

Chapter 8



Conservation of energy

Conservation of Energy



• ***Energy is conserved***

- This means that energy cannot be created nor destroyed.
- If the total amount of energy in a system changes, it can only be due to the fact that energy has crossed the boundary of the system by some method of energy transfer.

Conservation of Mechanical Energy

3

The mechanical energy E is the sum of the kinetic energy and potential energy:

$$E = K + U$$

Conservation of Mechanical Energy

4

“For a system with only conservative forces acting, the mechanical energy remains constant.”

- $\Delta E_{mech.} = 0$
- $E_i = E_f$
- $\Delta K = -\Delta U$
- $K_i + U_i = K_f + U_f$

Changes in Mechanical Energy for Nonconservative Forces

5

When work is done by non-conservative forces (W_{nc}) and conservative forces (W_c), then; the work done by all non-conservative forces equals the change in the total mechanical energy of the system.

$$W_{nc} = \Delta E$$

Situations Involving Kinetic Friction

6

Friction is a non-conservative force. So, if friction is present, we have:

$$W_{nc} = \Delta E$$

$$-f_k d = \Delta E$$