



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Prem M. Talwai	Project Number J1613
Project Title Sudoku Patterns	
Abstract Objectives/Goals The main goal of this project was to identify patterns in solved 9x9 Sudoku puzzles and then to use these patterns to create a new method to solve any standard 9x9 puzzle. This will provide Sudoku solvers a logical way to approach Sudoku puzzles that avoids long, intense calculations and guesswork. Methods/Materials The materials I used were empty 9x9 Sudoku grids, a large collection of Sudoku puzzles and their solutions (Super Colossal Book of Sudoku by William Shortz), and a pencil or pen. The first step of my procedure was creating a letter system to map Sudoku puzzles on the 9x9 grid. The letter systems consisted of the letters A through I, each letter consistently representing a number throughout each Sudoku grid. I mapped many puzzle solutions and found basic patterns that were evident in the bands and stacks of each puzzle. I then investigated how these patterns arise and came to the theory that certain #transformations# occur in a Sudoku puzzle. By examining these transformations on several Sudoku solutions, I discovered many more complex patterns. I used these patterns to configure a method to solve a Sudoku puzzle. I tested this method on many Sudoku puzzles. Results I successfully found patterns in solved Sudoku puzzles. I devised a repeating three step method, using band and stack patterns, which can be used to logically solve any 9x9 Sudoku puzzle without guesswork. Conclusions/Discussion I concluded that there are consistent patterns that arise in any Sudoku puzzle. I fulfilled my goal and created a method to solve Sudoku puzzles that uses these patterns.	
Summary Statement My project creates an easily understandable method to solve any 9x9 Sudoku puzzle.	
Help Received No help was received.	