

# Potential Energy

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## Mechanical Energy

Mechanical energy is the combination of kinetic and potential energy

- ▶ Kinetic Energy (KE)
- ▶ Energy of Motion
- ▶ Potential Energy (PE)
- ▶ Energy that is stored and held in readiness.
- ▶ It has the POTENTIAL to do work.
- ▶ Calculated as Gravitational Potential Energy

$$KE = \frac{1}{2} mv^2$$

$$PE = \text{weight} \times h$$

$$PE = mgh$$

## Factors Affecting PE

- ▶ Potential energy of an object is stored energy.
- ▶ PE is based on 3 factors:
  - The mass of the object... (in kg)
  - The height of the object... (in m)
  - Gravity pulling down on the object... ( $g=9.8 \text{ m/s}^2$ )

$$PE = mgh$$

- If you have Newtons, then gravity is already included.

$$PE = \text{weight} \times h$$

$$F_w = mg$$

## PE Examples

The higher the ball, the greater the potential energy.

The more the bow is pulled back, the greater the potential energy.

## Which has more PE

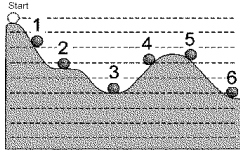
- ▶ A tall rollercoaster at the top of a 100 meter tall drop or an identical rollercoaster at the top of a 40 m tall drop.

## Which has more PE?

- ▶ A 200 kg wrecking ball or a 50 kg wrecking ball from the same height?

## PE

- ▶ Potential energy calculations...
- ▶ The ball accelerates down the hill. When is the PE the greatest? The least?



## PE Calculations

- ▶ **4)** calculate the PE of a 5kg object sitting on a ledge 3 m above the ground.  $PE = mgh$   $m = \frac{PE}{gh}$   $h = \frac{PE}{mg}$
- ▶ **7)** How high up is a 3 kg object if it has 300 J of PE?
- ▶ A bungee jumper has 82,320 J of PE. If he jumps from a height of 80 meters, what is his mass?