ENERGY

Mechanical Energy & Conservation of Energy

Lufkin HS

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Review Terminology Correlation

- GPE = Gravitational Potential Energy
  - U_g = PE_g = Gravitational Potential Energy
  - PE = Potential Energy
- KE = Kinetic Energy
- W = Work
- F = Force
- d = Displacement (distance sometimes)
- Δ = Change in; final minus initial
- P = Power

Review Equations for Energy

- $KE = \frac{1}{2} mv^2$
- $GPE = mgh$
- $W = Fd$
- $W = \Delta KE = KE_f - KE_i$
- $KE_i + GPE_i = KE_f + GPE_f$
- $P = W/t = Fd/t = Fv = \Delta KE/t$

Review: Work – Kinetic Energy Theorem No Friction

- Work ($W = F\Delta d$) will change the energy of the system
- Net work is equal to the change in kinetic energy.
  - $W_{net} = \Delta KE = KE_f - KE_i$

Mechanical Energy of a System

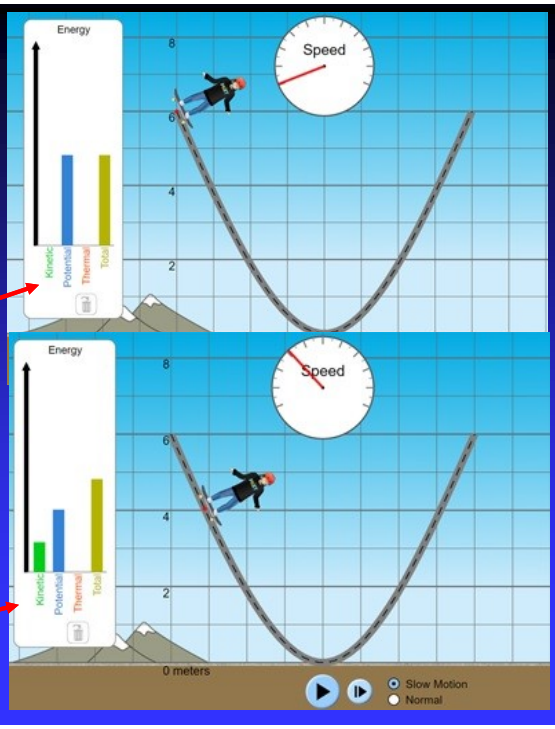
- Mechanical Energy is the sum of the potential energy and the kinetic energy of a system.
- Since energy cannot be destroyed but only converted then the energy of a system is constant (even with friction).
- Equation:
  - $ME = KE + PE$

Mechanical Energy & Conserved Relationship

- Since the energy you start with you must end with the same amount, we have the following equations.
  - $ME_i = ME_f$
  - $KE_i + GPE_i = KE_f + GPE_f$
  - Please note: all terms must not be present at all times in that some can be zero.

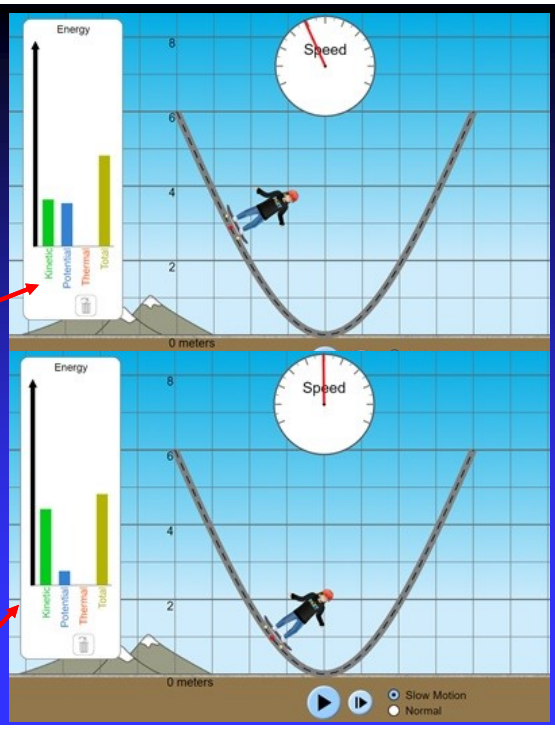
Skate Park Example of Conservation of Energy

- Looking at the bar chart of the top image notice the total energy is equal to the potential energy.
- Looking at the bar chart of the bottom image notice the total energy is now equal to the potential energy plus the kinetic energy.



Skate Park Example of Conservation of Energy

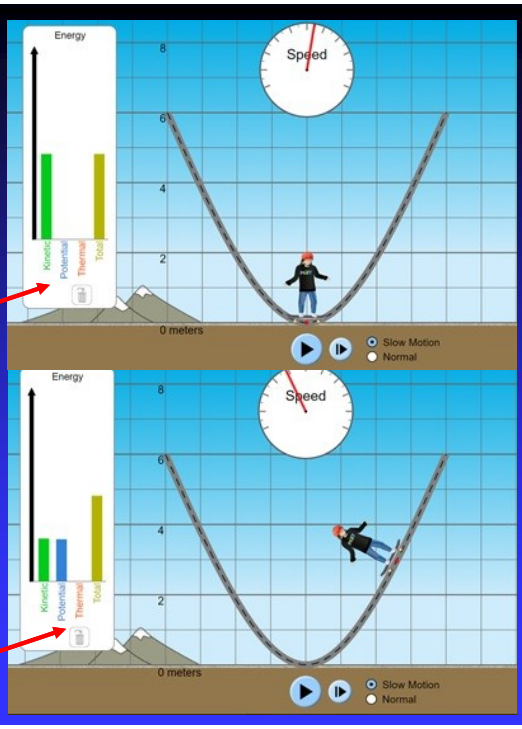
- Looking at the bar chart of the top image, what is happening to the kinetic energy and the total energy.
- Looking at the bar chart of the bottom image when the skater is nearly at the bottom, what has happened to the potential energy and the total energy?



Skate Park Example of Conservation of Energy

Looking at the bar chart of the top image, what is happened to the KE, PE, and the total energy.

Looking at the bar chart of the bottom image when the skater is half up the other side, what has happened to the KE, PE, and the total energy?



Now for Skate Park in the TI Calculator and later if you want on you phone.

- https://phet.colorado.edu/sims/html/energy-skate-park-basics/latest/energy-skate-park-basics_en.html
- http://sites.lufkinisd.org/arduke/