



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Hunter Gasca	Project Number J1813
Project Title Bridge the Gap!	
Abstract Objectives/Goals The objective is to determine which through truss design ("X", Howe, Pratt) has the most structural integrity to support weight (2kg, 4kg, 6kg, 8kg, and 10kg). Methods/Materials Meter stick, timer, log, data tables (three per truss), two equal supports five decimeters tall, two bags of sand (4kg each), one bag of sand (2kg), wire hanger, two spring scales, and K'NEX bridge models: Control (no triangulation), "X" through truss, Pratt through truss, Howe through truss K'NEX materials were used to facilitate bridge reconstruction. Each bridge model was tested using incremental weights. The deflection of the "roadway" was measured using a meter stick after the weight was applied for 30 seconds. Three trials were conducted for each bridge tested. Only 30 trials were conducted, since no further tests were done with greater weights when a collapse occurred. The weight averages were used to graph the data using bar charts. Results The control bridge supported 2kg, but failed the 4kg test. The Pratt truss supported 4kg, but failed the 6kg test. The Howe truss supported 6kg, but failed the 8kg test. The "X" truss supported 8kg, but failed the 10kg test. Therefore, the "X" truss design proved to have the most structural integrity, being the only bridge to support 8kg for any length of time. The control bridge demonstrated the most deflection and supported the least amount of weight. Conclusions/Discussion The control truss supported the least amount of weight due to the absence of triangulation. The "X" truss held the most weight due to maximum triangulation. Although the "X" truss model supported the most weight, it required twice as many beams to construct, and added extra weight. In real-world applications, the "X" truss may cost more and take longer to build. Therefore, depending on use, the Howe truss would be the most practical through truss design.	
Summary Statement My project is about demonstrating which through truss bridge design can support the most weight due to its structural integrity.	
Help Received Mr. Mendez (Cal Trans civil engineer) loaned me his college textbooks & responded to my interview questions; Mom helped me get materials, gave feedback on my data tables and abstract, and helped me complete applications to RIMS & CSSF; Dad supervised me while I conducted the experiment	