



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Logan M. Pike	Project Number J0217
Project Title The Art and Science of a Trebuchet	
Abstract Objectives/Goals My goal was to determine how a trebuchet worked and what goes into making the trebuchet one of the most deadly weapons of its time. Methods/Materials wood, screws, nails, rope, canvas, tennis balls Results In the first experiment, in which the sling lengths were varied, the launches with the shortest sling traveled the shortest distance-- roughly 10 feet. However, as predicted, as the sling length increased so did the distance the projectile traveled to a maximum of about 43 feet. While the sling length tripled, the distance quadrupled. The data did seem to flatten out at the end with the longest sling, so the prediction is that if the size of the trebuchet had not limited the length of the sling, the data would have eventually shown a dip. The second experiment in which the weights of balls changed did not go as expected, in fact it went the complete opposite direction of the hypothesis. As the heavier balls were tested, they went shorter distances. By the time the heaviest ball was tested, it was going an average of only 28 feet vs. about 34 feet for the lightest ball. This experiment illustrated the impact of inertia on distance. The heavier the projectile (mass), the greater the inertia, which decreases velocity and shortens distance. Conclusions/Discussion I think my data could help explain to historians how the ancient trebuchets were used in combat. For instance, my data indicates the optimal distance a trebuchet should be located from its target to have the best effect. It also showed why the trebuchets were more effective than the catapults that preceded them, because of their longer range. However even after trying to keep constant as many variables as possible in the testing there were certain things that affected the launch like the shafts rubbing against the hinge and the movement of the counter weight. Also, I was limited in the size of my trebuchet. I believe building a larger frame for the trebuchet would clearly show that increasing the sling length would result in shorter launch distances after a point. So, in wrapping up this experiment, it is apparent that there are certain things that could be improved with more equipment and more supplies. If I could further test the trebuchet and study more about its mysteries I could answer more of history's questions on this great siege weapon.	
Summary Statement Experimentation on an ancient siege weapon and investigating how it propells projectiles over distances by varying the sling lengths and the ball weights.	
Help Received Mom bought supplies and sewed sling gloves.	