Topic 4B: Conservation of Energy

Skill 31: Conservation of Energy

In an ideal (frictionless) system all Mechanical energy is conserved

Frictionless: $E_T = PE + KE$ (remember PE can be gravitational or elastic)

In a system with heat (friction or internal energy) energy is conserved but may no longer be mechanical energy

With Friction: $E_T = PE + KE + Q$

In both cases (friction & frictionless) the total energy remains constant but gets redistributed. If friction is present include Q

Set up chart with a row for each time frame in scenario

Example

	E_T	= KE	+ PE	+ Q
Top				
Mid-pt				
Bottom				

Identify type of energy involved at any point and eliminate terms that are not present or equal to zero

For an object launched upward

- Initial KE equals final PE $KE_{Bottom} = PE_{Top}$ $\frac{1}{2}mv^2 = mgh$
- If launched by spring $PE_s = KE = PE$ $\frac{1}{2}kx^2 = mgh$

For a released from a height (dropped or frictionless slide)

- Initial PE equals final KE $PE_{Top} = KE_{Bottom}$ $mgh = \frac{1}{2}mv^2$
- If dropped on spring $PE_s = PE$ $\frac{1}{2}kx^2 = mgh$

Work done equals energy gained

- Work done on spring equals PE_s which equals KE launch or PE high pt. $W = PE_s = KE = PE$ $Fd = \frac{1}{2}kx^2 = \frac{1}{2}mv^2 = mgh$

wipe out any terms that are not involved.