Inelastic Collision Demo Name_____ Period_____

Procedure: You will be observing several inelastic collisions between 2 carts. An **inelastic collision** is one where the objects collide and stick together. Write down your predictions. Circle the correct answer after observing each collision. Answer all questions and record the data for each collision in the data table below.

Collision 1: Both carts have the same mass. One cart is at rest and the other moves toward it and collides and sticks. What will be the speed of the carts after the collision compared (v_f) to before the collision (v_i)?

Prediction			**Actual**		
A. Faster	B. Slower	C. Same	A. Faster	B. Slower	C. Same

Collision 2: Both cart masses are doubled. One cart is at rest and the other moves toward it and collides and sticks. How will v_f compare to v_i?

Prediction			**Actual**		
A. Faster	B. Slower	C. Same	A. Faster	B. Slower	C. Same

Collision 3: Both cart masses are tripled. One cart is at rest and the other moves toward it and collides and sticks. How will v_f compare to v_i?

Prediction			**Actual**		
A. Faster	B. Slower	C. Same	A. Faster	B. Slower	C. Same

Collision 4: The moving cart has twice the mass of the stationary cart. How will v_f compare to v_i?

Prediction			**Actual**		
A. More than ½ v_i	B. Less than ½ v_i	C. Half	A. More than ½ v_i	B. Less than ½ v_i	C. Half

Collision 5: The stationary cart has twice the mass of the moving cart. How will v_f compare to v_i?

Prediction			**Actual**		
A. More than ½ v_i	B. Less than ½ v_i	C. Half	A. More than ½ v_i	B. Less than ½ v_i	C. Half

Collision 6: The moving cart has triple the mass of the stationary cart. How will v_f compare to v_i?

Prediction **Actual**

Collision 7: The stationary cart has triple the mass of the moving cart. How will v_f compare to v_i?

Prediction **Actual**

List all the factors that affect the final speed of the carts.

Collision	Before Collision (initial)				After Collision (final)	
#	m_1 (kg)	v_{1i} (m/s)	m_2 (kg)	v_{2i} (m/s)	$m_{(1+2)f}$ (kg)	$v_{(1+2)f}$ (m/s)
1						
2						
3						
4						
5						
6						
7						

Draw a Picture of the Scenario before and after the collision.

Before **After**

Calculate the Momentum before and Momentum after for each collision and then record it in the data table. Show work. Use the back of the lab if you need more space.

Collision #	Momentum Before Collision (initial) (kgm/s)	Momentum After Collision (final) (kgm/s)
1		
2		
3		
4		
5		
6		
7		

Using **Logger Pro**, graph the "momentum after" on the Y axis and the "momentum before" on the on the X axis.

Determine the mathematical model (use the procedure described in the "How to Create a Mathematical Model from a Straight Line Graph" sheet). Show all three steps. Make sure your units are correct!

Problems

A 1.0 kg cart is moving with an initial velocity of 0.4 m/s. It collides and sticks to a stationary cart with a mass of 0.3 kg. Use your model to predict the velocity of the carts as they move together.

A 2.0 kg cart collides with a 1.0 kg cart and move together with a speed of 0.4 m/s. What was the initial velocity of the 2.0 kg cart?

Conclusion