



# CALIFORNIA STATE SCIENCE FAIR 2015 PROJECT SUMMARY

<b>Name(s)</b> <b>Kiel A. Messinger</b>	<b>Project Number</b>  35903
<b>Project Title</b> <b>How Does the Distribution of Weight Affect the Speed of a Toy Car on a Downhill Slope?</b>	
<b>Objectives/Goals</b> My goal was to determine how the placement of added weight on a non-motorized toy car would affect the speed of the car on a downhill slope. <b>Abstract</b> <b>Methods/Materials</b> Two types of toy cars, labeled G and A, were used for the experiment. Four of each type, labeled 1 to 4, were raced on a downhill 4-lane toy racetrack. Four control races were conducted for each type of car before weights were added, alternating lanes to make sure that no lane gave an advantage. The cars that were labeled 1 were the control cars, with no added weight, for the whole experiment. Identical 15 gram weights were taped to cars labeled 2 (weight in front), 3 (weight in middle) and 4 (weight in back). Thirty-six experiment races were done for each type of car (G and A), again alternating lanes with each race. Cars were scored based on what place they finished for each race. <b>Results</b> The cars with added weight in the middle (A3 and G3) had the highest average score, meaning they were the fastest overall. The cars with added weight in the front (A2 and G2) finished in second place. The control cars (A1 and G1) surprisingly finished third place overall. In last place were the cars with added weight in the back (A4 and G4). <b>Conclusions/Discussion</b> From my experiment, I disproved my hypothesis that the cars with the weight in front would be the fastest going down a hill. Instead, I discovered that the cars with the weight in middle were the fastest, possibly because of the perfect balance of weight on the car and less resistance on the wheels. The cars with the weight in front were the second best, faster than the control cars with no weight, likely because the center of gravity was in the front. However, the cars with the weight in back were the slowest, slower than the control cars, possibly because of the resistance caused by the weight on the back wheels, or by the effect of gravity pulling on the back of the car. Thus, the extra weight itself was not the key factor, but the placement of the weight made a difference. This experiment shows that there are many things that affect speed.	
<b>Summary Statement</b> My project proved that the location of added weight (to the front, middle or back of the car) had an impact on the speed of a toy car on a downhill slope.	
<b>Help Received</b> Mother and Father helped with proofreading. Mother helped with graph software. Mrs. Anthony (science teacher) provided guidance.	