IMPULSE

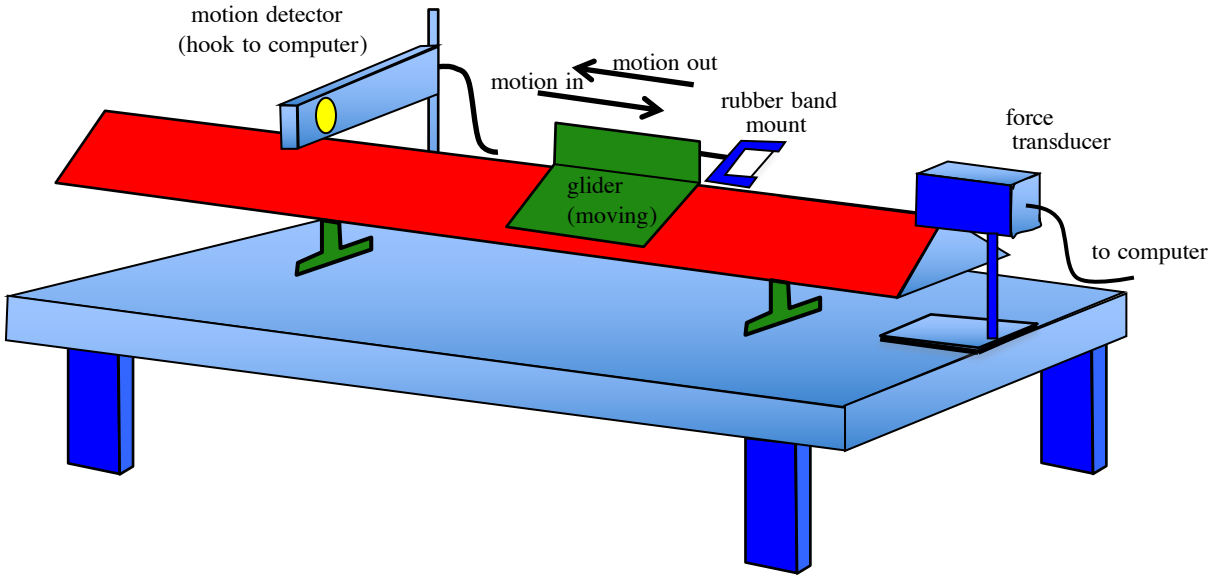
(L-12covid)

Does the *impulse* applied to a body really equal the body's *change of momentum*? This lab will give you the opportunity to find out.

PROCEDURE--DATA

Part A: (comparing the *impulse* **F**Δt to a body's *change of momentum* Δ**p**)

a.) The lab will have a glider strike a Force Transducer attached to a computer, which will generate a *force vs time* graph for the collision. Additionally, a motion detector will generate a *velocity vs. time* graph for the motion. A sketch of the overall device is shown below.



b.) Look at the video at https://www.youtube.com/watch?v=R_e3ujHalJk&feature=youtu.be, which will shows all of this happening. From it you will be able to glean all the data needed to write up this lab.

CALCULATIONS

Part A: (relationship between *impulse* and a body's *change of momentum*)

1.) The collision's *impulse* $F\Delta t$, as determined by the area under the *force versus time* graph (your computer gave you this number), was provided in the video. What was that value?

2.) We'd like to see if the impulse determined using the *force versus time* graph is the same as the cart's *change of momentum*. That is, is $\mathbf{F}\Delta t = \Delta \mathbf{p}$? To find out: We need to determine the glider's *change of momentum*. To do so:

a.) Determine the incoming and outgoing momenta. Blurb well.

b.) Determine the net *change of momentum* (including units) of the glider during the collision. BE VERY CAREFUL WITH YOUR SIGNS!

3.) As was stated above, the computer was kind enough to provide you with a numerical value for the area under the *force versus time* graph. Generated as a consequence of the glider's momentum-changing collision with the Transducer's ARM in our set-up, this area was $\mathbf{F}\Delta t$.

If our theory is correct, the glider's *change of momentum* determined in *Calculations 2b* should equal, to a very good approximation, that $\mathbf{F}\Delta t$ value. Do a % comparison between those two values and comment on your results.

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