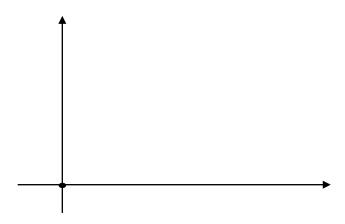
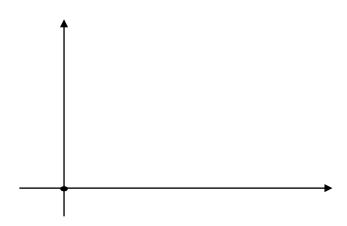
LECTURE 8: NEWTON'S SECOND LAW - CONSTANT FORCE REPORT

Name:	
Class:	
1. Purpose:	
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	•••••
2. Results:	
2. Results. 2.1. Predict	
1. What will happen to an object when you apply a net force to it?	
1. What will happen to all object when you apply a net force to it:	
2. What will happen to the motion of an object if it has a constant mass but you ch	ange the
magnitude of the net force on it?	
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	•••••
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2.2. Data	
Sketch a graph of position versus time for one run of data. Include labels and units for y	VOIIT V

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 net force (hanging mass x 9.8 N/kg) increases but the total mass of the system (mass of cart + hanging mass) 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: Initial mass of cart + masses (m _{cart}):	
Run #1: Initial mass of the hanging mass (m _{hanging}):	

Run #2: Total mass of hanging masses (0.02 kg + 0.02 kg):	
Run #3: Total mass of hanging masses (0.05 kg + 0.01 kg)	
Run #4: Total mass of hanging masses (0.05 kg + 0.02 kg + 0.01 kg)	

2.5. Data table 2: Experimental Acceleration

Run	Acceleration (m/s²)
#1	
#2	
#3	
#4	

2.6. Data table 3

 F_{net} , (net force) = hanging mass x 9.8 N/kg

Run	Hanging cart (kg)	F _{net} (N)	Acc., theory (m/s ²)	Acc., exp. (m/s ²)	%difference
#1					
#2					
#3					
#4					

1. Why did the slope of velocity versus time change for each run?
2. For the runs, what did you observe about the slope of the Linear Fit as the net force increased but the total mass remained?

3. What happens to an object's acceleration if the net force applied to the object increases but
the total mass of the system remains constant?
•••••••••••