# Kinetic and Potential Energy





- Energy of moving things
  - The faster something is traveling the more kinetic energy it has
- Variable: KE
- Unit: Joules (J)
- Formula:  $KE = \frac{1}{2} m v^2$

- Examples
- 1. What is the kinetic energy of a 65kg skier moving at 7m/s?

$$V_{2} = V_{2} m v^{2}$$
  
 $V_{2} = (0.5)(65kg)(7mls)(7mls)(7ml))$   
 $V_{3} = (593)$ 



Examples What is the mass of an ice skater that has 625J of 2. kinetic energy and is traveling at 5m/s? 6255 $\frac{1}{1} \sqrt{L} = \frac{1}{(\delta \cdot S)(Sml)(Smls)}$ DKG



Examples
 How fast is a 3kg ball rolling if it has 37.5J of kinetic energy?
 v = v (KE / (½ m)) = v (37.5J / ((0.5)(3kg))) = 5m/s





# Potential Energy



# Potential Energy

- Energy stored
  - Stored due to shape = elastic potential energy
    - More stretched/compressed = greater energy
  - Stored due to position = gravitational potential energy
    - Higher = greater energy
- Variable: PE (PEe or PEg)
- Unit: Joules (J)
- Formula: PEg = mgh





#### Potential Energy

• Examples

How much gravitational potential energy does a
 4kg cat have while sitting on a shelf that is 2m high?

25

 $PE = m_{0}h = (U|k_{3})(q.8m/)(2m)$ 

PZ = -78.45



 $g = 9 \cdot \sqrt{100}$ 

# Potential Energy 0=7.8m/5

• Examples

0

2. What is the mass of a box that has 60J of potential energy while on a table that is 0.5m high?

6 C

P25

 $(7 \cdot (m/r)) (\partial \cdot (m))$ 

- 2.0



# Potential Energy 9 = 7 . 8 m/s

• Examples 3. How far above the ground is a 0.5kg bird with 20J of potential energy? P = 20 M = 0M = 0



# Conservation of Energy

- As an object falls, it trades off decreasing gravitational potential energy for increasing kinetic energy (until it hits terminal velocity)
  - This allows us to set the two formulas equal to each other\_\_\_\_\_\_

 $1/2mv^2 = mgh$ 



Conservation of Energy V= 147m3 Example A 1.2kg rock was dropped from a height of 2.5m. Assuming that 100% of the original gravitational potential energy was converted to kinetic energy, how fast was the rock traveling the instant before it struck the ground?  $(1.3K5)(9.5mls^2)(3.5m) =$  $(0.7)(1.2)(\sqrt{\sqrt{2}})$ 

