

Objective

The point of this experiment is to obtain the force supplied by a fan cart to a PASCO cart by experimental means, then use this information to determine the angle of inclination of a ramp upon which the fan cart would remain stationary. You will then place the cart on the ramp at the predicted angle to see if your prediction is correct. If not, you will adjust the angle until the cart does remain stationary and give the percent difference between predicted and actual angle.

You will decide what data is required to determine the force supplied by the fan cart. You will organize data and calculations, and whatever graphs used from graphical analysis, you used to make your predictions.

The experiment must be divided into two distinct parts. Part I is obtaining the force. Part II is testing your results and measuring accuracy (finding percent difference between the predicted angle and actual angle.)

Part I . Find the Force . Steps

1. List the quantities to be measured. (In your introduction you will describe how measurements are taken using what apparatus.)
2. Do the experiment and take measurements. Make sure you write measurements down neatly and clearly on a data sheet(s).
3. Analyze data and determine predicted angle. Show all calculations necessary .

Part II. Find the Angle. Steps

1. Describe how you obtained the angle of inclination of the ramp.
2. Start the fan cart and place it on the ramp and see if it remains stationary.
3. If it doesn't , raise or lower the ramp and try again. Continue this process until the cart does remain stationary, then record data necessary to obtain this angle.
4. Calculate percent difference between predicted and actual angles.

(Yes, this is a write up lab.)

Notes:

Don't play around with the fan cart too much, because the strength of batteries will decrease so much your prediction will fail because the batteries have weakened too much.

Put equipment up when you finish.

Fan Cart Lab Data Sheet

Part I. Find force

Quantities

| Name | Value | Source |
|------------------------|-------|--|
| Mass of cart M (kg) | | POGMMD |
| Acceleration a (m/s) | | Logger Pro / motion detector |
| Fan Force (N) | | $F = M a$ (this value also goes in the conclusion) |

Show adequate data here or on a print out to indicate where / how you obtained acceleration.

Part II. Find the Angle

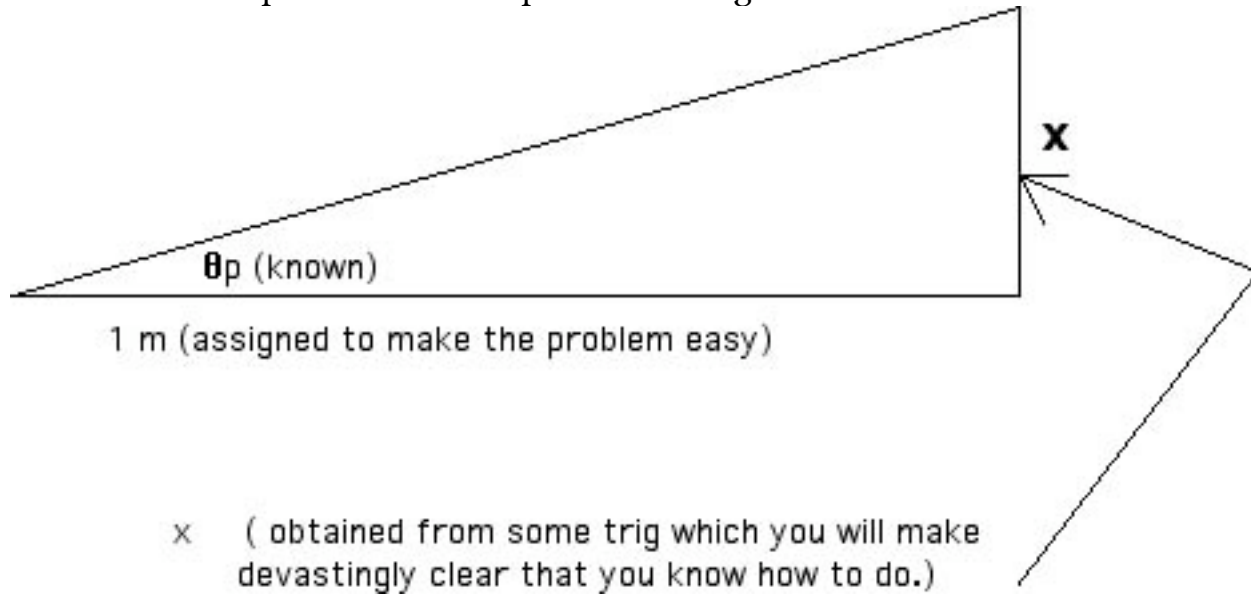
Draw a clearly and accurately labeled FBD here from which to obtain :

$$\sum F_y =$$

$$\sum F_x =$$

do some scribbling here to convince me that you really understand why $u_p = \sin^{-1}(a / 9.8)$, obtain it's value, write it down here and also include it in your conclusion since it is the major objective of this experiment.

Next we will determine the value of height to raise the ramp 1 m from the pivot end so the ramp will be at the predicted angle with the horizontal.



Next we will try the experiment and **record here** what happened.

If the cart remains stationary, we are finished, % difference is zero.

If the cart does not remain stationary, we will adjust the ramp until it does, then obtain that angle using clear and concise trig, and record that angle u_{actual} here.

Finally, we will obtain the % difference between these two angles = $\left[\frac{|u_p - u_{\text{actual}}|}{(u_p + u_{\text{actual}})} \right] \times 200$ and also put this in the conclusion too!