



**CALIFORNIA STATE SCIENCE FAIR  
2009 PROJECT SUMMARY**

<b>Name(s)</b> Courtney N. Friesen	<b>Project Number</b> <b>J1910</b>
<b>Project Title</b> <b>Does Horizontal Speed Help Your Vertical Jump in High Jump?</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The objective of my project is to analyze how the approach speed and center of mass of a high jumper relates to the vertical height that the athlete will clear. <b>Methods/Materials</b> A high jump pit was set up on a grass surface and a starting point was marked 37 feet from the bar. Sixty jump attempts were made over a four-day period and the speed of each jump was recorded along with the success of the jump measured on a one to four scale with four being the best. On one set of jumps, the center of mass of the body was recorded through the use of a measuring bar placed in front of a video camera that recorded the jumps. Information from elite high jumpers was also researched and analyzed. <b>Results</b> The results of the horizontal speed test were plotted on a graph and the resulting trend line showed that the medium to fast approach speeds produced the best results. Bar charts also supported this conclusion. The success rate of the jumps dropped a little on the fastest speeds and dropped a lot faster on the slower approach speeds. The center of mass test consistently showed that the vertical jumps were better when the body's center of mass was lower. <b>Conclusions/Discussion</b> My conclusion is that fast approach speeds and lowering the body's center of mass will improve the success rate of a high jump. The horizontal speed can be converted into vertical speed as long as it is done in a controlled manner. The study of elite jumpers and my own experiment showed that faster and lower is better. Strength and speed training can help improve both of these areas.	
<b>Summary Statement</b> I wanted to determine how horizontal speed and the body's center of mass affect the vertical jump in high jump.	
<b>Help Received</b> Dad helped type report and record high jump experimental information	