



**CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY**

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Project Title CheckMate: The Effect of Playing Chess on Spatial Cognition	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this experiment was to determine if spatial cognition is affected by playing chess, gender, and grade level.</p> <p>Methods/Materials In my experiment, I used an online, 16-question spatial reasoning test. I tested a total of 138 students -- 41 sixth grade students, 49 seventh grade students, and 48 eighth grade students. Within each grade level, the students were divided into two groups: the control group, composed of students who did not play chess, and the test group, consisting of students who self-reported that they were active chess players. Each student took the untimed test individually in a quiet setting.</p> <p>Results I found that the eighth grade chess group performed 15.35% better than the eighth grade non-chess group, that the seventh grade chess group 17.5% better than the seventh grade non-chess group, and that the sixth grade chess group performed 1% better than the sixth grade non-chess group. Looking solely at the student's grade levels, I found that the eighth grade chess group had the highest average score on the spatial reasoning exam. This group scored 5.3% higher than seventh grade chess group, and the seventh grade chess group scored 9.2% higher than the sixth grade chess group. Similarly, the eighth grade non-chess group performed 8.15% better than seventh grade non-chess group, but only 0.85% better than sixth grade non-chess group. Surprisingly, the non-chess group of sixth grade students performed better on the assessment than the non-chess group of seventh graders. Furthermore, the male students performed better than the female students. The chess playing female students scored 8.4% lower on the exam than their male counterparts, and the non-chess playing females scored 6.6% less than the control group males.</p> <p>Conclusions/Discussion My test results demonstrated that students who play chess have measurably greater spatial ability than those who do not play chess. I also found that as the students' grade levels increased, their scores did as well. Lastly, I discovered that the average male test subject performed better than the average female test subject. The data from this project can be directly translated into school curriculum; schools can add chess electives to their course selections at the elementary school and junior high levels, improving students' spatial abilities, their abilities to comprehend new and abstract concepts, and solve problems.</p>	
Summary Statement This experiment studies the effect of gender, grade, and chess-playing ability on spatial cognition.	
Help Received Dr. David Sherman provided guidance throughout the project.	