



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Anakaren Chable	Project Number J1506
Project Title It's the Cement's Fault!	
Objectives/Goals My objective was to determine whether different proportions of cement and sand in different cement mixtures affect the strength of the cement.	
Abstract With parent supervision cut the carton roles into 20 pieces, each measuring 18 cm. Classify into four mixtures: A= 20 % of cement, 80% of sand, 50% of gravel; B= 30% of cement, 70% of sand, 50% of gravel; C= 40 % of cement, 60% of sand, 50% of gravel; D= 50 % of cement, 50% of sand, 50% of gravel. Put a label on each piece of the 20 pieces of carton tubes, then with the permanent marker label them. Place a piece of duct tape at the bottom of all the carton tubes. Prepare cement mixture A in a bucket by mixing cement, sand, gravel, and water. Pour cement mixture A into carton tubes labeled A1, A2, A3, A4. Remove excess from bucket and repeat steps 5-6 using the other mixtures and carton tubes. Place all carton tubes in bucket and let them rest for 48 hours. Remove duct tape from bottom of carton tubes and then peel the carton off from the cement tubes, as you are peeling off the carton rewrite the label of the carton tube on the cement tube. Place jack on top of the scale and inside the wooden frame. Insert the cement tube into the holes of the wooden frame. Discount the weight of the jack until the scale reads 0. Pull the handle on the jack until the concrete tube is fractured. Record pressure. Repeat steps 11-14 for the rest of the concrete tubes. Find average of 5 trials per category of cement mixture.	
Methods/Materials With parent supervision cut the carton roles into 20 pieces, each measuring 18 cm. Classify into four mixtures: A= 20 % of cement, 80% of sand, 50% of gravel; B= 30% of cement, 70% of sand, 50% of gravel; C= 40 % of cement, 60% of sand, 50% of gravel; D= 50 % of cement, 50% of sand, 50% of gravel. Put a label on each piece of the 20 pieces of carton tubes, then with the permanent marker label them. Place a piece of duct tape at the bottom of all the carton tubes. Prepare cement mixture A in a bucket by mixing cement, sand, gravel, and water. Pour cement mixture A into carton tubes labeled A1, A2, A3, A4. Remove excess from bucket and repeat steps 5-6 using the other mixtures and carton tubes. Place all carton tubes in bucket and let them rest for 48 hours. Remove duct tape from bottom of carton tubes and then peel the carton off from the cement tubes, as you are peeling off the carton rewrite the label of the carton tube on the cement tube. Place jack on top of the scale and inside the wooden frame. Insert the cement tube into the holes of the wooden frame. Discount the weight of the jack until the scale reads 0. Pull the handle on the jack until the concrete tube is fractured. Record pressure. Repeat steps 11-14 for the rest of the concrete tubes. Find average of 5 trials per category of cement mixture.	
Results It took an average force of 641.41 N to break the columns in mixture A; mixture B took an average force of 1078.49 N to break the columns; mixture C took an average force of 1302.52 N to break the columns; mixture D took an average force of 82859 N to break the columns.	
Conclusions/Discussion The amount of cement and sand in a cement mixture does affect its strength. Mixture D, which had an impractical amount of cement then the cement columns in mixtures B and C, should not even be considered because it is not cost effective. In conclusion, the cement mixture of cement mixture C was the best and most resistance out of all the mixtures.	
Summary Statement My project is about determining whether different proportions of cement and sand in a cement mixture affect its strength.	
Help Received My dad helped me make the cement mixtures and testing apparatus, My mom helped me glue things to the board, and Mr. Post gave me advice and helped me write in proper format.	