



**CALIFORNIA STATE SCIENCE FAIR  
2007 PROJECT SUMMARY**

<b>Name(s)</b> Nolan H. Poe	<b>Project Number</b> <b>J1315</b>
<b>Project Title</b> Can a Robot Balance on Two Wheels?	
<b>Abstract</b> <b>Objectives/Goals</b> The objective of my project is to develop an algorithm to balance a two wheeled, one axle autonomous robot. <b>Methods/Materials</b> For my project, I used a vex robotics kit and the optional C programming kit. I also used a Sharp infrared distance sensor. I built the robot completely out of parts from the vex robotics kit, except for the infrared distance sensor. The distance sensor was mounted pointing down, on an arm, so that sensor output is a function of robot angle. I iteratively wrote programs to balance the robot based on the sensor output. <b>Results</b> The algorithm that corrected for angle and change in angle balanced the best. Its mean balance time is higher than any of the others, and its maximum balance time is almost double that of the runner-up algorithm. However, the minimum balance time of all algorithms is fairly constant; the same goes for the median balance time. This indicates significant room for improvement. <b>Conclusions/Discussion</b> The algorithm that balanced based on the angle and the change in angle worked the best. Nevertheless, some factors keep it from balancing for a significant amount of time. Possible reasons include loose gears and nonlinear motor behavior.	
<b>Summary Statement</b> The purpose of my project is to find the best algorithm to balance a two wheeled robot.	
<b>Help Received</b> Father helped with some robot construction and sensor selection; Mother helped in board layout.	