

CONCEPT: CONSERVATION OF ENERGY EQUATION WITH NON-CONSERVATIVE FORCES

- If NON-conservative forces do work ($W_{NC} \neq 0$), Mech. Energy is _____ conserved.

- However, still use the **Conservation of Energy** equation to solve these problems!

Conservative Forces		Non-Conservative Forces	
Gravity	Springs	Applied	Friction

$$K_i + U_i + \text{_____} = K_f + U_f$$

(Conservation of Energy)

$$W_{NC} = \text{_____}$$

- W_{NC} is simply the _____ of work done by any applied forces + friction.

EXAMPLE: A 0.5 kg hockey puck is initially moving along the smooth ice at 4m/s. Using your hockey stick, you push the puck with a constant 200N through a distance of 0.3m. Calculate the puck's final speed.

CONSERVATION OF ENERGY

- 1) Draw Diagram
- 2) Write Cons. of Energy EQ
- 3) Eliminate & expand terms
- 4) Solve

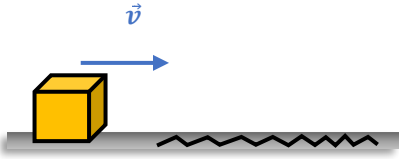
WORK & ENERGY

$$W = Fd\cos\theta$$

$$W_{FA} = F_A d\cos\theta$$

$$W_{fk} = -f_k d$$

PROBLEM: A block of unknown mass is sliding along a flat surface with 30m/s when it enters a long, rough patch. If the coefficient of friction between the block and the floor is 0.6, calculate the distance the block travels before stopping.



CONSERVATION OF ENERGY

- 1) Draw Diagram
- 2) Write Cons. of Energy EQ
- 3) Eliminate & expand terms
- 4) Solve

- Whenever **M.E.** isn't conserved, **W_{NC}** always makes up the difference. **W_{NC}** = energy added/removed from system

PROBLEM: An 800kg car skids to a stop from 30m/s through a distance of 90m. Calculate the coefficient of friction between the car and the road.

CONSERVATION OF ENERGY

- 1) Draw Diagram
- 2) Write Cons. of Energy EQ
- 3) Eliminate & expand terms
- 4) Solve

PROBLEM: A 2-kg object dropped from a height of 80m reaches the floor with 30m/s. Using Energy Conservation, calculate **a)** the amount of work done by air resistance, and **b)** the average force of air resistance.

CONSERVATION OF ENERGY

- 1) Draw Diagram
- 2) Write Cons. of Energy EQ
- 3) Eliminate & expand terms
- 4) Solve

- We can use Energy Conservation to solve problems with “resistive” forces like air/water resistance, which act like friction!