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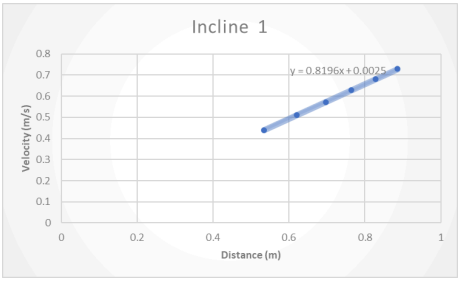
Acceleration on An Inclined Plane
Lab report

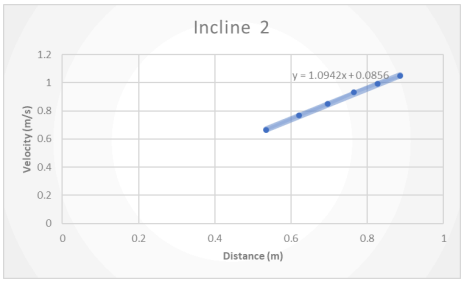
Analysis:

In this experiment, we measured different velocities at varying positions and heights to then determine the average velocity and acceleration for that height. We did this by measuring the velocity from different distances in multiple trials.



Through this we were able to use the equation V^2=Vo^2+2aΔX, to find the exact relationship between the distance and velocity that we measured. By simplifying this equation and solving for V, we were able to simplify this equation to $V=\sqrt{2a} \times \sqrt{\Delta X}$, with V representing velocity (m/s) as a dependent variable (y) and $\sqrt{\Delta X}$ representing the change in distance (m) as an independent variable.

We then used this simplified equation to input our values from our experiment into a linear graph, with distance as the x-axis and velocity as the y-axis. The equation that this linear graph projected (which directly represents and matches the simplified equation of $V=\sqrt{2a} \times \sqrt{\Delta X}$) is y=.8196x+.0025 for the first instance where the inline is 3.8 meters and y=1.0942x+.0856 for the inline of 7.8 meters for the second instance. Using the slope from these equations, we then could solve for acceleration using the equations given.



Conclusion:

The projected acceleration for the first incline is .33 m^2/s and .59 m^2/s for the second incline for the graphs, which are the expected acceleration errors. The projected percent errors are -6.25% and -5.28%, which are significantly lower than the expected amount of 9.8 m^2/s. The acceleration of the cart is projected to be .35 m^2/s for the first incline and .63 m^2/s (work shown in another doc).

In terms of sources of error in the experiment, we could say that during the experiment, the value of the distance was moved, as in when we tried putting the cart in the exact same spot, it may have been not in the exact point. Also even though we didn't really factor in friction, it did have a significant cause to determine the acceleration and how off it was from the projected value. Lastly, while we were testing the experiment, the velocity tracker moved slightly as the cart went down the incline, objectively testing it at different areas causing different results and abnormalities.