Chapters 4, 5 and 6 Force, Work and Power, and Momentum

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| Force:  **F = ma**  **Fg = mg (g = 9.8 N/kg on earth)**  **Ff = μFn ( = μmg)**  *Fg*  *m*  *g*  *F*  μ  m  g  *F*  *m*  *a* | Symbols and units:  *F* - force (N)  *m* - mass (kg) (g/1000 = kg)  *a* - acceleration (m/s/s)  *μ* - coefficient of friction |
| Work and Power:  *W*  *F*  *d*  **W = Fd = Fd(cosθ)**  **F = mg (lifting)**  **F = μmg (dragging)**  *W*  *P*  *t*    **P = Fv** | Symbols and units:  P - Power (W)  W - Work (J)  F - Force (N)  d - distance (m)  t - time (s)  m - mass (kg)  μ - coefficient of friction  1 HP = 745.7 W |
| Kinetic Energy:  **KE = ½mv2**  Potential Energy:  **PE = mgh**  Elastic (Spring) Potential Energy:  **PEelastic = ½kx2**  *o*  *e*  *i*    **Fd + mgh + ½mv2 = Fd + mgh + ½mv2** | KE - Kinetic Energy (J)  m - Mass (kg)  v - Velocity (m/s)  PE - Potential Energy (J)  m - Mass (kg)  g - 9.8 N/kg  h - Elevation (m)  PE - Potential Energy (J) (Stored in a spring)  k - Spring Constant (N/m)  x - Stretch/Compression Distance (m) |
| Momentum:  **p = mv**  **FΔt = impulse**  **FΔt = mΔv** | Symbols and units:  *p* - momentum (kg m/s)  m - mass (kg)  *v* - velocity (m/s)  *Δv* - change in velocity (m/s)  *Δt* - elapsed time (s) |