



**CALIFORNIA STATE SCIENCE FAIR  
2009 PROJECT SUMMARY**

<b>Name(s)</b> Michelle C. Stanley	<b>Project Number</b> <b>J0224</b>
<b>Project Title</b> <b>The Distance a Trebuchet Catapult Can Throw Projectiles of Different Masses: A Study in Energy Transfer</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of this experiment was to determine if the mass of a projectile affects the distance it will travel when launched from a trebuchet type catapult. It was hypothesized that the lightest projectile would receive the greatest amount of energy transferred from the catapult and travel the furthest distance.</p> <p><b>Methods/Materials</b> A catapult is any non-held machine that hurls an object without the aid of an explosive substance. It works through a central lever that is mounted "counterpoise" and has a see-saw movement. A trebuchet is a type of catapult that was used in Europe in siege warfare during the Middle Ages.</p> <p>A miniature model of the trebuchet was purchased on-line and constructed.</p> <p>A marshmallow, a foosball, and a golf ball were weighed. The weight of the projectiles was the only variable in the experiment. The sling length and the weight in the counterweight were fixed variables.</p> <p>Each projectile was launched twelve times to determine the average distance traveled.</p> <p><b>Results</b> The marshmallow traveled an average distance of 40.38 cm. The foosball traveled an average distance of 29.44 cm. The golf ball traveled an average distance of 16.34 cm.</p> <p><b>Conclusions/Discussion</b> The results supported my hypothesis. The marshmallow, the lightest projectile, clearly traveled the furthest distance in this experiment because the marshmallow received a greater amount of energy from the trebuchet than the heavier objects.</p>	
<b>Summary Statement</b> The mass of an object influences the distance it can travel when launched from a trebuchet due to the principles of energy transfer.	
<b>Help Received</b> My mother purchased the model trebuchet. My science teacher gave me a scale to weigh the objects. My dad helped me measure the distances the projectiles traveled.	