General announcements

Things we know so far

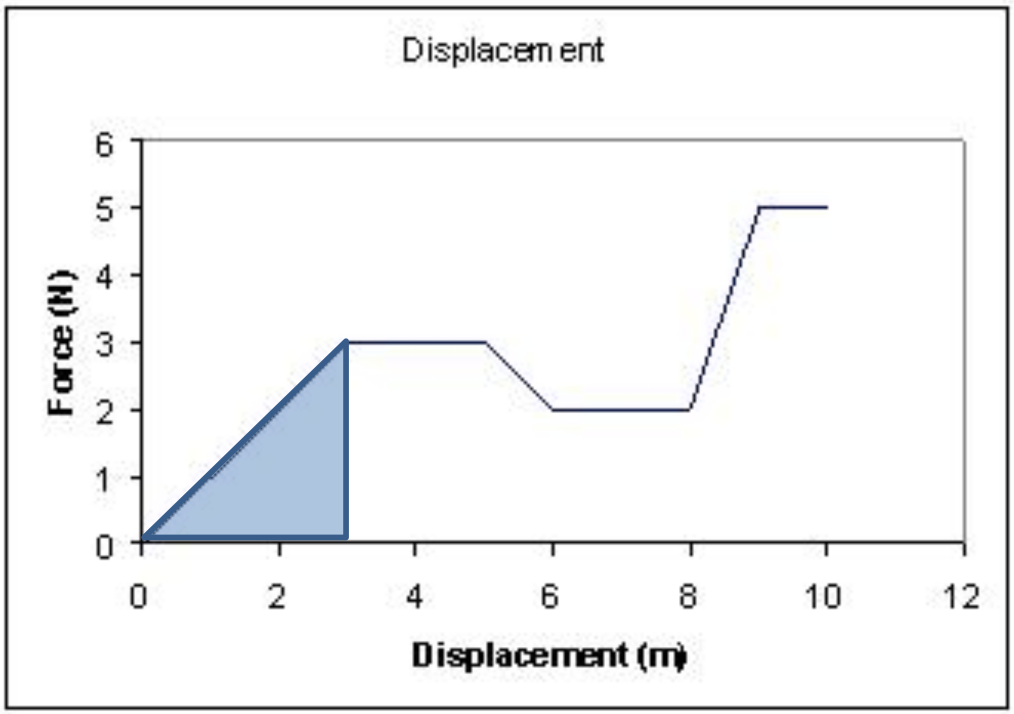
- Work-Energy Theorem: $W_{net} = \Delta KE$
- Total (mechanical) energy is $\sum KE + \sum U$ at any point
  - $KE = \frac{1}{2} mv^2$
- Gravity is a conservative force – does not change total energy
  - Its potential energy function is $U_g = mgy$
  - Does work $W_g = -(\Delta U_g)$
- Ideal springs also exert conservative forces
  - Spring potential energy function is $U_{spring} = \frac{1}{2}kx^2$
  - x is displacement from equilibrium position; k is spring constant
- Conservation of energy states:

$$E_1 + \sum W_{extraneous} = E_2$$

$$\left(\sum KE_1 + \sum U_1\right) + \sum W_{extraneous} = \left(\sum KE_2 + \sum U_2\right)$$

F-d graphs

- Given a graph of force vs displacement, how could you calculate the work done?



On an Fd graph, the work done in any segment is the area under the graph. To get net work, add up each segment!

What happens if the graph dips into –F territory? (-work is done)

Fd graph

- Given the force vs displacement graph below, determine:
  - (a) the work done for each segment of the graph (AB, BC, CD, DE)
  - (b) the net work done
  - (c) if the object has a mass of 1 kg and v = 1 m/s at x = 0, how fast is it moving at point C?