



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Ting L. Kelly	Project Number J0218
Project Title Fractography: The Way Things Break	
Abstract Objectives/Goals I wanted to know if brittle materials broke in a pattern, and if so, whether similar materials have similar patterns of breaking. My hypothesis was that each material would break in its own pattern (sizes, shapes and number) and that different thicknesses or sizes of the material would not affect the results as much as different types of material would. Methods/Materials My design used 6-10 pieces of each material: textured plastic, acrylic plastic, bathroom tile, regular glass, and textured glass. I would break each piece the same way, by dropping a 1.350 kg ball weight from 1 meter high onto the center of the object. Afterwards, I would measure the angle of each shard, and tally the quantity of pieces from each piece of material. Then I plot the data into a chart. Results My results were clear and interesting. The way a material breaks was not random, but had a pattern. More importantly, I also discovered that similar materials did break into similar patterns. For example, both types of tile, patio and bathroom, both broke into 4 or 5 square pieces. The patio tile was almost four times the size as the bathroom tile, but they still produced almost identical results. Conclusions/Discussion My final conclusion was that the type of material made a bigger difference for the pattern of breaking than the texture, size or thickness of that material. I learned that each kind of material had its own method of breaking because of the way it is constructed, so similar materials broke in similar ways.	
Summary Statement My project shows how different materials have their own distinct way of breaking and similar materials break in similar patterns.	
Help Received My father showed me how to cut the glass and took pictures of me working. My mother assisted me with using the graphing program.	