

Unit 06 – Vocabulary and Equations – Impulse & Momentum

<p><u>Vocabulary:</u> previous vocabulary internal energy elastic collision, perfectly inelastic collision conservation of momentum conservation of energy deformation energy, internal energy</p>	<p><u>Symbols:</u> p, m, v,</p> <p><u>Equations & constants:</u> You get these on test: $v = \frac{\Delta x}{\Delta t} \qquad a = \frac{\Delta v}{\Delta t} \qquad 1 \text{ mi.} = 1609 \text{ m} = 5280 \text{ ft}$ $1 \text{ m/sec} = 2.24 \text{ mph}$ $0.4536 \text{ kg} = 1 \text{ lb}$ $\Delta x = v_0 \Delta t + \frac{1}{2} a t^2, \quad v_f^2 = v_i^2 + 2a \Delta x$ $v = v_0 + a \Delta t \quad (v \text{ means } v_f)$ $v_x = v \cos \Theta, \quad \Delta x = v_x t, \quad v_i = v \sin \Theta, \quad \Delta y = v_y t$ $F = ma \quad F_f = \mu F_n \quad p = mv \quad I = \Delta P = F \Delta t$ $W = Fd \quad P = W/t \quad PE = mgh = mg \Delta y \quad KE = \frac{1}{2} mv^2$ $W = \frac{1}{2} kx^2 \quad F = kx$ $1 \text{ hp} = 746 \text{ W}, \quad 3,600,000 \text{ J} = 1 \text{ kW-hr}, \quad 1 \text{ lb} = 4.45 \text{ N}$ $m_{1i}v_{1i} + m_{2i}v_{2i} = m_{1f}v_{1f} + m_{2f}v_{2f}$ $\frac{1}{2}m_{1i}v_{1i}^2 + \frac{1}{2}m_{2i}v_{2i}^2 = \frac{1}{2}m_{1f}v_{1f}^2 + \frac{1}{2}m_{2f}v_{2f}^2$</p>
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Unit Objectives - Williams

1. I understand all the vocabulary & math of this unit and all demos, videos, equations, and class assignments.
2. I remember objectives & vocabulary from previous units.
3. I can compute momentum, know it's conserved in isolated systems and can contrast it with impulse and KE
4. Using momentum conservation, I analyze collision problems, finding final velocity & internal energy, etc.
5. A collision is not required for one object to affect the momentum of another, as in gravitational field forces
6. I can critically analyze collisions data and distinguish between elastic and perfectly inelastic collisions
7. I understand what impulse is and can apply it to find applied forces, contact times, etc.
8. I can use principles of impulse and momentum to understand the effects of longer collision times on forces
9. Using momentum, I can discuss the effect mass has on forces and energies exerted upon colliding objects of different masses
10. I know the units for momentum and know how these units differ from the units for energy
11. I know equal impulses don't mean equal consequences and can apply this in real situations, like landing on a cushion or a semi truck crashing into a car
12. I can analyze impulse and momentum equations from graphical information

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301. I can identify momentum as the product of mass and velocity.
302. I can calculate the change in momentum (impulse) of one object which is acted on by a net external force.
303. I can analyze the momentum of a system of objects in one dimension.
304. I can distinguish between elastic and inelastic collisions
305. I can solve problems using conservation of momentum where the net external force is zero.
406. I can identify that energy is transferred between different forms
411. I can differentiate between conservation of momentum and conservation of energy.