

Name: \_\_\_\_\_

## Investigating Collisions

Previously, your friend who drives a Sport Utility Vehicle (SUV) had claimed that in a collision the SUV would exert a greater force on a small car than the small car would exert on the SUV. You collected data in the Investigating Forces – Part Two Lab, you showed that this claim was incorrect, and from this data, you were able to see Newton's Third Law. After you reported the results of your lab to your friend, your friend is frustrated and wants you to figure out why SUVs are safer in a collision. Today, this is your job, you will be investigating collisions, trying to look for patterns in a number of collisions.

Because you have already done a lab involving collisions, you can start by summarizing the main result of the previous collision lab here.

Since you already have a conclusion about the forces on each object in a collision, today you are going to investigate the collisions with just the motion detectors, instead of using force probes.

There are a few experimental notes prior to conducting any experiments. First, set up the track with a motion detector on each end, remember that the motion detectors won't see anything that is closer than 15 cm, so your collisions will need to take place near the center of the track. The second note is that you will have two velocity vs. time graphs, one for each cart; the graphs are set so that each car shares the same frame of reference.

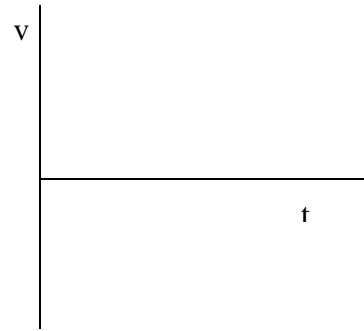
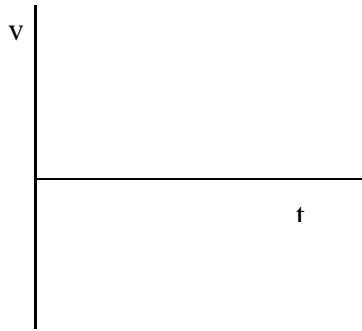
You will be collecting data about 8 different collisions and you can select the 8 collisions. Prior to each collision, you should make a prediction of the velocity vs. time graph for each cart.

Trial One Description:

Prediction

Red Cart

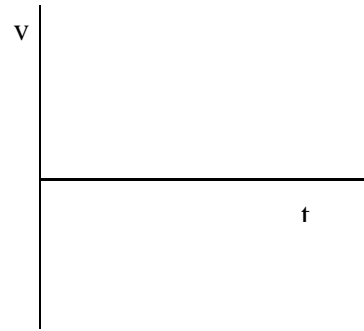
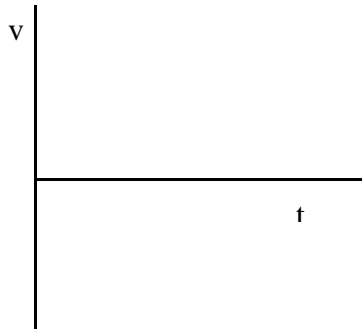
Blue Cart



Data

Red Cart

Blue Cart

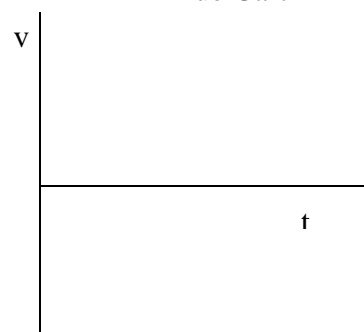
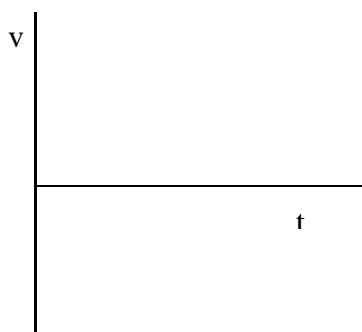


Trial Two Description:

Prediction

Red Cart

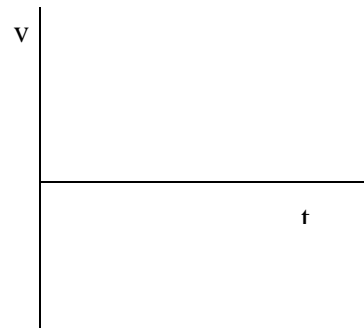
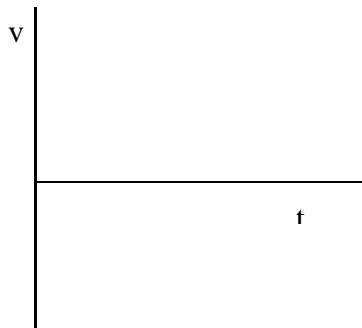
Blue Cart



Data

Red Cart

Blue Cart

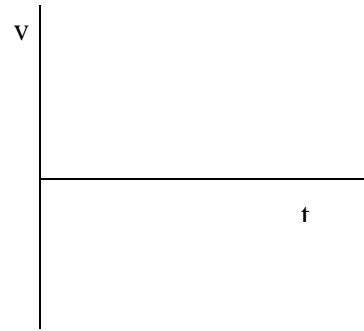
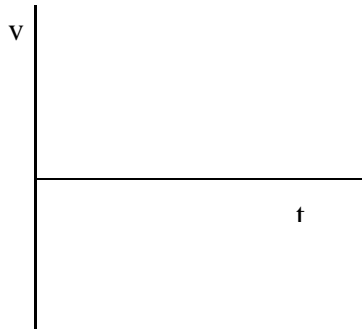


