



# CALIFORNIA STATE SCIENCE FAIR 2011 PROJECT SUMMARY

<b>Name(s)</b> <b>Patrick J. Manghera</b>	<b>Project Number</b>  31228
<b>Project Title</b> <b>Does Number Sense Develop with Age?</b>	
<b>Objectives/Goals</b> My objective was to determine the affect age has on automatic number sense. Based on my 2010 results, this year I focused more on fast questions that require no reading and very quick responses. Also, the 2010 experiment indicated a possible difference in genders, so I specifically analyzed skills of boys versus girls in number pattern questions. <b>Abstract</b> <b>Methods/Materials</b> This year I created a PowerPoint to control response time and reading demands by putting the directions on one slide and showing the picture or number pattern on the next slide. Given in a traditional classroom, individual students answered on a separate piece of paper. This year, I only focused on two skills: visual recognition and number patterns. I tested 22 2nd-grade students, 29 4th-graders, 31 6th-graders, 32 8th-graders; using the same subjects, I compared results of 62 males and 52 females. I analyzed the results for accuracy answering visual recognition and number pattern questions. <b>Results</b> My results determined that number sense does improve with age and there is a difference in automatic number sense between males and females. The 8th grade average correct (53.1%) was significantly higher than the 2nd grade average (25.9%). In a linear fashion, 4th and 6th-grade averages were better than 2nd(34.8% and 47.7% respectively). When comparing males to females (regardless of age), males averaged 45.6% correct to females at 37.3%. The most significant differences, whether addressing age or gender, was the number pattern category. Regarding age, the second grade averaged 0.5 out of 5 correct while the 8th grade earned an average of 3.4 out of 5.0. Comparing boys to girls, the boys averaged 2.5 while the girls averaged 1.7 on the same questions. <b>Conclusions/Discussion</b> Adding to the innate vs. learned debate, my experiment showed that the number sense skill of pattern awarness does improve with age, and therefore can and is learned through experiences. Therefore, identifying children with a weak number sense early can be helpful to enhance this skill. The experiment further indicates a natural difference in males vs. females, which validates one theory of brain differences between the genders set through the evolutionary process. Perhaps teachers should teach patterning differently to the two genders so both comprehend the relationship of numbers.	
<b>Summary Statement</b> I tested 114 students at grades 2, 4, 6, and 8 to determine that automatic number sense does improve with age; males clearly have a more natural ability than do females.	
<b>Help Received</b> Mother helped edit my writing and tested her 8th grade students. She also helped cut and glue the board.	