



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

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Project Title Handle with Care: Testing the Effectiveness of Different Packaging	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals To test the level of protection that different packaging materials offer</p> <p>Methods/Materials Materials: 240 full, unopened 12 oz. soda cans, 10 corrugated card board boxes the same size and thickness (10½ feet by 5 feet by 10½ feet), Bubble wrap, Foam Packing Peanuts, Newspaper, A metric ruler, Packaging tape, A pen, A notebook to record observations Procedure: Put one kind of packaging material in the box (bubble wrap, packing peanuts, newspaper, nothing-control). Put two unopened soda cans into the box and surround each with packaging material. Tape the box shut. Put the box on a platform one, two or four meters high. Push the box lightly off the object onto concrete at the same spot. Open the box and inspect any damage done to the cans. Record the results and organize the cans according to the conditions of the cans for further comparison. Finally repeat steps 1-8 until you have tested each packaging material at each height ten times.</p> <p>Results Packing materials have the same effectiveness up to two meters, but bubble wrap, on average, protected items better than foam peanuts or newspaper at four meters. During my experiment sometimes the boxes bounced. Most of the time when the boxes bounced there was more damage to the two cans inside because they collided. If you want to ship multiple items you must protect them from outside forces but you must also protect them from each other. Sometimes one can in the box was damaged while the other can was not damaged. This shows that damage can occur internally as well as externally.</p> <p>Conclusions/Discussion Bubble wrap was the most effective packaging material at higher levels because the bubbles absorbed the force better. Other packaging materials protected the items inside, but they allowed them to shift a little more. At one meter, which is near the height of a loading dock, all three packaging materials performed well. At two and four meters nothing was perfectly protected. Also, if you ship a light object such as a light bulb, which has less mass, dropping it off a great height would not break it because the corrugated box is enough protection. Packaging for light items is there to protect against forces such as vibration or shaking. However when shipping an object with more mass, packaging is important to protect the item from deforming during impact.</p>	
Summary Statement To test the effectiveness of different packaging materials.	
Help Received My dad drove me to get my materials.	