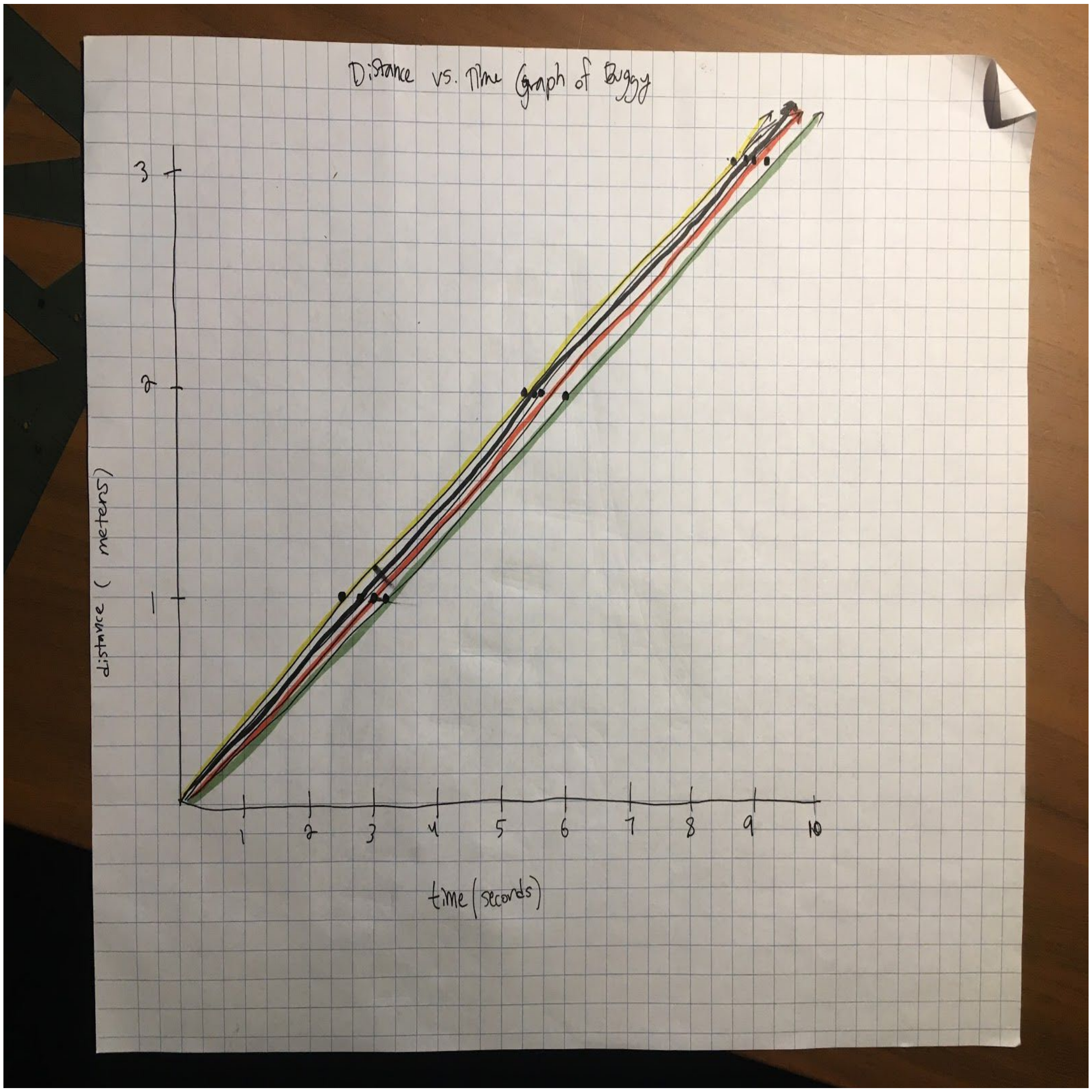
Sofia Leaf | Buggy 1 Partner: Henry Guzman-Mitchell
Accelerated Physics Lab Report | Buggy 2 Partner: August Geraci, Rafe Abdulali

