Impulse

IB PHYSICS | ENERGY & MOMENTUM

IB Physics Data Booklet

Sub-topic 2.4 – Momentum and impulse p = mv $F = \frac{\Delta p}{\Delta t}$ $E_{\rm K} = \frac{p^2}{2m}$ Impulse = $F\Delta t = \Delta p$

Remember Work?

Work = Force × Distance



Introducing Impulse





Impulse

Work \rightarrow Change in Energy Impulse \rightarrow Change in ____

What about Units?

IB Physics Data Booklet

Sub-topic 2.4 – Momentum and impulse

p = mv $F = \frac{\Delta p}{\Delta t}$ $E_{\rm K} = \frac{p^2}{2m}$ Impulse = $F\Delta t = \Delta p$

Impulse and Momentum

Impulse can act to increase or decrease an object's momentum

Final Velocity 0 *m/s* Initial Velocity 0 m/s

Initial Velocity 0 m/s







How are these the same? different?





Impulse → Slowing Down



How can we decrease the force acting on an object?



Impulse and Momentum

Impulse = $F\Delta t = \Delta p$









Impulse to Speed Up



Should a cannon have a long or short barrel to produce to largest final velocity? Why?

Marshmallow Shooter



Marshmallow Shooter

Impulse = $F\Delta t = \Delta p$







What if the force isn't constant?



Remember how we found work done by a varying force?



Which impulse is larger?



The force matters!



Lesson Takeaways

- □ I can describe the meaning of impulse and how it is related to momentum change
- □ I can conceptually describe how to decrease the force experienced in a collision
- I can determine the impulse of a collision from a force vs time graph