

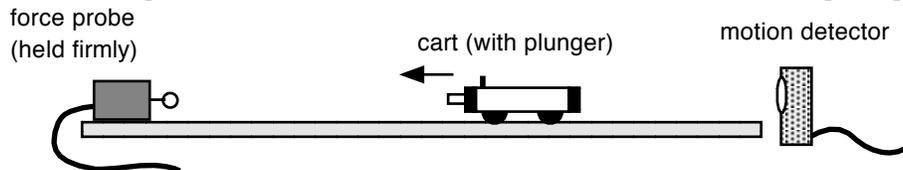
Lab 9-1: Impulse

Purpose: 1. To compare the impulse exerted on a cart and compare it to the change in momentum of the cart.

Equipment: 1 cart w/plunger 2 500 gram bars motion detector, force probe

Procedure:

1. Arrange a cart, force probe and motion detector on a level track as shown. Open up Logger Pro.



2. Hold the force probe firmly in place and zero the probe. Start collecting data – when you hear the motion detector clicking, give the cart a quick shove so that it ends up colliding and bouncing off the force probe.
3. From the velocity vs time graph, record the velocity of the just before and after the collision by clicking on the “Examine” button.
4. From the force vs. time graph, determine the total impulse acting on the cart and record this in the data table below. (To determine the area under a curve in Logger Pro, click on the integrate button or under Analyze, choose Integral.)
5. Repeat the above, but give the cart a bigger initial speed. (You may have to switch the force probe to read 50 N - in which case you need to restart Logger Pro.)
6. Repeat the above two more times, each time adding one of the 500 gram black bars.

Calculations:

1. Calculate the change in momentum of the cart for each trial. Show your work here, and record your results in the table.

2. How did you determine the impulse acting on the cart by the spring?

Data and Results:

trial	mass (kg)	v_i (m/s)	v_f (m/s)	Impulse (N•s)	Δp (kg•m/s)
no bar	0.5				
no bar	0.5				
1 bar	1.0				
2 bars	1.5				

Conclusions:

1. In general, how did the impulse of the spring compare to the change in momentum of the cart?

2. For each trial, what happened to the kinetic energy of the cart?