



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Shari W. Eskenas	Project Number S0706
Project Title Determining the Coefficient of Kinetic Friction with a Microcontroller	
Abstract Objectives/Goals My objective was to determine whether I could effectively measure the coefficient of kinetic friction for "wood on wood" using a microcontroller device. Methods/Materials An accelerometer circuit, an LCD circuit, and a touch sensor circuit were built onto a Basic Stamp 2 microcontroller programming board. The board was attached to a wooden block. A wooden platform with a spring was built on which to launch this block. The average spring force and the mass of the block were determined. These values were plugged into a horizontal forces equation in a PBASIC computer program. The computer program was written so that once the block was launched, the instantaneous acceleration would be measured by the accelerometer and the program would use this value in the equation to compute the coefficient of kinetic friction for "wood on wood". Results An average value of 0.181 was obtained from ten trials. This value is within proximity to the approximate scientific value for "wood on wood" of 0.2. Conclusions/Discussion Determining the coefficient of kinetic friction using a microcontroller is an effective experimental method. The microcontroller's capability to execute computer programs at 4,000 instructions per second enables it to measure the instantaneous acceleration with an accelerometer and a touch sensor. The microcontroller can calculate the coefficient of kinetic friction by utilizing the horizontal forces equation after the instantaneous acceleration is determined.	
Summary Statement I devised a new method for determining the coefficient of kinetic friction that can replace time-consuming common laboratory methods.	
Help Received Father helped construct launching platform; Used Mr. Ramstedt's lab equipment	