



**CALIFORNIA STATE SCIENCE FAIR  
2010 PROJECT SUMMARY**

<b>Name(s)</b> <b>Caitriona M. Parker</b>	<b>Project Number</b> <b>J0711</b>
<b>Project Title</b> <b>Soil vs. Water</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The purpose of my project was to determine if adding different materials to soil will have an effect on liquefaction during an earthquake. I was curious about soil liquefaction because we have many earthquakes in northern California. I wanted to see if the effects of liquefaction could be prevented by adding various materials to soil, for example, packing peanuts, rocks, bark, and leaves. I believe that packing peanuts will have the greatest effect on mitigating liquefaction. <b>Methods/Materials</b> Prepared two pieces of 2" wide PVC pipe 21" long, with 4 drilled holes spaced 5" apart, filled cylinders with soil and completed 6 trials with additives (clay soil, sandy soil, sandy soil with packing peanuts, rocks, bark, leaves). After soaking in water, dowels were placed in the 4 holes, cylinders were dropped to simulate an earthquake and spring scales were used to pull out the dowels. <b>Results</b> Trial 4 had the overall highest average grams of force to extract the dowel from the cylinder. This trial was sandy soil mixed with rocks. Trial 1 had the smallest average grams of force to extract the dowel. This was clay soil. The dowel that came out the hardest the most times was dowel 2 which was the second one up from the bottom. The dowel that came out the easiest the most times was dowel 4, the one on the top. <b>Conclusions/Discussion</b> My conclusion is that sandy soil with rocks greatly compacted the soil around the dowels because the rocks were heavy on top of the soil on and the dowels. This compression of the sandy soil and rocks made the dowels very hard to remove. As a result of my study, it would appear that soil mixed with rocks would lessen the effects of liquefaction.	
<b>Summary Statement</b> My project is about adding various materials to soil in order to make the structure of the soil stronger to limit liquifaction hazards.	
<b>Help Received</b> Father helped use power tools	