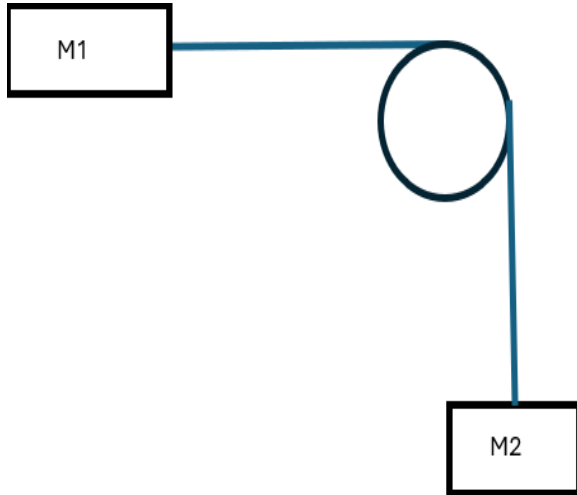


Danny Harn

## Lab Report

Investigative question: How does changing the surface area of an object affect its coefficient of friction and acceleration within a modified Atwood machine?

Hypothesis: A greater surface area touching the ground increase the coefficient of friction and lower acceleration in a linear relationship.



Strategy: We used a cart, a track, a block, and the Vernier Graphical Analysis tool. We will attach a block with velcro on the bottom to one end of the cart and a weight on the other. There will be a pulley attached to one end of the track. The weight will drag both the cart and the block with Velcro on the bottom. Then we will use the Vernier Graphical Analysis tool to analyze our data (acceleration and surface area). We will do this 3 times for four different combinations of 2 different weights and 2

different surface areas.

## Data & Analysis

Mass	Surface Area	Acceleration	Coefficient of Friction
100g	11 in <sup>2</sup>	0.9017	0.116005786
150g	11 in <sup>2</sup>	1.4653	0.14274062
100g	5.5 in <sup>2</sup>	1.5169	0.038848715
150g	5.5 in <sup>2</sup>	0.9102	0.218848376

As seen within this data the surface area may have a small effect on the coefficient of friction and acceleration. As we know these two values are linked as the higher the coefficient of friction the lower the acceleration. There may have been other reasons for these results such as more air resistance due to a larger surface area. We found the coefficient of friction by plugging it into a equation using acceleration. As through outside scientific research surface area should not affect the coefficient of friction based on theory. But the surface area could have affected other factors.

## Conclusion

Throughout our data although it does show a linked between a larger surface area and a negative correlation too coefficient of friction. That isn't a reason to believe that surface area affects the coefficient of friction as other variables may be at play within this lab like air resistance.

