2 (odor present during the memory phase and not during the recall phase) averaged 15.81 correct answers. Group No. 3 (odor present during the recall phase only) had the worst average score of only 14.18 correct answers. Group No. 4 (the control group, no odor present at either phase) averaged 14.71 correct answers. Further, the results revealed that orange scent produced the highest average score. The lowest scores were obtained by the groups that had either the vanilla or the cinnamon scent present during the testing phase only. Conclusions/Discussion The results confirmed that simultaneously stimulating the olfactory system during the learning process improves memory. Introducing an odor during the learning process improved average scores on the memory test by almost two standard deviations. Improvement in memory is accomplished when odors were presented during learning and memory phases, and also that not all odors have the same effect on memory. It was demonstrated that internal processes that initially appear unrelated, such as smell and memory, are actually interconnected within the brain.	
Summary Statement Whether memory can improve by simultaneously stimulating the olfactory system during the learning and recall phases.	
Help Received Father helped buy supplies, my friends and family members volunteered to be the subjects in the experiment	