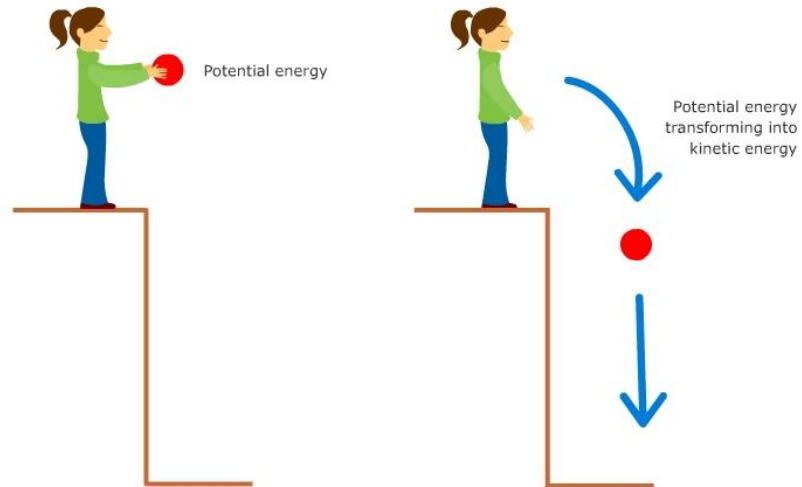
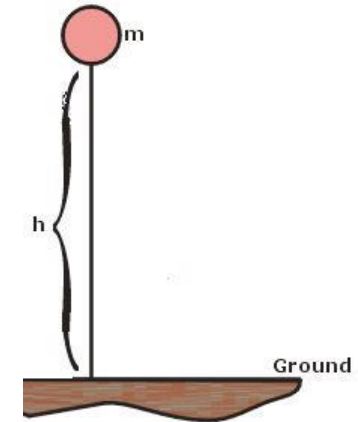


# CALCULATIONS INVOLVING POTENTIAL & KINETIC ENERGY



# GRAVITATIONAL POTENTIAL ENERGY

- Is the energy possessed by an object due to its height relative to some other surface.
- It is directly proportional to its mass, its height, and gravitational field



st  $E_g = mgh$  where  $m = \text{mass (kg)}$

$g = \text{gravitational field strength (9.8 N / kg)}$

$h = \text{height (m)}$



## EXAMPLE 1

- A 3.0 kg cat is perched on a 2.0 m high shelf.  
What is the cat's gravitational potential energy?



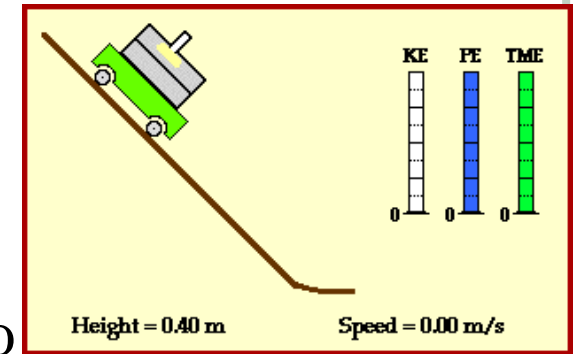
## EXAMPLE 2

- A diver on a diving board at a height of 5.0 m dives into the water experiencing a loss in gravitational potential energy of 2655 J. What is the diver's mass?



# KINETIC ENERGY

- Is the energy possessed by an object in motion
- The amount of kinetic energy possessed by an object proportional to its mass and to the square of its speed<sup>1</sup>



$$E_k = \frac{1}{2}mv^2 \quad \text{where } m = \text{mass (kg)}$$

$$v = \text{speed (m/s)}$$



## EXAMPLE 3

- A 2500.0 kg car is travelling at 80.0 km/h (22.222 m/s). What is its kinetic energy?



## EXAMPLE 4

- A runner of mass 59 kg possesses a kinetic energy of 1.3 kJ. What is her speed?



## EXAMPLE #5

- A 65 kg diver performs a handstand dive from a 10.0 m high platform. Determine his speed 3.0m below the platform and his speed when he hits the water.