Trial Three Description:

Prediction

Red Cart

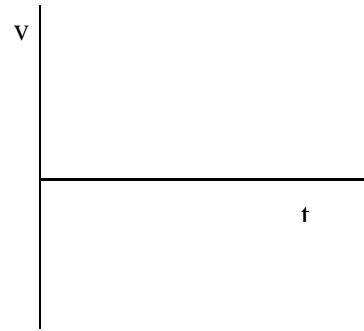
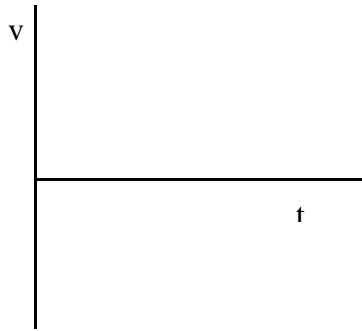
Blue Cart



Data

Red Cart

Blue Cart

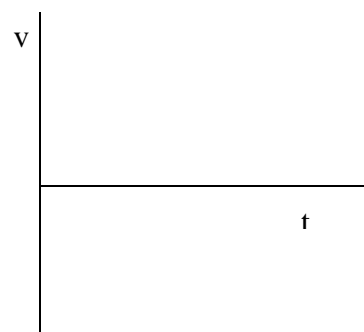
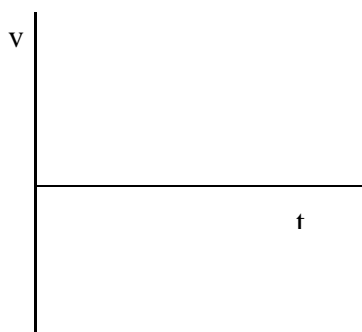


Trial Four Description:

Prediction

Red Cart

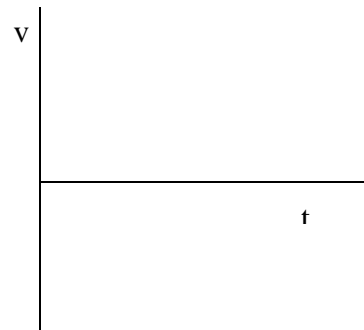
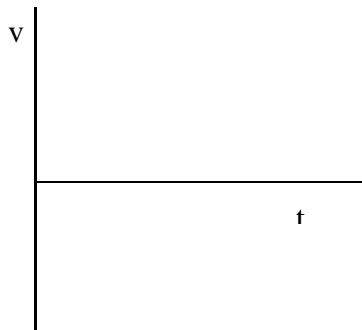
Blue Cart



Data

Red Cart

Blue Cart

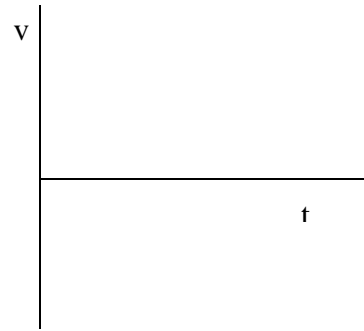
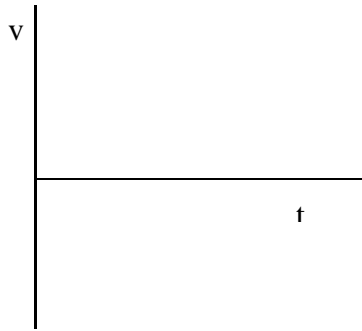


Trial Five Description:

Prediction

Red Cart

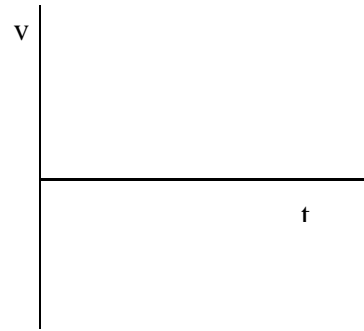
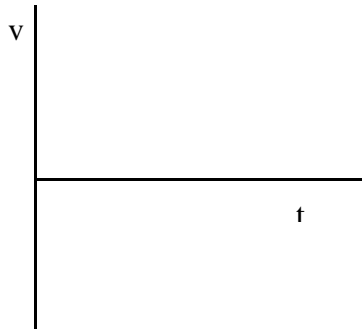
Blue Cart



