



CALIFORNIA STATE SCIENCE FAIR  
2011 PROJECT SUMMARY

<b>Name(s)</b> Josephine Wong	<b>Project Number</b>  31927
<b>Project Title</b> Power of the Waterwheel	
<b>Objectives/Goals</b> The objective is to develop a formula that relates the number of blades to the time it takes my waterwheel to lift a 16.4-gram object thirty-five inches. <b>Abstract</b> <b>Methods/Materials</b> I conducted three experiments. In Experiment #1, I used a three-bladed waterwheel, a six-bladed waterwheel, and a twelve-bladed waterwheel and controlled the weight at 1030.156 grams. In Experiment #2, I changed the weight of the waterwheel to 1030.156 grams, 1127.486 grams, and 1226.816 grams and controlled the number of blades at twelve. In Experiment #3, I used a 12-bladed waterwheel weighing 1030.156 grams, a 6-bladed waterwheel weighing 923.366 grams, and a 3-bladed waterwheel weighing 869.946 grams. I conducted five trials for each waterwheel. In each, I measured the number of seconds it took the waterwheel to lift the 16.4-gram object. I used the results from Experiments #1 and #2 to write my formula and the results from Experiment #3 to check whether my formula was correct. <b>Results</b> In Experiment #3, the twelve-bladed waterwheel took 13:27, the six-bladed waterwheel took 13:94, and the three-bladed waterwheel took 16:62 to lift the 16.4-gram object. <b>Conclusions/Discussion</b> These data results show that my hypothesis - when the number of blades is doubled, the time it takes waterwheel to lift the 16.4-gram object will decrease by 20% - was incorrect. The time actually decreases exponentially according to: $y = 23.01 \times 0.9501^x$ , where $x$ is the number of blades and $y$ is the time elapsed in seconds. In the future, I plan to experiment how blade designs affect a waterwheel's efficiency.	
<b>Summary Statement</b> My project focuses on how the number of blades affects the time it takes the waterwheel to lift a 16.4-gram object thirty-five inches.	
<b>Help Received</b> Father helped me buy the materials needed to build the waterwheel.	