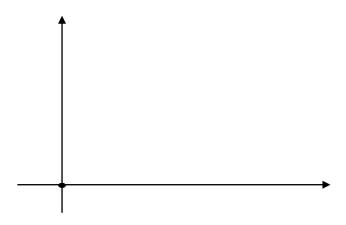
LECTURE 7: NEWTON'S SECOND LAW – CONSTANT FORCE REPORT

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3 D) W
	Results: Predict
	. What will happen to an object when you apply a net force to it?
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	. What will happen to the motion of an object as its mass changes but you keep the magnitude
	ne net force on it constant?
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2.2. Data

Sketch a graph of position versus time for one run of data. Include labels and units for your y-axes and x-axes.

Sketch a graph of velocity versus time for one run of data. Include labels and units for your y-axes and x-axes.



2.3. Calculations

Calculate the theoretical acceleration when the mass is constant and the net force is changed and record the calculations in the Data Table 3.

• The theoretical acceleration is the ratio of the net force divided by the total mass.

$$a = \frac{m_{hanging} g}{m_{cart} + m_{hanging}}$$

- For runs #2, #3, and #4, the total mass of the system (mass of cart plus hanging mass) increases and the net force (hanging mass x 9.8) remains constant.
- Assuming no friction, the net force is the weight of the hanging mass (mass x 9.8 N/kg). Find the percent difference between the theoretical and experimental acceleration and record it in the data table.

$$\%$$
 difference = $\left| \frac{theoretical - experimental}{theoretical} \right| x 100$

2.4. Data table 1

Item	Mass (kg)
Run #1: Total mass of the hanging mass (m _{hanging}):	
Run #1: Total mass of cart (m _{cart}):	
Run #2: Total mass of cart plus 0.200 kg:	
Run #3: Total mass of cart plus 0.400 kg:	
Run #4: Total mass of cart plus 0.600 kg	

2.5. Data table 2

Run	Acceleration (m/s ²)
#1	
#2	
#3	
#4	

2.6. Data table 3

2.7. Questions

Run	Mass, cart (kg)	Total mass (kg)	Acc., theory (m/s²)	Acc., exp. (m/s ²)	%difference
#1					
#2					
#3					
#4					

1. For runs #2, #3, and #4, what did you observe about the slope of the Linear Fit as the net force remained constant but the total mass increased?
2. What happens to an object's acceleration if the net force applied to the object is kept constarbut the object's mass increases?
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