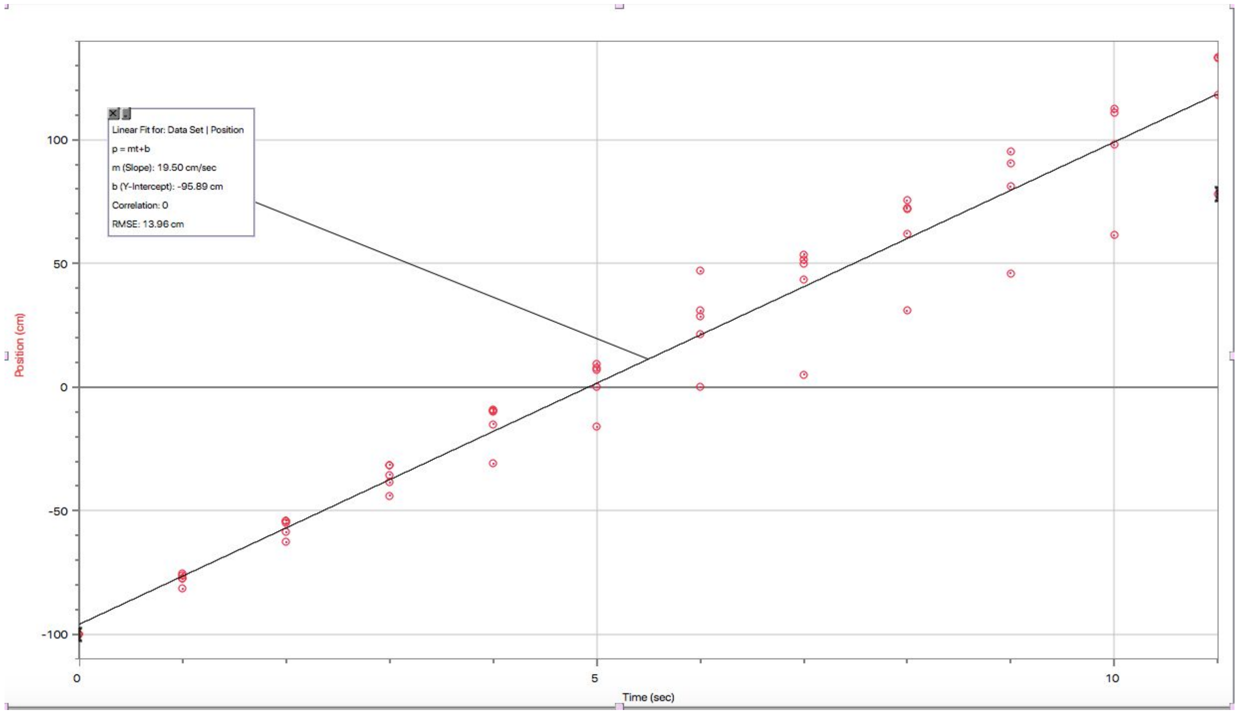
For the first lab, my partner and I acquired one meter stick and used tape to measure out six meters on the ground. We then aligned our buggy with the front end of meter one and angled so that it would move towards the end of the six-meter lines. When we turned on the buggy, we made sure to immediately start the stopwatch as well. We lapped the stopwatch when the buggy reached the end of the first meter mark, the third meter mark, and the sixth meter mark. We then recorded the time it took to travel each distance in a data table, and averaged out each trial to find the meter/seconds results. In Buggy Lab 2.0, my partners and I obtained a metronome and placed our buggy 100 meters away from the origin. We angled it so that the buggy was *facing* the origin while on the negative side of the classroom. We started the buggy on a solid metronome beat and placed a metal washer on the ground every time the metronome rang, marking the position in which the buggy stood. In total, we collected eleven data points (meaning we placed down eleven washers) and did 5 trials. After completing both tests, we realized that the procedures and overall experiments immensely differed from one another. During the first buggy lab, we marked our independent variable (IV) as distance and our dependent variable (DV) as time (you may see that this is backwards by looking at the first graph, yet my partner and I made a mistake and it was supposed to be as stated above); yet in Buggy Lab 2, the IV was time and the DV was distance. Also, instead of using a timer like in the first lab, 2.0 expressed the use of a metronome and washers to count. 2.0 also conveyed the importance of distance and position while the first lab didn't acknowledge those variables at all.

After completing the first Buggy Lab, Ms. Machac asked us to attempt another set of procedures differing greatly from the first. While both experiments had the same question in mind, Ms. Machac had us do Buggy Lab v2.0 to show how various experiments can get the same result. In the first Buggy Lab, we only looked at speed, yet with the second experiment, we got a closer look on velocity. Instead of just focusing on how distance affects speed, we added two new variables, direction and starting position, which gave us more specific data. Even though we got the same result after completing both experiments, we weren't able to conclude that the buggy remained moving at a constant velocity just by looking at the first graph (as seen below). By looking at the first graph, it is clear that there is a near constant rate between each data point (due to some human error) which presents a constant *speed* for the buggy. However, because we did not keep the buggy's starting position and direction in mind during the first experiment, and only created positive graphs starting at the origin, we can not rightfully assume the buggy's velocity. Just by looking at the graphs, number 2 is already seen as more reliable because of its more specific starting position at -100 cm. In the second graph, we created a line of best fit to show the actual progression rate of the data points. The best fit (BF) equation is $x=(19.45cm/s)t - 95.65cm$, "x" meaning position of the buggy and "t" equaling time. Both graphs show a linear progression aside from some off points due to human error, which demonstrates constant slopes and velocity in the case of Buggy Lab 2. All in all, only one of our experiments were able to display a constant velocity for the buggy, as result of not including the key points for finding velocity in Buggy Lab 1. While the ideas were the same, we learned to always be precise with our data collection and to keep all variables in mind.

Buggy Lab 1 Graph: This graph is labeled incorrectly, the time should have been on the vertical axis while the distance should have been on the horizontal axis.



Buggy Lab 2 Graph:



BF equation: x= (19.45cm/s) t - 95.65cm