



# CALIFORNIA STATE SCIENCE FAIR 2011 PROJECT SUMMARY

<b>Name(s)</b> <b>Lauren E. Henske</b>	<b>Project Number</b> <b>J1309</b>
<b>Project Title</b> <b>Breaking Wood: What Is Stronger, Real Wood from a Tree or Plywood, and Are Heavier Woods Stronger Than Lighter Woods?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> In my "Breaking Wood" project, I wanted to learn what was stronger - real wood from a tree, or plywood, and if the heaviest woods are strongest. Based on research, I hypothesized that real wood would be stronger than plywood, which is made from bits of wood, and that denser/heavier woods are going to be stronger than lighter woods.</p> <p><b>Methods/Materials</b> To test this, I built a test apparatus with my Dad that attaches weights to same-size wood samples until the wood breaks. Since wood varies by density, age, and moisture content, I had to weigh each wood sample separately and evaluate sample weight as a variable. Then, I recorded the weight that the sample cracked and/or broke at. Since I did not have 60 one pound weights, my father poured little lead bricks that I spray-painted pink (to decrease my risk of lead poisoning), weighed individually, loaded into the apparatus sequentially, and added up total ounces to see how much weight each sample could support.</p> <p><b>Results</b> My tests indicate that plywood breaks under less weight than real wood and that heavier, denser woods are stronger than lighter woods. My hypothesis was correct, but some plywoods are stronger than real wood and some softwoods are stronger than hardwoods. I had to graph my data to fully understand it. Initial samples required more weights than my test apparatus could accommodate, so I had to redesign my test and add weights and use smaller pieces of wood. Some samples bent or did not break, but at least 3 samples per wood species snapped to give me usable test data.</p> <p><b>Conclusions/Discussion</b> Learning that real wood from a tree supports more weight than plywood indicates that natural products may be better than man-made ones. However, wood is a natural resource, so plywood should be used as needed. My results should be used when building strong structures like bridges or buildings. Since wood is used in sporting goods, musical instruments, boats, planes, cars, cabinetry and other items, my research can help people find attractive and durable wood. In hindsight, my research would be better if I found the lowest priced hardest woods (or bamboo) and that is how I would change my project in the future. Given the recent earthquake in Japan, I think additional research understanding which woods are strongest and most flexible could be helpful. Perhaps it would encourage tree farmers to grow more of them, making the wood more available.</p>	
<b>Summary Statement</b> "Breaking Wood" shows that all woods are not the same and that denser, more complex-celled hardwoods tend to be stronger than less dense two-celled softwoods or man-made plywoods.	
<b>Help Received</b> My dad helped pour lead into molds to form my weights. He also helped me make my test apparatus and slice the wood samples because using a table saw and power tools was a new experience for me.	