**Gravitational Potential Energy (GPE)**

* Work done to lift object subject to gravity (at constant velocity)
* W = Fd = GPE = m\*g\*h (mass times acceleration of gravity times the height)
* g = 9.8 meters/speed2 = acceleration of gravity (reference value)
  + The rate that which the object picks up speed

**Trends**

* Mass ⇡ → GPE ⇡
* Height ⇡ → GPE ⇡

**(Total) Energy “E”**

* E = KE (kinetic energy) + GPE (Gravitational Potential Energy)
* E = mv2 + (m\*g\*h)

**Law of Conservation Energy (LCE)**

* If gravity is the only force, then E (total energy) stays constant during motion
* EX 1)
  + Drop ball (no air)
    - Velocity ⇡→ Kinetic Energy ⇡
    - Height ⇣→ Gravitational Potential Energy ⇡
* But: <E = KE + GPE> stays constant
  + (Both KE and GPE are changing)

**SI Unit of Energy**

* Joule → J = kg\*()2

Illus: Drop ball: no air

* Mass = 10 kg
* Height = 10 m
* Question: What is the KE of ball when at 6m above the ground?

|  |  |  |  |
| --- | --- | --- | --- |
| Height (m) | Kinetic Energy (J) | GPE (J) | Total Energy(J) |
| 10 [release] | 0 [velocity = 0] | 10\*10\*10 = 1000 | 1000 |
| 6 [after release] | |  | | --- | | ? | | 400 | | 10\*10\*6 = 600 | 1000 |

* As ball falls to the ground
  + KE ⇡→ GPE ⇣
  + When it gets closer and closer to the ground, the force of gravity decreases as it is getting closer to the center of the Earth.