



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Cynthia L. Yin	Project Number J1918
Project Title How Do Varying Amplitudes, Weights, and Lengths Affect the Period of Motion of a Pendulum?	
Abstract Objectives/Goals The objective of my project is to determine how amplitude, weight, and length affect the period of motion of a pendulum. My hypotheses were as follows: 1) Higher amplitude would result in a longer time for the pendulum to return to the original point of release at the maximum amplitude. This would result in a longer period of motion. 2) The effect of greater weight would be longer period of motion. 3) Longer string length would mean more surface area in contact with air. This would increase air resistance and period of motion. Methods/Materials A wooden frame for the pendulum was constructed. A cup with pre-determined weight and length was hung on the pendulum frame and released from an amplitude. I timed how long it took the pendulum to swing back and forth three times to its original point of release at the maximum amplitude. The amount of time was divided by three to obtain the average period of motion for one swing. I repeated multiple trials of this process for various combinations of amplitudes, weights, and lengths. Results After I collected data and graphed the amplitude versus average period of motion, weight versus average period of motion, and length versus average period of motion, I compared the results. I prove that length has a positive effect on the period of motion of the pendulum. On the other hand, there is an insubstantially positive relationship between amplitude and period of motion. In addition, weight affects the period of motion insignificantly. Conclusions/Discussion My hypotheses were that higher amplitudes, greater weights, and longer lengths would result in longer periods of motion. Based on my thorough observations, the pendulum's period of motion is significantly dependent on the length of the string, supporting my hypothesis. However, the results reveal negligible relationship between weight and period of motion, and a slightly positive relationship between amplitude and period of motion, contradicting my hypotheses.	
Summary Statement My project compares average periods of motion of a pendulum for varying amplitude, weight, and length to determine the effects of amplitude, weight, and length on the period of motion of a pendulum.	
Help Received My appreciation goes to Ms. Agapoff who lent me her scale. In addition, my parents' utmost and unwavering support and praise cannot be overemphasized. They assisted in constructing the pendulum frame and conducting the experiments.	