



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Robert A. Hays	Project Number J1809
Project Title Structures Put to the Test: The Effects of Seismic Activity on Different Types of Buildings	
Abstract Objectives/Goals The goal of my project is to determine which structure; a dome, 3-Sided pyramid, 4-Sided pyramid, or standard square structure; is strongest in an earthquake simulation. Methods/Materials Specially Cut Toothpicks, Oil-Based Clay, Electric Drill, Piece of Thin Plywood, Large Piece of Wood, Wire Coat Hanger, Threaded Metal Rod for Motor Shaft, 2 blocks of wood taller than the height of the motor shaft above the base once attached to drill, 4 blocks of wood to support rails, Thin wooden disk with holes drilled in it, Washers to space wooden disk from second block of wood and to space coat hanger wire from wooden disk, Screw to put in wooden disk, Nuts to hold screw to wooden disk and to hold wooden disk to motor shaft, 2 plastic tubes, Two metal rails that fit through the plastic tubes and allow the tubes to slide back and forth, Small block of wood with screw in it, Hot-Glue Gun, Wrench, Something to lubricate the rails with, Digital Camera, Stop Watch, Pen, Composition Book, Duct Tape, Wood Glue Results I built three of each structure and so conducted three trials of each structure. The 4-Sided Pyramid ended up being the strongest, the square structure came closely behind it, the 3-Sided pyramid was third strongest, and the dome's strength was separated from the other three structures by a good distance, making it the weakest. Conclusions/Discussion My results do not support my hypothesis because I thought the dome would be the strongest structure, and it ended up being the weakest. One pattern I noticed was that the structures with bases that had four sides were the strongest structures. Also, almost all the structures broke around stages 9 and 10. I learned that the structure that most houses are made of (square) is a good choice because it is very strong, and is a practical shape for construction. Two possible sources of error are that each of the 3 constructions of each structure could have been built differently, and the dome might not have been built well, resulting in it not being very strong.	
Summary Statement My project determines which structure; 3-Sided Pyramid, 4-Sided pyramid, dome, or standard square structure; is strongest.	
Help Received My dad helped me build the shake table, which I used to test the structures' strengths.	