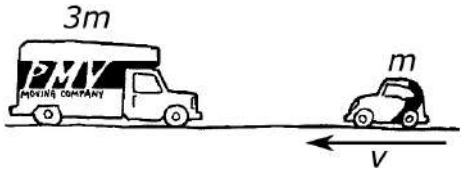
NAME _____ DATE _____

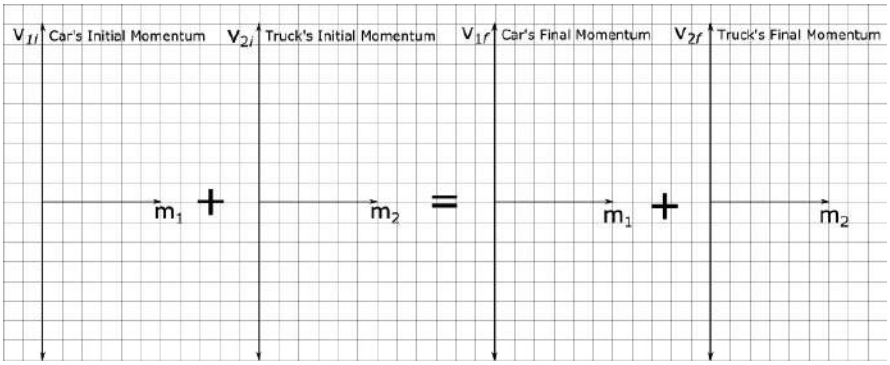
Scenario

A toy car is pushed with a speed v toward a toy truck initially at rest. The car bounces back off the truck so that the car's final speed is $\frac{v}{2}$ *in the opposite direction. Consider the system to be the car and the truck.*



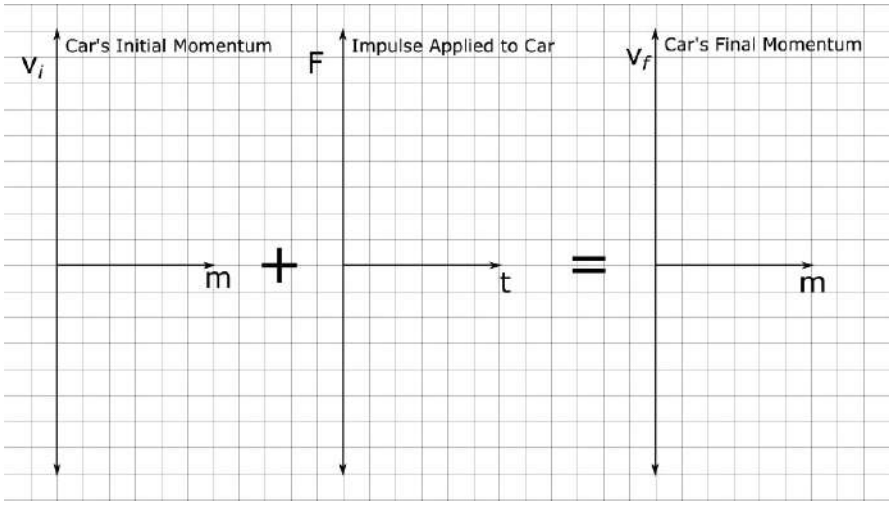
Using Representations

PART A: Sketch a momentum diagram for the car and truck before and after the collision.



How does the situation change if we consider the system to only contain the car?

PART B: Sketch a momentum diagram for the collision for the car-only system.



Data Analysis

PART C: In the laboratory, a ball is dropped onto a force-sensing platform several times, each time hitting a different surface (foam, feathers, clay, etc.). The momentum of the ball changes by the same amount in each trial; in each trial, the average scale reading is F, and the time of collision t are measured. What quantities would need to be graphed to exhibit a straight-line relationship?

Justify your answer in a few sentences.

Checklist:

_____ I answered the question directly.

_____ I stated a law of physics that is always true.

_____ I connected the law or laws of physics to the specific circumstances of the situation.

_____ I used physics vocabulary (momentum, mass, energy, force, velocity, speed, time).