Exploding Carts Interactive

Purpose:
To analyze the explosion that propels two stationary carts in opposite directions in an effort to determine some guiding physics principles that describe such explosions.

Data:

	Mass of Red Cart (kg)	Mass of Blue Cart (kg)	Post-Explosion Speed of Red Cart (m/s)	Post-Explosion Speed of Blue Cart (m/s)
a.				
b.				
c.				
d.				
e.				
f.				
g.				
h.				

Use the collected data to answer the following questions.
Questions:
Situations involving collisions and explosions are usually thought of in terms of the individual objects and in terms of the collection or combination of objects. The combination of two or more objects is referred to as *the system*. In this case, the system is best thought of as the red cart and the blue cart combined.

1.   What is the individual momentum of the red cart before the explosion?

2.   What is the individual momentum of the blue cart before the explosion?

3.   What is the combined momentum of the system of two carts before the explosion?

4. Consider three trials above. Pick whatever three you wish as long as the ratio of m_{red}/m_{blue} is different for the three that you pick. For each trial, calculate the post-explosion momentum of each individual cart. Show your work in the table cells.

Trial	Post-Explosion Momentum of Red Cart (kg•m/s)	Post-Explosion Momentum of Blue Cart (kg•m/s)

5. How do the direction of these two post-explosion momentum vectors compare?

6. Use your answer to question #4, your answer to question #5, and the fact that momentum is a vector quantity to determine the post-explosion momentum of the system of two carts (i.e., the vector sum of the momentum of the two carts).

7. Use your answers to question #3 and question #6 to explain how one can say that system momentum is conserved in an explosion?

8. Pick three different trials that have a different mass ratio. For each trial that you pick, fill in the table below.

Trial	m_{red} / m_{blue}	v_{red} / v_{blue}

9. Analyze the data in the table above. State a rule that describes how to predict the relative velocities of the two carts after the explosion.