

Physics 04-02 Conservation of Momentum Lab

Name: _____

Modified from PASCO Essential Physics

Objective:

- Investigate and verify conservation of momentum

Materials:

- Red Smart Cart
- Blue Smart Cart
- Track with end stops
- 4 250 g masses for Smart Carts
- Tablet or computer with SparkVue App



Procedure:



- In the SparkVue app, open the 11A_ConservationOfMomentum file in the Essential Physics folder. Then turn on and connect the Smart Carts to the app.
- Set a red cart and blue cart on the track facing the same direction with the blue cart in front.
- Push the plunger of the blue cart until it catches at the third position. Set both carts in the middle of the track with the plunger of the blue cart touching the red cart. (If the carts won't sit still, you may need to level the track.)
- Begin collecting data, then tap the plunger release trigger to launch the carts.
- Stop collecting data after the carts reach the end of the track.
- Use the tools  in the SparkVue app. Use the MultiCoordinates tool  to find the velocity of each cart right after the launch.
- Run the experiment with different combinations of masses for the carts. Record your data in the table.

Table: The cart is approximately 250 g empty and each extra mass is 250 g.

m red (g)	v red (m/s)	p red (kg m/s)	m blue (g)	v blue (m/s)	p blue (kg m/s)
250			250		
250			500		
250			750		
500			250		
500			500		
500			750		
750			250		
750			500		
750			750		

Questions:

- Describe the velocities when the masses of the two carts are equal. _____
- Describe the velocities when the red cart has more mass than the blue cart. _____
- Describe the velocities when the blue cart has more mass than the red cart. _____
- Which of the quantities from the table are equal and opposite for the two carts after they are released? Explain. _____

- If the two carts are considered a closed system, what is the net force on the two carts together? What is the change in the system's momentum? Use equations to explain your answers. _____

- Describe the similarities between the velocities and momenta when the masses are equal. _____

- Describe the velocities when one mass is twice the other and three times the other.
Twice: _____
Three times: _____
- Describe the momenta when one mass is twice the other and three times the other.
Twice: _____
Three times: _____