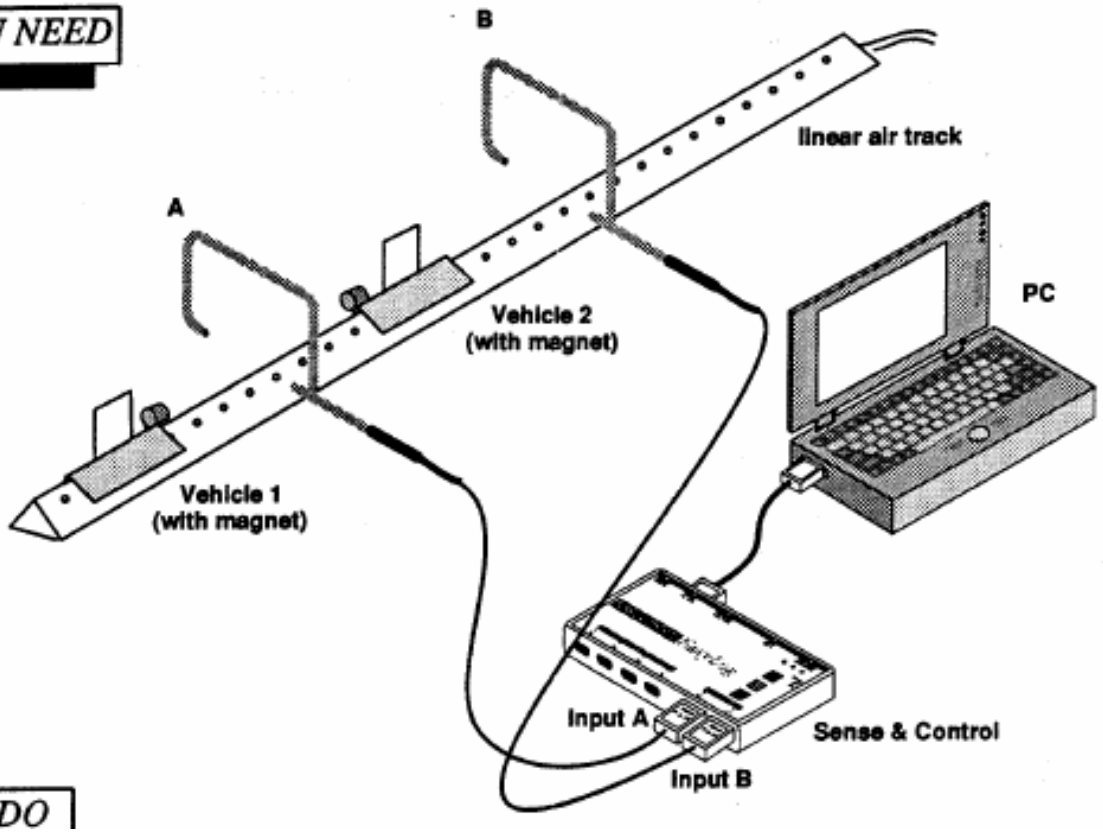
Name _____ Physics

Elastic Collisions.

READ

In this experiment you will discover how the velocities of 2 "vehicles" moving along a **"frictionless"** air track change when they collide "head on". The velocities before and after collisions are found and you will analyse the results to investigate the momentum and kinetic energy before and after the collision.

WHAT YOU NEED



WHAT TO DO

1. Set-up the Apparatus as shown above and as directed in pre-lab
2. Click-on the *Data Studio* icon on the desktop and open the program
3. Click-on the *Create an Experiment* icon and add the photogates to the software as directed in pre-lab. Make the adjustments and bring-up the tables as also directed in pre-lab.
4. **Show how you will determine if the Total momentum BEFORE and the Total momentum AFTER the collision are equal:**

_____ = _____

Procedure:

1. Mass Cart 1 and Cart 2 using the triple beam balance and place these values below.

   Mass Cart 1 _____ Kg Mass Cart 2 _____ Kg

2. Mass a mass bar and place this value below

   Mass of Mass Bar 1_____ Kg Mass of Bar 2 _____Kg

3. Place Cart 1 on one side of the photogates and Cart 2 on the other side of both photogates
4. Press START to run the program and gently push Cart #1 and Cart #2 towards each other. The carts should strike each other BETWEEN THE PHOTOGATES and both move through a photogate after the collision.
5. Enter the elapsed times into the velocity calculation program to obtain the velocities for each pass through the photogates. Record these velocities in the table below.
6. Calculate the Total Momentum BEFORE and Total Momentum AFTER the collision and place these values in the table. Show all work in the provided areas.
7. Repeat the experiment with the varying masses as shown below.

	Mass of Incoming Cart (Kg)	Mass of Target Cart (Kg)	Velocity Cart 1 BEFORE	Velocity of Cart 2 BEFORE	Velocity of Cart 1 AFTER	Velocity of Cart 2 AFTER
Carts only						
Cart 1 w/ mass bar						
Both carts w/mass bars						

Calculate the Momentum BEFORE and AFTER the Collision

Trial #1 Carts Only

Momentum BEFORE Collision

Momentum After Collision

Trial #2 Mass on Cart 1

Momentum BEFORE Collision

Momentum After Collision

Trial #3 Masses on both carts

Momentum BEFORE Collision

Momentum After Collision

Momentum Table

	Momentum Before	Momentum After
Trial 1		
Trial 2		
Trial 3		

Questions:

1. How do you your AFTER values compare to your BEFORE values? _____

_____

2. What sources of error do you think account for the difference in values? _____

_____

3. What modifications could you make to this experiment to possible achieve better results? _____

_____

_____