



**CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY**

Name(s) Callie M. McCaffery	Project Number J1715
Project Title Centrifugal Force or Fiction?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals I want to understand how changing the distance at which an object spins around a center point affects the centrifugal force experienced.</p> <p>Methods/Materials I used a box fan motor, tinker toy hubs and arms, springs and metal balls. The balls were attached to the springs which were attached to the arms connected to the hub on the fan shaft. I changed the length of the arm then measured the spring stretch for each arm length. I then found the force associated with this spring stretch which is used to represent the centrifugal force.</p> <p>Results I found that the shorter the spinning arm, the more force is exerted on the spinning object. My experiment helped me understand the strength of centrifugal force, how it relates to Newton's first law of motion, and velocity.</p> <p>Conclusions/Discussion I found that my hypothesis was correct, the smaller the spinning radius the larger the centrifugal force. I wanted to verify my measured forces with calculations, so I used mathematical formulas ($F = ma$) to calculate the force. These calculations helped me see that by changing the arm length, I was also changing the velocity of the spinning object. This change in velocity also changed the amount of force, even more than the arm length.</p> <p>In addition to the physics, I learned how we've adapted to the effects of centrifugal force in the real world by banking curves on roads and train tracks.</p>	
Summary Statement How will changing the distance at which an object spins around a center point affect the measured centrifugal "force" or inertia.	
Help Received I designed the prototypes and planned the experimental set up. My father helped me with construction of the set up and verified the calculations. My mother helped me with data collection.	