



**CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY**

Name(s) Azzurra-Sky Riley	Project Number 33741
Project Title Measuring a Sand Substitute In Concrete	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of this experiment was to determine whether coffee grinds are a suitable substitute for sand in concrete.</p> <p>Methods/Materials Materials: Water, Cement, Coffee Grounds, Sand, Aggregate (Rock), 2 Large Mixing Bowls, Electrical Concrete Mixer, Gram Scale, Graduated Cylinder, Metal Rod, Mouth Mask, Safety Goggles, Camera, Video Camera, Cylinder Containers.</p> <p>Method: A total of 6 batches of concrete mixtures were made with different amounts of sand, coffee grinds, cement, water, and aggregate. One batch served as a control with 0% coffee grinds and 100% sand in the mixture. The second batch had 10% coffee grinds and 90% sand, the third batch had 20% coffee grinds and 80% sand, the fourth had 30% coffee grinds and 70% sand, the fifth batch had 50% of both sand and coffee grinds, and the last batch, batch 6, had 100% of coffee grinds and 0% sand. Once each batch was mixed and poured into the plastic sample containers, they were left to cure for 8 days. Then the cylinders were taken out of the cylindrical containers, capped with gypsum to make the bottoms and tops very smooth and fill any of the holes on top surface. This "capping" was done to make sure that when they were tested, by the compressive strength test machine that the pressure would be applied to the whole surface area, not just one spot. After the gypsum caps dried, the samples were tested on the compressive strength machine.</p> <p>Results The experiment showed that all of the test samples containing coffee grinds significantly underperformed the control group.</p> <p>Conclusions/Discussion The data shows that the hypothesis was not supported and that coffee grounds are not a good substitute for sand in concrete.</p>	
Summary Statement I substituted coffee grinds in for sand when making concrete.	
Help Received Guidance by parents; use of lab equipment at Heider Engineering Services under the supervision of Mr. Denis Heider.	