



# CALIFORNIA STATE SCIENCE FAIR 2005 PROJECT SUMMARY

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<b>Project Title</b> <b>Mathematics: Is There a Gender Difference?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of my project was to compare data compiled for boys' and girls' success rates and times when solving tangram puzzles to determine which gender displays stronger spatial reasoning ability at 11 to 12 years of age.</p> <p><b>Methods/Materials</b> I used 60 puzzle papers, 30 sixth grade girls, 30 sixth grade boys, 60 tangrams, and a timer. I timed the sixty subjects making four types of shapes using the seven tangram pieces (2 animal shapes and 2 solid shapes), on two different days. I gave the subjects no more than 20 minutes for each shape, and then I recorded the times in my log. Average times were calculated only for subjects who successfully completed the puzzle. I then compared the times and the success rate for girls versus boys to determine if there is a gender difference in spatial reasoning.</p> <p><b>Results</b> Analyzing the results of subjects who solved the puzzle, the boys' average time for shape A was 6:43 minutes with 90% finishing the shape; shape B's average time was 8:05 with 67% finishing; shape C averaged 11:19 minutes with 40% finishing, and shape D averaged 8:28 with 17% finishing. For the solvers only, the girls' average time for shape A was 7:14 minutes with 73% finishing; shape B averaged 7:26 minutes with a success rate of 60%; shape C took 12:23 minutes on the average with 33% finishing; and lastly, shape D took the girls 11:35 on the average, with 20% solving the puzzle.</p> <p><b>Conclusions/Discussion</b> After analyzing the data, my hypothesis that girls would successfully complete more puzzles with a faster time, was proven wrong. I found that the 30 boys were mathematically faster and more successful solving every shape with two exceptions. Although more girls finished shape D, the boys' time was significantly faster. For shape B, the girls' time was faster than the boys' time by 39 seconds, but 7% more of the boys solved the puzzle. For shape A, the boys' time was 31 seconds faster and 23% more boys solved the puzzle; for shape C, the boys were faster by 1 minute and 4 seconds with a 7% higher solution rate; and for shape D, the boys were faster by three minutes and seven seconds, with 3% more girls solving the puzzle. For both genders, shapes A and B (the animal shapes) were easier than for shapes C and D (the solid shapes) because subjects could use their background knowledge of geometry for clues to pieces on the edges.</p>	
<b>Summary Statement</b> I compared the spatial reasoning abilities of 30 boys to 30 girls and found that boys are faster and more successful because their brains may be structured differently.	
<b>Help Received</b> My mother helped cut tag board and she used the hot glue gun to help me mount the board and read the project for understandability and grammar. Two teachers let me use their classes to test subjects.	