



**CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY**

Name(s) Nicole M. Stokowski	Project Number S0320
Project Title Drive or Drag	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The goal of my project was to determine whether driving force or drag force on an object has more of an affect on an object's speed in water.</p> <p>Methods/Materials A wooden boat equipped with a cutting board (to change the amount of cross sectional area or drag) pulled through the water by a string and wooden stake, attached to a spring scale (allowing me to measure the amount of force being applied). A timer was used to calculate the boat's speed at any given amount of force and drag.</p> <p>Results My experiment showed that both driving and drag forces have unique relationships to speed in water, and therefore cannot be compared outright. Driving force becomes more effective as cross sectional area increases and drag force becomes more effective when driving force decreases. For instance, in terms of driving force, at a 2% change in driving force there was over a 1% change in speed (when the area was 47.88 in²). However, there was only a little more than 1/2% change in speed when the area was 10.50 in², at the same percentage change of driving force.</p> <p>Conclusions/Discussion From my project I began to understand the logic behind certain behaviors in swimming. I know from experience that swimmers will focus on different things depending on how far they have to swim, but I could never understand why. I understand now that because drag force has little effect at larger amounts of driving force sprinters don't often worry about it. Conversely, drag force has a much larger effect at lower amounts of driving force, so it would make sense that those who swim longer distances, at a slower pace, would focus on drag.</p>	
Summary Statement I showed that Driving force and drag force have varying effects on the speed of object in water depending on the amount of each force present.	
Help Received I constructed and built the boat with some help from my dad. I also came up with the experiment and my dad helped me to find ways in which to expand my data set. I also received help from my physics teacher and student teacher, Mr. Fabini and Ms. Galloway, when I was trying create an experiment.	