



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

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Project Title Smooth or Fractured Aggregate: Which Will Make a Stronger Concrete Mix?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals I tested to see which aggregate would make a stronger concrete mix. I used two of the most commonly used aggregates: river and fractured aggregate.</p> <p>Methods/Materials For the concrete mix I used a volume method of 1:2:3. I mixed 5 kg. of cement powder, 10 kg. of sand, 15 kg. of aggregate, and 15 kg. of faucet water. I made 8-10cm X 25cm cylinder samples to test per mix. I mixed two batches following this outline with fractured and river aggregate. I mixed a control with the same basic outline but substituted the aggregate with sand and no aggregates were in this mix. The mixes cured for intervals of 8, 16, and 24 days (2 of the cylinders were for backups). Two cylinders of each mix were then stripped, capped, and vented on each of the three test days. They were put in a compression machine to test the strength of the mix. The strength was taken in PSI, pounds per square inch, and had to be converted to Mps, mega paschals. The weights were recorded and then I averaged the strengths of the two mixes to draw the conclusions.</p> <p>Results The mix with the fractured aggregate was stronger than the river aggregate, but the control was the strongest of them all. In the testing the two aggregate mixes stayed relatively low. The control was very high in all tests.</p> <p>Conclusions/Discussion I had thought the fractured aggregate would be the stronger between the two aggregate mixes, and I was right. I was surprised to find that the control mix was the strongest of all three. The river rock would work better with small home jobs that don't need to hold a lot of weight. The fractured aggregate would work better with bigger projects as well as small home projects where a stronger concrete mix is needed. The mix with just sand will work sometimes with patch up jobs but mostly will not have the strength of the other two.</p>	
Summary Statement I tested which aggregates will make a stronger concrete mix.	
Help Received used lab equipment at Caltrans Kerny Mesa lab, mom & dad helped mix the cylinders and profread my report, was supervised by caltrans workers, and cylinders were donated by G-Force	