



**CALIFORNIA STATE SCIENCE FAIR  
2008 PROJECT SUMMARY**

<b>Name(s)</b> <b>Alanna K. Williams</b>	<b>Project Number</b> <b>J0131</b>
<b>Project Title</b> <b>What Makes a Whirlpool?</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The objective of my experiment was to see which of the variables of drain size, depth of liquid, flow rate, inclusion of a solid object and viscosity of liquid affected the size and strength of a whirlpool. I hypothesized that each of these components would have some effect on the whirlpools. <b>Methods/Materials</b> To do my investigation, I took a clear plastic tub with depth markers up the side and a variably sized hole in the bottom and filled it up with either water or soybean oil. I let the liquid drain while measuring the size of the whirlpool (in terms of its diameter at the surface) and its rotations per minute at a two centimeter radius at varying depths. I also measured drainage rates. This was all repeated with a small piece of wood and with different drain sizes. <b>Results</b> My results were that the soybean oil only made a whirlpool at the largest drain size, while the water made one for all drain sizes. The whirlpools had the greatest average diameter and RPMs at intermediate liquid depths. Also, when a piece of wood was added the vortices were generally substantially smaller and slower. The larger drain sizes, which had higher flow rates, produced quicker and bigger whirlpools. <b>Conclusions/Discussion</b> Based on my results, my hypothesis that all the variables would have an effect on the vortices was proven. Every single component I tested had some impact on the dynamics of the whirlpools. Their size and speed was maximized in intermediate depths of water with no solid objects, at larger drain sizes and once circular flow was established.	
<b>Summary Statement</b> My project investigates the effects of different variables on the dynamics of whirlpools.	
<b>Help Received</b> Father helped drill holes and offered pointers; Mother cheered me on; Teacher gave advice.	