CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
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Project Number
J1808

Project Title
Little Plastic Bridges

Abstract

Objectives/Goals
I built a beam, arch, and suspension bridge out of LEGOS and tested to see which design held the most weight. I improved the beam, arch, and suspension bridges once and tested again to see which design now held the most weight. My hypothesis was that the arch bridge would hold the most weight before improved, but the suspension bridge would hold the most weight after improved. I just wanted to see which design would hold the most weight.

Methods/Materials
I used LEGOS to build the bridges, except for the suspension bridge where I also used fishing line, and weight anchorages. The weights I used to see how much weight the bridge could hold are quarters. The way I would test the strength of the bridge is by putting the cup attatched with string to the excact middle of the bridge deck. I used the same bridge deck for each bridge. Once the cup was in the middle of the bridge deck I would drop in ten quarters at a time. Ten quarters equals 56.7 grams. After each time I dropped ten quarters in the cup, I would measure how far to the ground the cup is with a ruler in the back in centimeters. I would continue dropping in ten quarters and measuring how far to the ground the bridge was until it broke.

Results
I found out the suspension bridge supported the most weight before and after improved. It held way more weight then the beam and arch bridge.

Conclusions/Discussion
I was wrong and right on how I guessed the arch bridge would support the most weight before improved; instead the suspension bridge supported the most weight before improvements and after. The suspension bridge supported the most weight because of the many vertical cables. Each cable helped to carry the weight of the entire bridge deck at many different points along both sides of the bridge. Each cable acted like a pier holding up the bridge deck, which is the reason why the beam bridge, with the same bridge deck length, supported less weight because it only had two piers, while the suspension bridge had seven vertical cables that took place of piers. This method of support in using cables is a much more effective way of carrying the load of the bridge deck, especially for a long spanning bridge. In conclusion, suspension bridges support the most weight and in longer distances because of the cables that act like piers on top of the bridge, reducing the number of piers on the bottom of the bridge.

Summary Statement
I built the beam, arch, and suspension bridges out of LEGOS and tested their strengths.

Help Received
Friend lent me some LEGOS.