



# CALIFORNIA STATE SCIENCE FAIR 2011 PROJECT SUMMARY

<b>Name(s)</b> Madison P. Meredith	<b>Project Number</b> <b>J0117</b>
<b>Project Title</b> <b>Swim Faster! Salt and Chlorine Pools and the Effect on a Competitive Swimmer's Time</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> In competitive swimming, a second can make the difference. However, there is little research regarding swim speeds between salt and chlorine water pools. This study investigated if the type of water in a pool; salt or chlorine effected a competitive swimmer's time. The question was: Which is better for a competitive swimmer's winning time, a salt-water or chlorine pool?</p> <p><b>Methods/Materials</b> The materials were the pulley machine, timed trials, water samples and research. The machine pulled the swimmer across a fixed pool distance of 10.97 meters. The trial times recorded by stopwatch using two observers. One-liter water samples from the salt and chlorine pools were weighed at a city lab. The density was obtained using the formula: density[d] equals mass[m] per unit volume[v](<math>d=m/v</math>). The research focused on the winning times in the men's 100-meter freestyle event in past Olympics; and the use of salt or chlorine water pools in the Olympics. The materials used were a: salt-pool, chlorine pool, stopwatch, competition swimsuit, goggles, swimcap, snorkel, weights, pulley machine, tape measure and swim buoy.</p> <p><b>Results</b> The hypothesis indicated that a salt-water pool would benefit a competitive swimmer's time because the salt treated water becomes more buoyant. The average swimmer's winning time in a salt-water pool is 11.05 seconds; in a chlorine water is 11.06 seconds. The salt-water sample density is 0.99607 grams/milliliter (g/ml). The chlorine water sample density is 0.992720 g/ml. The salt water sample has a +0.00335 g/ml density that is higher than the density of the chlorine water.</p> <p><b>Conclusions/Discussion</b> It was hypothesized that the swimmer's winning time would benefit from a salt-water pool because of added buoyancy from the salt. The chlorine water indicated a density of 0.992720 g/ml while the salt water indicated a density of 0.99607 g/ml. The trials for the salt-water pool averaged 11.05 seconds; for the chlorine water pool averaged 11.06 seconds or a difference of 0.01 seconds in favor of the salt water pool. The time trial difference could be an issue of pool shape and size, method of timing or the water temperature. With several variables and variation in trials and density of the water samples, it would not allow a solid conclusion. However, there is enough data for a future re-examination of this question.</p>	
<b>Summary Statement</b> My project is about finding if the chemical treatment done to pools makes a difference on a competitive swimmers time.	
<b>Help Received</b> Mother bought supplies; Grandma and Grandpa helped edit research paper; Science teacher helped get supplies for machine.	