For the two PASCars, please add masses so that the mass ratios of cars R and B are 2:3.

Mass of car R = _____ Mass of car B = _____

#1 Have them collide in a **perfectly inelastic collision**. Use the onboard sensors to make measurements of their velocities before and after the collision.

a) Sketch a picture of the cars on the track before and after the collision

b) On the same set of axes, sketch velocities v_{Ri}, v_{Bi}, and v_{RBf} versus time. Also sketch v_{CM}.

c) Is kinetic energy conserved? Measure K_{i} and K_{f}

d) Is momentum conserved? Check if your measurements match up with the prediction.

For the two PASCars, please add masses so that the mass ratios of cars R and B are 2:3.

Mass of car R = _____ Mass of car B = _____

#2 Now have them collide in an **elastic collision.** Use the onboard sensors to make measurements of their velocities before and after the collision, and the force sensors too.

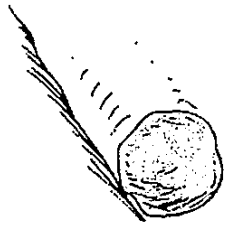
a) Sketch a picture of the cars on the track before and after the collision

b) On the same set of axes, sketch velocities v_{Ri}, v_{Bi}, v_{Rf} and v_{Bf} versus time.

c) Is kinetic energy conserved? Measure K_{i} and K_{f}

d) Measure the change in momentum of each car.

e) On the same set of axes, sketch the forces F_{RonB} and F_{BonR} versus time. Find the area under the curve to measure the impulse. Compare this number with part d.



mass m =

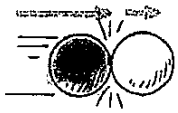
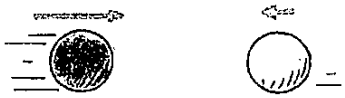
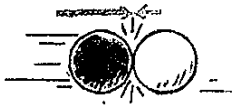
speed v =

Momentous Marbles
(Elastic Collisions)

Rolling marbles have momentum. The system of all the marbles follows the Law of Conservation of Momentum. In each case, draw the marbles *after* the collision and draw their momentum arrows.

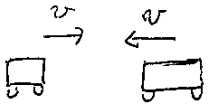
Plot

Before Collision	Collision	After Collision
		
		
		
		
		

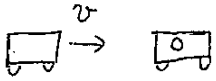
Before Collision	Collision	After Collision
		
		
		

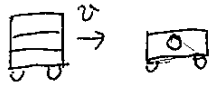
INELASTIC (*Bonus in v)

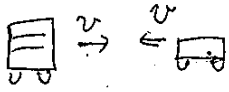
Before

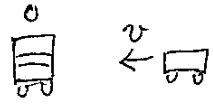


After



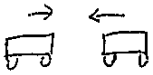






ELASTIC

Before



After