



# CALIFORNIA STATE SCIENCE FAIR 2011 PROJECT SUMMARY

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<b>Project Title</b> <b>Strongest Truss Bridge</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The purpose of this project is to investigate the load carrying capacity of different type of truss bridges. I knew I wanted to attempt this investigation one year ago. The idea came to me at the County Science Fair Competition last year where I built 3 types of bridges Suspended, Truss, and Beam. After that I focused on trying to figure out which type of truss bridge will be the strongest, Equilateral, Right Isosceles, and 30-60-90 deg. I chose to focus more on truss bridges because it is more practical and economical to build.</p> <p><b>Methods/Materials</b> To perform this investigation, three types of truss bridges were built (three of each to get an average). These types are: Equilateral, Right Isosceles, and 30-60-90 deg. The bridges were built using Balsa wood, Popsicle sticks, and tacky glue. Once the bridges were built and were dry enough to be tested, the Equilateral truss bridges were loaded first. The bridges were supported on each side by metal stools, and we hung a bucket from the center of the bridge and filled it up with water. I added water gradually to the bucket until the bridge broke. Once the results were recorded, the same test was performed on the Right Isosceles truss bridge as well as the 30-60-90 deg truss bridge. The same tests were performed two more times on each type of bridge, and the results averaged and recorded.</p> <p><b>Results</b> The average weight held by the 90 deg. isosceles bridge was 7.56 kg with maximum deflection of . The equilateral truss bridge held an average weight of 17.56 kg, and the 30-60-90 deg. bridge held the maximum load of 20.56 kg.</p> <p><b>Conclusions/Discussion</b> The results of this experiment proved that the hypothesis that the 30-60-90 deg. truss bridge holds the most weight was correct. The maximum load carried was 20.56 kg with maximum deflection of 2.31 inches. The 90 deg. Isosceles Bridge was the weakest type holding the least amount of load of 7.56 kg, with a maximum deflection of 0.56 inches. The equilateral truss bridge was the second strongest of all three bridges tested carrying 20.56 kg, with a maximum deflection of 1.3 inches. The reason the 30-60-90 deg. Bridge held the most weight is that the truss members were much more than the other two bridges, and therefore were able to carry more load.</p>	
<b>Summary Statement</b> My project is about the testing of 3 truss bridges. Equilateral, 30-60-90 deg, and Right isosceles. Which is strongest?	
<b>Help Received</b> My Father instructed me through the building of the bridges.	