



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Brian P. Hoover	Project Number J0108
Project Title The Shapes of Boat Hulls Matter	
Objectives/Goals In this experiment I proved that the shape of a boat hull affects the friction or resistance between it and the water.	
Abstract Methods/Materials A water trough was constructed out of a plastic gutter 5 feet by 4 1/2 inches. Four boats were made of wood from a 2 by 4. Each one was 6 inches long and had a different shaped bow. They were a flat bow(front of the boat), flat bottom(Boat 1); pointed bow, flat bottom (Boat 2); flat bow, rounded bottom (Boat 3); pointed bow, rounded bottom (Boat 4). A piece of twine was attached to to a screw located 1 inch from the bow. A scale was created to measure the amount of resistance each of the boats displayed in a constant flow of water from a garden hose. A cap was placed on the end of the trough with a small weir to control the depth of the water in the trough. A boat was placed in the trough facing into the current with the string attached to the scale. The amount of resistance was recorded on a scale between 0 and 16 mm. This procedure was repeated 3 times with each hull. The average was calculated for each hull.	
Results Boat #3 had the least amount of resistance. Repeating the process three times provided results of 2 mm, 0 mm, and 1 mm of resistance. An average of 1 mm was recorded for Boat # 3 with the flat front rounded bottom. The other boats averaged; 4 mm(Boat #1), 2.3 mm (Boat #2), and 2.6 mm (Boat #4). Boat #3 clearly had less resistance in the constant flow of water in this experiment.	
Conclusions/Discussion In my project, I discovered that the shape of a boat hull makes a big difference in the way it travels through the water. I had some unexpected obstacles. The first obstacle was that the original boats that I made, one inch by one inch, were not big enough to show any difference in efficiency and they did not move straight through the channel of water. The next problem that I encountered was that the spring scale I borrowed from school was not sensitive enough to measure resistance on three of the four boats. Because of this, I had to design and build my own tool to measure resistance. My hypothesis in this study was that the boat with the triangular bow would have the least resistance when flowing through water. I was not correct. The experiment proved that the boat with the flat front and rounded bottom had the least amount of resistance. Without further study, I cannot explain why this occurred.	
Summary Statement I did this project to find if the shape of a boat hull affects the efficiency of it traveling through water.	
Help Received I had no help with this project.	