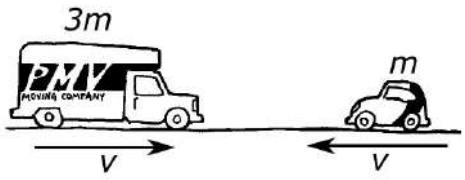
NAME _____ DATE _____

Scenario

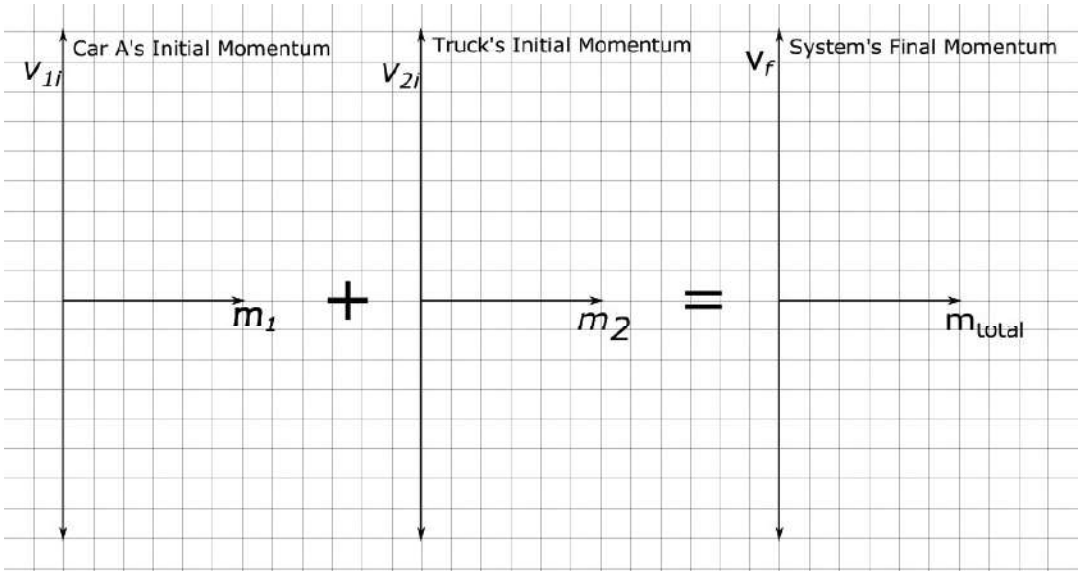
A toy car of mass m and a toy truck with a mass 3m *travel in opposite directions at identical speeds. The truck moves to the right and the car moves to the left. The two toys collide and stick together.*



Using Representations

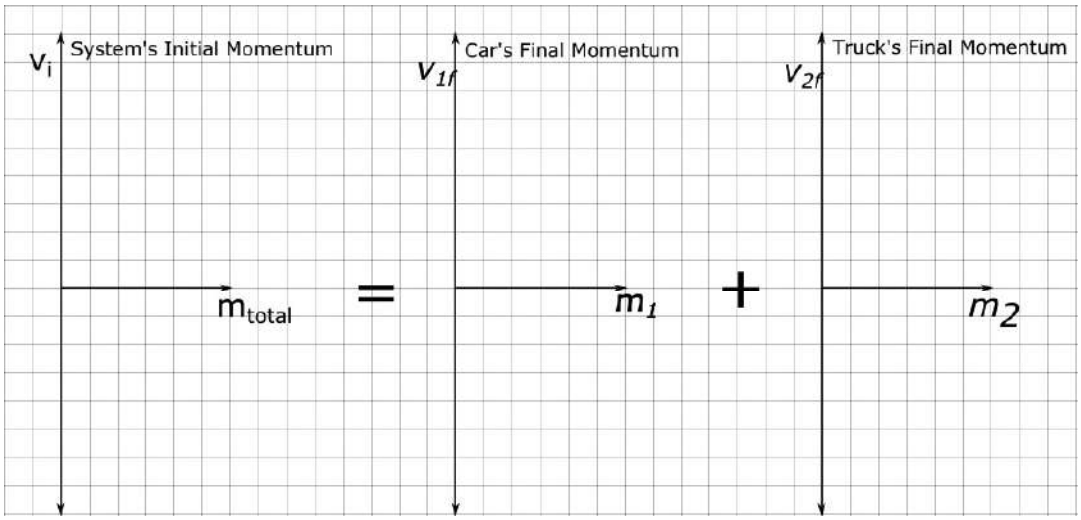
PART A: Identify the system by drawing a dotted circle around the truck and the car.

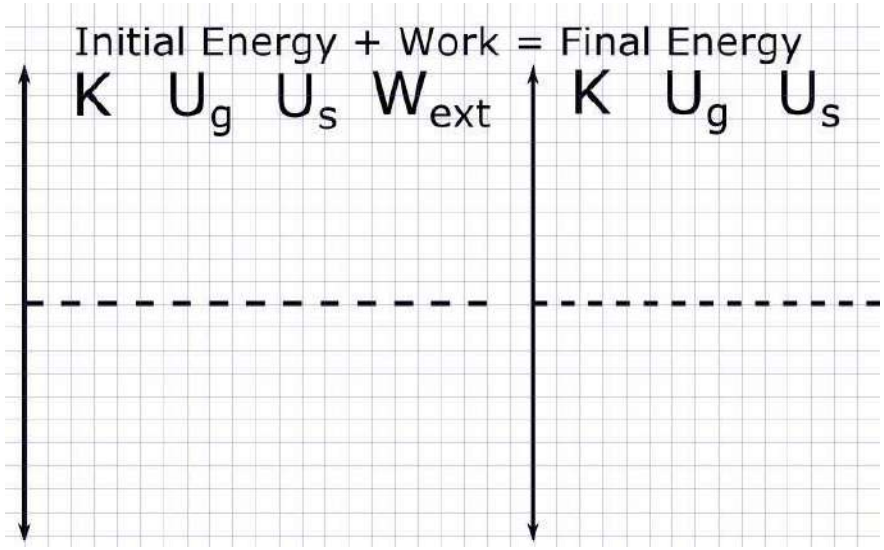
PART B: Diagram the situation.



In which direction will they be traveling after the they collide? Explain and justify your answer.

PART C: The toy car and truck are now pressed together with an ideal spring compressed between them. They are then released from rest. Diagram the momentum before and after the explosion as well as the energy before and after the explosion.





PART D: If there were instead two identical toy cars traveling in opposite directions at identical speeds, how would the momentum diagram change, and what direction would they be traveling after the collision? Explain and justify your answer.