

Exploring Momentum & Impulse using video games

Part 1
(momentum)

1st Trial Vehicle type: _____ Weight _____ convert to kg _____

Initial Speed/velocity _____ convert to m/s _____ Final Speed/velocity _____ convert to m/s _____

Time difference: _____ (the change in time to go from initial to final as seen on game)

Object interacting with above vehicle (this one must be stationary):

What made the vehicle's speed change?

How did the above occurrence cause the speed to change?

2nd Trial Vehicle type: _____ Weight _____ convert to kg _____

Initial Speed/velocity _____ convert to m/s _____ Final Speed/velocity _____ convert to m/s _____

Time difference: _____ (the change in time to go from initial to final as seen on game)

Object interacting with above vehicle (this one must be moving- replicate above information):

What made the vehicle's speed change?

How did the above occurrence cause the speed to change?

What do you notice about the change in speed/velocity of the above two trials?

What (if anything) could you do to reduce or increase the change in the speed or velocity?

Describe how the change(s) would be experienced by the occupants of the above vehicles:

1st Trial p (momentum) = m (mass) V (velocity)

Calculate $p = mv$, before the collision:

Calculate $p = mv$, after the collision:

Calculate the difference between the two (initial-final). Explain what it represents to you.

2nd Trial p (momentum) = m (mass) V (velocity)

Calculate $p = mv$, before the collision:

Calculate $p = mv$, after the collision:

Calculate the difference between the two (initial-final). Explain what it represents to you.

Part2 (impulse)

$$\mathbf{F} = \frac{\mathbf{m}\Delta\mathbf{v}}{t}$$

1st Trial

Using the change in time (Δt) from the game and the difference in momentum solve for the force acting on the car.

2nd Trial

Using the change in time (Δt) from the game and the difference in momentum solve for the force acting on the car.

What does the above force represent on each car?

What would happen if the force increased or decreased?