Average initial (before) momentum=_____kg-m/s

Elastic Collision

Table 4 Before Collision

| | **Cart A** | | | | **Cart B** | |

Trial	measured time in **seconds** for bar 1	velocity Cart A (m/s) (divide bar 1 width by time)	momentum kg-m/s		velocity Cart B (m/s)	momentum kg-m/s
1					0	
2					0	
3					0	

Average initial (before) momentum=_____kg-m/s

Table 5 After Collision

| | **Cart A** | | | | **Cart B** | |

Trial	measured time in **seconds** for bar 2	velocity Cart A (m/s) (divide bar 2 width by time)	momentum kg-m/s		measured time (s) for bar 3	Velocity Cart B (m/s) (divide bar 3 width by	Momentum kg-m/s
1							
2							
3							

Average initial (after) momentum for Cart A=_____kg-m/s
Average initial (after) momentum for Cart B=_____kg-m/s
Total momentum after collision_____ kg-m/s

Elastic Collision with increase Mass of Cart A

25. If time permits, double the mass of cart A and repeat steps 20 through 24 but put data in Tables 6 & 7. Please note that the initial momentum will depend on new mass of cart A.

New mass of cart A (use in table 5 & 6 below) =_____kg

Elastic Collision With Added Masses to Cart A

Table 6 Before Collision

Cart A   **Cart B**

Trial	measured time in **seconds** for bar 1	velocity Cart A (m/s) (divide bar 1 width by time)	momentum kg-m/s		velocity Cart B (m/s)	momentum kg-m/s
1					**0**	
2					**0**	
3					**0**	

Average initial (before) momentum=_____kg-m/s

Table 6 After Collision

Cart A   **Cart B**

Trial	measured time in **seconds** for bar 2	velocity Cart A (m/s) (divide bar 2 width by time)	momentum kg-m/s		measured time (s) for bar 3	Velocity Cart B (m/s) (divide bar 3 width by	Momentum kg-m/s
1							
2							
3							

Average initial (after) momentum for Cart A=_____kg-m/s
Average initial (after) momentum for Cart B=_____kg-m/s
Total momentum after collision_____ kg-m/s

Questions

1. Using the results from the experiment, determine whether or not momentum is conserved in each part of the experiment. Is momentum conserved in both (all) parts? If not, give some possible sources of error.

2. What is impulse, and where did you see impulse in this experiment?

3. What's the difference between inelastic and elastic collisions? Is momentum conserved in both? If momentum is not conserved in a collision, what can you conclude?

4. When to cars collide in an automobile accident, what type of collision do the cars (typically) experience? Would it be more damaging to the people inside if the cars stuck together or bounced apart? Why?

5. Picture two astronauts holding on to one another in space (Their initial velocity with respect to each other is zero). If one astronaut pushes the other away, what is the total momentum of both astronauts? If one astronaut weighs (on earth) twice as much as the other, what can you say about the velocity of the less massive one compared to the other?

6. In the last part of the experiment you added mass to the first cart (effectively doubling its mass). Assuming that the spring mechanism acts with the same force over the same time

what do you think should happen to the cart's initial velocity? What about its initial momentum? Is this what you observed?