



# CALIFORNIA STATE SCIENCE FAIR 2015 PROJECT SUMMARY

<b>Name(s)</b> <b>Hannah Chernavsky</b>	<b>Project Number</b> <b>J0306</b>
<b>Project Title</b> <b>The Strongest Wood</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of the experiment is to determine the strongest material to build a beam bridge, given a situation where the only resources to create a simple beam bridge are Balsa wood, Western White Pine, and White Oak. There are several factors to consider while building wooden bridges: the elastic property of wood, the physical characteristics of wood such as texture affect its bending strength, and finally, the structural design of the bridge.</p> <p><b>Methods/Materials</b> Beams of western white pine, white oak, and balsa wood; Sand weights and bricks; Bar stools; Bucket; Loading bar; Scale.</p> <p><b>Results</b> The hypothesis stated that White Oak would be able to hold the most weight while Balsa would be the weakest wood out of the three woods tested (White Oak, Balsa, and Western White Pine). The experiment supported the hypothesis. White Oak held 45 lbs on average, Western White Pine held 30 lbs, and Balsa held 3 lbs.</p> <p><b>Conclusions/Discussion</b> As predicted White Oak was the strongest material to build the bridge out of the given choices. As with any experiment some lab errors did occur that could have led to inconclusive results. The bucket was too small, forcing the weights to overflow from the bucket and rest instead on the rope. The weights added were in large increments. For each wood, there was a general trend of a 2 to 5 pounds difference in each result. Throughout the trials, uncontrolled events occurred that could have affected the results. One uncontrolled variable was the order in which the weights were deposited into the bucket using small increments rather than large bricks to avoid sudden stresses. There are several ways this project could be expanded and improved; the bending points of the woods could be measured; use the same wood but test different truss models to observe how the lattice work affects a bridge's strength; use smaller weights for consistent load-increasing. Finally, the project could expand by analyzing in-depth the structural strength of wood, specifically grain alignment, the strength of cellulose, and how the two come together to form wood.</p>	
<b>Summary Statement</b> The purpose of the project is to determine the strongest material to build a bridge, given a situation where the only resources to create a simple beam bridge are Balsa wood, Western White Pine, and White Oak.	
<b>Help Received</b> My father helped with getting materials and assisting with the execution of the experiment; Mrs. Jacobson, guided me through the steps of this project	