



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

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| Name(s) David L. Reich | Project Number J0219 |
| Project Title Which Bridge Design Is the Strongest: Arch, Truss, or Suspension? | |
| Objectives/Goals Abstract The purpose of this project was to find out which bridge design is strongest: arch, truss, or suspension in a scenario where an increasing quantity of load is hanging from the bottom of the bridge. For the actual experiment of this project, a wooden scale model of each bridge design was built. The load was represented by different size weights weighing 1, 2, and 2.5 pounds, and 4 and 3 ounces. The load was placed in a metal container that was tied to the center beams of each bridge. Each bridge's ends were resting on bricks or bins. Two trials of this experiment were performed, one of them videotaped. The video was used to recreate the breaking sequence of each bridge on an advanced visual editing software, AutoDesk Maya. Therefore, part of the hypothesis was right. The test can be recreated on the computer. The results of the first test were that the suspension bridge broke at 11.45 kilograms, the truss broke at 14.46 kilograms, and the arch broke at 16.16 kilograms. Small items and procedures were changed for the second test, including weights and supports. The weights and the order they were put in were changed. The arch bridge broke at 17.61 kilograms, the truss broke at 11.23 kilograms and the suspension, at 14.86 kilograms. In conclusion, the results of this test suggest that the experiment can be recreated on the computer and that the arch bridge design is strongest in the specific scenario of this experiment. | |
| Summary Statement This project is meant to test the strength and find the breaking points of arch, truss, and suspension bridge designs. | |
| Help Received Teacher-Guidance, Civil Engineer-Interview, Sister-Camera footage, Animation Instructor-Assistance for animations | |