Data

Red Cart

Blue Cart

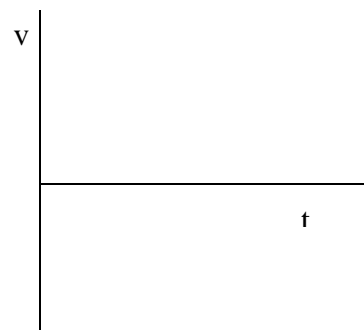
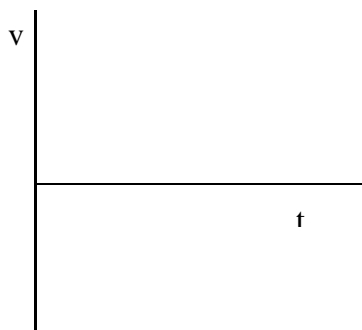


Trial Six Description:

Prediction

Red Cart

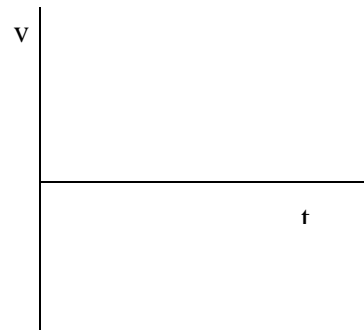
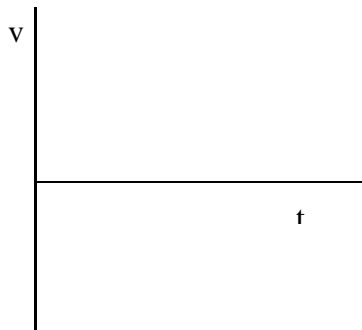
Blue Cart



Data

Red Cart

Blue Cart

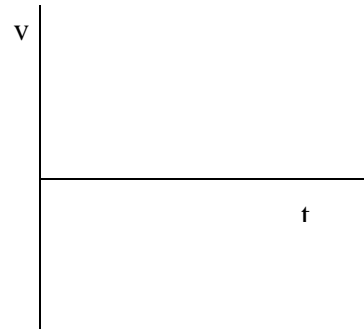
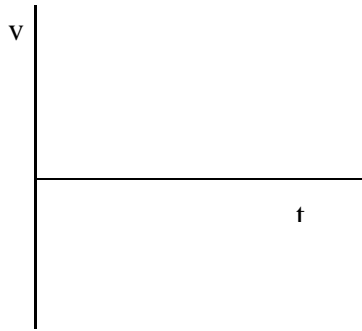


Trial Seven Description:

Prediction

Red Cart

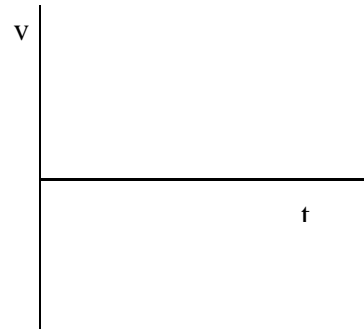
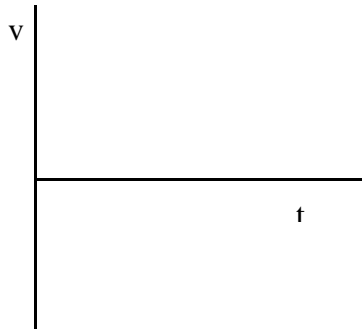
Blue Cart



Data

Red Cart

Blue Cart

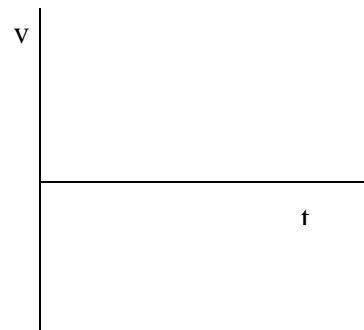
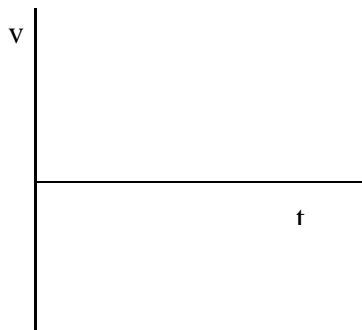


Trial Eight Description:

Prediction

Red Cart

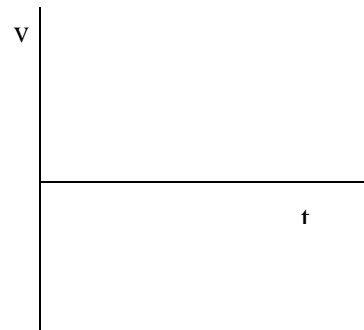
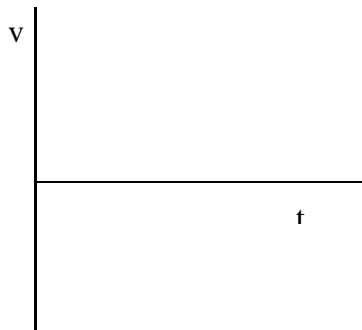
Blue Cart



Data

Red Cart

Blue Cart



Questions:

1. Describe any pattern you see in the above trials.
2. If you were to try make an equation that represents the pattern you described in question #1, what would the equation be?
3. How do the results of this lab relate to the results of the previous lab?
4. In these collisions is energy conserved? How can you tell?