

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

## Virtual Momentum Lab

$$\text{Momentum (kg}\cdot\text{m/s)} = \text{mass (kg)} * \text{velocity (m/s)}$$

### Directions:

Log on to <http://www.walter-fendt.de/ph14e/collision.htm> and read the introduction paragraphs.

1. What is an elastic collision?
2. Is momentum conserved in an elastic collision?
3. What is an inelastic collision?
4. Is momentum conserved in an inelastic collision?

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*Now run the experiment, leave the initial settings alone:*

1. What is the momentum of the red wagon (#1) before the collision? (Show work)
2. What is the momentum of the blue wagon (#2) after the collision? (Show work)

*Now change the settings so that the red wagon (#1) has a mass of **1 kg** and a velocity of **0.3 m/s**.*

3. What is the momentum of the red wagon (#1) before the collision? (Show work)
4. What is the momentum of the blue wagon (#2) after the collision? (Show work)

*Change the settings so that the red wagon (#1) has a mass of **1 kg** and a velocity of **0.5 m/s**. While the blue wagon (#2) has a mass of **0.1 kg**.*

5. What will the velocity of the blue wagon be after the collision?
6. What would happen to the blue wagon's velocity after the collision if the mass were doubled?
7. What would happen to the blue wagon's velocity after the collision if the mass of the red wagon were doubled?

Now logon to <http://jersey.uoregon.edu/vlab/Momentum/index.html> and play with the wagon and cannon. Assume that the mass is in kg and the velocity is in m/s.

8. What is the mass of the cannon ball in kg's? (Explain how you found this)
  
9. Based on your answer to question #8, what is the velocity of the cannon ball if the starting momentum is  $500 \text{ kg}\cdot\text{m/s}$ ? (Show your work)
  
10. If the starting momentum of the cannon ball is  $750 \text{ kg}\cdot\text{m/s}$ , what is the end velocity of the wagon? (Show your work)

On your own (or use google.com):

11. Explain why people who get shot in a movie and go flying back are obviously acting. Use your knowledge of physics and momentum.
  
  
  
  
  
  
  
  
  
  
12. Explain why momentum has to be conserved in any type of collision.
  
  
  
  
  
  
  
  
  
  
13. Explain why a train that is moving very, very slowly has many times the momentum of a bullet traveling very, very fast.