PHYSICS 207

Linear Momentum Lab

In this lab you are using the Physics Aviary Impulse Version 2 Lab Simulation:

https://www.thephysicsaviary.com/Physics/singlepage.php?ID=396

Procedure

Go to the above listed url and click on the center of the rectangular box on the page. The variables in this experiment are listed as mass of Wally the astronaut (m_w) , magnitude of propulsion force from fire extinguisher (F_{Net}) and duration of propulsion force from fire extinguisher (time, Δt).

All variables are easily located on screen with up or down arrows to adjust each variable magnitude.

Follow the instructions provided and click on 'Begin'.

Be aware that photogate time is the time for Wally to travel between the two vertical red lines which symbolize two photogates.

In this momentum experiment, why should you shut off the fire extinguisher before Wally reaches the first photogate red line? Which of Newton's three laws of motion are in effect here?

What is the fire extinguisher propulsion effort doing to Wally's body mass each second it is spraying?

How many different methods of calculation can you use to determine the speed of Wally?

When is Wally's speed changing, during the spraying of the fire extinguisher or when the fire extinguisher is off? Which of Newton's three laws of motion are applicable here?

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Using your three variables [*mass of Wally the astronaut (m_w) , magnitude of propulsion force from fire extinguisher (F_{Net}) and duration of propulsion force from fire extinguisher (time, Δt)*] by holding two constant and varying only one at a time create data sets for five trials of each variable.

Create graphs for:

(1) (F_{Net})(time Δt) vs. speed of Wally
(2) F_{Net} vs. speed of Wally
(3) m_W vs. speed of Wally

Compare your graphs to the momentum of Wally.

End of simulation experiment.

Use your data collected to prepare your lab report.