



CALIFORNIA STATE SCIENCE FAIR 2007 PROJECT SUMMARY

Name(s) Katelyn E. Shipp	Project Number J0227
Project Title Standing Tall: Strength of Shapes	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of this project was to find out which shape of column is the strongest and will support the most weight. It was hypothesized that the circular shaped column would be the strongest and would support the most weight.</p> <p>Methods/Materials A column is a vertical structure that is used to support a large load, usually in the form of a building or structure. This experiment involved making several different shaped columns, lifting and setting multiple weights onto the columns until the columns failed, and recording the data. The tests were run using triangular shaped columns, square shaped columns, hexagonal shaped columns, octagonal shaped columns and cylindrical shaped columns. Each shape of column was tested thirty different times with four columns used in each trial.</p> <p>Originally the experiment was performed 10 times using 110 lb cardstock to make columns that were 5.5 inches tall. In order to validate the results, the entire experiment was run again using 110 lb cardstock and 11 inch tall columns and then a third time using 28 lb copy paper and 5.5 inch tall columns. This gave a total of thirty data points for each shape of column. Throughout all the experiments the perimeter of the columns was kept constant at 6 inches.</p> <p>Results The results of the experiment supported the hypothesis. The cylindrical shaped column was by far the strongest column and supported the most weight.</p> <p>Conclusions/Discussion The cylindrical shaped column is the strongest is because of corners. The flat sides of the shapes do not support structural load. Therefore, it is the corners of the shapes that give the columns their strength. The triangle has three corners to support its load, the square has four, the hexagon has six and the octagon has eight corners. In contrast, the circle can be viewed as having 360 corners. Thus, the circle is by far the strongest shaped column.</p>	
Summary Statement This experiment tested 5 shapes of columns (triangle, square, hexagon, octagon, circle) varying the height and thickness of the material to determine which shape was the strongest and could support the most structural load before failure.	
Help Received I would like to thank my dad for lifting some of the weights that were too heavy for me to lift, my sister for taking pictures during my tests, and my mom for helping me organize my science fair presentation board.	