



**CALIFORNIA STATE SCIENCE FAIR  
2015 PROJECT SUMMARY**

<b>Name(s)</b> Todd C. Kelley	<b>Project Number</b> <b>J0312</b>
<b>Project Title</b> <b>Stop It! Which Brakes on a Car Work Best?</b>	
<b>Objectives/Goals</b> The purpose of this project is to determine whether a car's front or rear brakes are more efficient.	
<b>Abstract</b> <b>Methods/Materials</b> Materials needed, 2x Wood pieces 25in x 9in x 2in, Hinge, Protractor, Saw, Drill, Screws, Sand paper, Spray glue, X-acto knife, Large rubber bands, Toy car, Notepad, Pencil, Internet sources. First we gathered materials and built the test ramp. The test ramp works by placing two pieces of wood together with a hinge at the end of both planks and placing a protractor on the side of the bottom plank so that 0 degrees would be flat with the top of the bottom plank then we placed sandpaper and glued it to the top of the ramp so the car's tires would try and spin and not slide. The test ramp is used to measure the angle between the test surface and the horizontal table. Then we placed the car at a determined place with the rubberbands off and slowly raised the ramp until the test car started to roll, the resulting angle was recorded. Then we placed the rubberbands on the sides of the rear tires and under the chassis. Then we repeated the test procedure and recorded the data. Then we put the rubberbands around the front tires, repeated the test procedure and recorded the data. Then we put the rubberbands around both wheels, then repeated the test procedure and recorded those results. Then we examined the data and formed our conclusion.	
<b>Results</b> With the rear tires locked with rubberbands the car started to roll at 42 degrees. With the front tires locked with rubberbands the car started to roll at 53 degrees. Then with both brakes locked with rubber bands the car finally moved at 61 degrees. Then we did one more test with no brakes and the car slid at 8.5 degrees.	
<b>Conclusions/Discussion</b> After looking over the results we can tell that the front brakes are more effective than rear brakes, although using front and rear would be best. The front brakes did better than the rear because stopping power depends on traction, which is the force of friction between the tires and road, which is dependent on the weight pushing the tire down onto the road. When you apply the brakes the weight transfers to the front of the car due to momentum, increases the friction between the front tires and the road, and allows the front tires to apply more braking force to the road without slipping.	
<b>Summary Statement</b> My project is about seeing what brakes work better for a car; front or rear.	
<b>Help Received</b> My dad gave me a list of subjects to research such as how brakes work and why, What friction is and what kinetic energy is. My brother helped me make and fit my board.	