Potential Energy

- Kinetic Energy ($K$) is the energy of motion.
  \[ K = \frac{1}{2}mv^2 \]

- Potential Energy ($U$) is a storage system for energy.
  - Gravitational Potential Energy depends on weight and height, $h$, but it is independent of horizontal position.
  \[ U_g = mgh \]
  - Potential energy stored in a spring
  \[ U_s = \frac{1}{2}kx^2 \]

Conservation of Mechanical Energy

- Mechanical Energy is the sum of the potential and kinetic energies of an object.
  \[ E = K + U \]

- In systems with conservative forces only, the mechanical energy $E$ is conserved.
  \[ E_i = E_f \]

Conservation of Energy

Use the law of conservation of energy (assume no friction) to fill in the blanks at the various marked positions for a 1000 kg roller coaster car.

Bar Chart Illustrations

One tool which can be utilized to express an understanding of the work-energy theorem is a bar chart. A work-energy bar chart represents the amount of energy possessed by an object by means of a vertical bar. A bar is constructed for each form of energy and the length of the bar is representative of the amount of energy present.
Conservation of Energy

![Diagram of a person skiing down a hill with a chart showing energy changes: KE, PE, W, and TME.](Image)

**WORK-ENERGY CALCULATIONS WORKSHEET**

- **Height – 8.0 m**
- **Speed – 29.4 m/s**

**Physics Interactives**

- Work and Energy
- Chart That Motion

---

**PHYSICS 1**

March 05, 2019