



**CALIFORNIA STATE SCIENCE FAIR  
2003 PROJECT SUMMARY**

<b>Name(s)</b> <b>Katelyn Freund; Charlotte Mehaffey</b>	<b>Project Number</b> <b>J0213</b>
<b>Project Title</b> <b>Robot Efficiency Test</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> Our project is to test which robot can move more efficiently on both carpeted and smooth surfaces. We are testing out Robot A with legs and Robot B with wheels. We will vary the length of the legs and the size of the wheels to determine if the length and size alter the results.</p> <p><b>Methods/Materials</b> We will be using robots, made from K'NEX, to test our hypothesis. Both robots are battery operated with similar body designs except for their mode of travel - one with legs attached to the center shaft and the other with wheels on the center shaft. After assembling the robots, place the robots on the carpeted area and measure the time it takes to travel 273 cm distance; do the same for the hardwood surface. Then we modified our experiment so that the variable was distance instead of time, to ensure the battery life would not affect the results.</p> <p><b>Results</b></p> <ul style="list-style-type: none"><li>* Walking robot gave inconsistent results kept veering right and left - it also got stuck in the carpet.</li><li>* Battery cord could affect the direction the robot would turn.</li><li>* Both robots worked better on the hardwood floor.</li><li>* The Robot A - best results were with the short legs;</li><li>* The robot B best results were with the big wheels.</li><li>* Robot B traveled the same distance in less time on both the carpet and smooth surface.</li></ul> <p><b>Conclusions/Discussion</b> The wheeled Robot with the largest wheels is more efficient than the legged robot with any length of legs, because the larger diameter wheels covered more surface area in a shorter period of time. Short-legged robot worked best of the walking robot because it is more stable and has a lower center of gravity. Overall, the wheeled robot was faster than the walking robot because it has fewer moving parts.</p>	
<b>Summary Statement</b> Robotic movement comparison using various sized legs and wheels on different surfaces.	
<b>Help Received</b> Mother helped type report, prepare charts.	