



**CALIFORNIA SCIENCE & ENGINEERING FAIR
2018 PROJECT SUMMARY**

Name(s) Shane D. Gage	Project Number J1309
Project Title High Heat: The Science behind Throwing a Baseball	
Abstract Objectives/Goals My goal/objectives in this project was to have all of my test subject's improve their average kilometer per hour speeds by introducing new mechanics that are focused on linear and rotational energy. Also, I want to provide pitching mechanics that result in less injury. My question being addressed is, how does linear and rotational energy increase your velocity when pitching a baseball? Methods/Materials My main methods that I used were; Turn on your radar gun. Measure test subject's height in centimeters. Measure their stride. Have subjects throw 5 normal pitches. Record. Have them throw 5 more with increased stride and rotation. Record. Find the average speeds for both sets of 5 pitches. My main materials that are necessary are; One radar gun, one baseball per test subject, a pitchers mound, camera, one baseball glove per tester, a tape measure, and a spreadsheet. Results From my project, I proved that my hypothesis was true. This is true because once my test subject's increased their strides and hip rotations by 10%, they increased their average speed. I discovered though that you can max off on your stride length if your stride length is already over 80% of your total height. A total of 120 out of 160 pitches improved speeds using my mechanics. The top speed increase was 12.2 kilometers per hour. These relate to my objective because I wanted the pitches to improve in speed, and they did. My new mechanics presented were focused around those two energy types, and that was also my objective for this project. Conclusions/Discussion My project was a success as I was able to improve my test subject's pitch speeds and also create a new delivery or pitching motion. My project expands on the mammalian biology field as I expanded on the functions of humans (mammals) and also I further researched on how energy travels throughout the human body. It is important as my mechanics also provide an injury-free way to pitch because they focus on linear energy transfer which puts less stress on your arm. In my project, I accomplished my goals of increasing pitch speeds, and	
Summary Statement I tested how linear and rotational energy is seen in your throwing motion while pitching a baseball, and I was able to produce working mechanics that were based upon linear and rotational energy found in your stride length and hip.	
Help Received I recieved help from my dad, who is a biology teacher, and also my science teacher at school.	