Australia Curriculum – Senior Physics

Unit 2 – Linear Motion and Force

Mathematical representations and relationships

- $v = u + at$, $s = ut + \frac{1}{2}at^2$, $v^2 = u^2 + 2as$

  s= displacement, t = time interval, u= initial velocity, v= final velocity, a= acceleration

- $a = \frac{F}{m}$

  a = acceleration, F = force, m = mass

- $W = \Delta E$; where the applied force is in the same direction as the displacement, $W = Fs$,
- W = work, F = force, s = displacement, ΔE = change in energy
- $P = mv$, $\Delta p = F\Delta t$

  p = momentum, v = velocity, m = mass, F = force, Δp = change in momentum,

  Δt = time interval over which force F acts

- $E_k = \frac{1}{2}mv^2$

  E_k = kinetic energy, m = mass, v = speed

- $\Delta E_p = mg\Delta h$

  ΔE_p = change in potential energy, m = mass, g = acceleration due to gravity,
  Δh = change in vertical distance

- $\Sigma mv_{before} = \Sigma mv_{after}$

  Σmv_{before} = vector sum of the momenta of all particles before the collision,
  Σmv_{after} = vector sum of the momenta of all particles after the collision

- For elastic collisions: $\Sigma\frac{1}{2}mv^2_{before} = \Sigma\frac{1}{2}mv^2_{after}$

  $\Sigma\frac{1}{2}mv^2_{before}$ = sum of the kinetic energies before the collision,
  $\Sigma\frac{1}{2}mv^2_{after}$ = sum of the kinetic energies after the collision

The above formulae can also be found on the Australian Curriculum website for Senior Physics Unit 2 (Yr 11 and 12)
URL: http://www.australiancurriculum.edu.au/SeniorSecondary/Science/Physics/Curriculum/SeniorSecondary#page=2
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Pratical examples of the above can be found at the association's Lesson Ideas page.