



**CALIFORNIA STATE SCIENCE FAIR  
2004 PROJECT SUMMARY**

<b>Name(s)</b> Cheryl Anne P. Carolino	<b>Project Number</b> <b>J1802</b>
<b>Project Title</b> <b>Compressing: Revealing the Concrete Truth</b>	
<b>Abstract</b> <b>Objectives/Goals</b> My objective was to determine which mixture proportion, with the dominating ingredient either gravel or sand, will give the most strength when compressed. <b>Methods/Materials</b> Four different mixture proportion groups were mixed with ten tubes in each group. Two groups contained more gravel than sand. The other two groups contained more sand than gravel. All tubes had the constant water content, Portland Cement, and types of aggregates. From intervals of seven days, about two tubes were taken from each group and were cracked every week using a hydraulic jack. The strength was measured using a pressure gage. From there, data were used to determine weakest to strongest groups. <b>Results</b> The group with significant amount of gravel over sand in the mixture proportion proved to be the strongest. The second strongest group, despite having more sand than gravel, was strong due to the fact that it was workable for manual mixing. The other two groups were not as strong because of either more sand than gravel ratio or bad mixing. <b>Conclusions/Discussion</b> More gravel than sand in a concrete mixture can only be effective in terms of strength when there is significant amount in comparison to the two different sized aggregates. Proper mixing, clean ingredients, and right amount of moisture for aggregates will produce strong, durable, workable, and good looking concrete.	
<b>Summary Statement</b> My project is about concrete mixture proportions and how the gravel-sand ratio can affect the concrete's strength when compressed.	
<b>Help Received</b> Mother helped take pictures and buy materials. Father helped with understanding concrete concept and fieldwork. Brother helped set up hydraulic jack.	