



# CALIFORNIA STATE SCIENCE FAIR 2012 PROJECT SUMMARY

<b>Name(s)</b> <b>Robyn G. Lee</b>	<b>Project Number</b> <b>J1216</b>
<b>Project Title</b> <b>Which Middle School Sport Burns the Most Calories?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The CDC estimates that childhood obesity has more than tripled in the last 30 years. Children who are obese are more likely to be obese as adults and suffer resulting health consequences such as diabetes, heart disease, stroke and certain types of cancer. To help fight childhood obesity, my study measured which sports or activities of middle school children burn the most calories and compared them to a typical Middle School P.E. class. My goal was to objectively measure which sports or activities should be emphasized for Middle School children.</p> <p><b>Methods/Materials</b> Typical Middle School sports and activities included 1-mile run, full basketball game, full soccer game, full volleyball game, 50-min P.E. class, 9-holes golf round and 1-set singles tennis match. My control activity was quiet reading for 1 hour. Total movement and acceleration for each sport or activity were measured using the built-in 3-axis accelerometer in the iPhone 4 or Palm Pre apps recorded and stored the accelerometer data (g/hr) for the duration of each sport or activity and downloaded. I measured the total movement during the different activities (which varied from 11-90 min) and also normalized them to 1 hour. Heart rate was also measured using a finger-tip Pulse Oximeter to get the average heart rate for each sport or activity. Heart rates were converted to calories burned using the #Cals Burned# iPhone App, which used #Metabolic Equivalent of Task# database.</p> <p><b>Results</b> The total movement (in g/hr) for a soccer game was 6375.5 (highest), followed by 9-holes of golf (3,932.9), 1-set of tennis (2,076.8), basketball game (1923.3), 1-mile run (1838.1), volley game (1673.5) and P.E. class (1624.9). My control activity, reading, was 140.3. When normalized to 1 hr, running was the highest but my P.E. class still had the lowest level of movement. Total calories burned showed a very strong correlation with the amount of movement (<math>r=0.98</math>).</p> <p><b>Conclusions/Discussion</b> This study shows that a sport with the longest duration have most movement like golf. But when normalized to one hour, the more strenuous sports are much higher # running and soccer. My P.E. class was shown to have the least amount of activity. In calories, (total activity time) soccer was shown to burn the most calories and a basketball game the least. For calories burned per hour, a mile run burns the most and golf burns the least amount of calories.</p>	
<b>Summary Statement</b> My study measured which Middle School sport or activities was best at fighting childhood obesity by using a Smartphone accelerometer.	
<b>Help Received</b> My dad helped me with heart rate measurement and statistics.	