Gravitational Potential Energy

(Energy Due to Position)

$$E_g = mgh$$

E_g -> gravitational potential energy (J)
m -> mass (kg)
g -> magnitude of acceleration due to gravity (m/s^2)
h -> magnitude of object's position relative to reference or zero line* (m)

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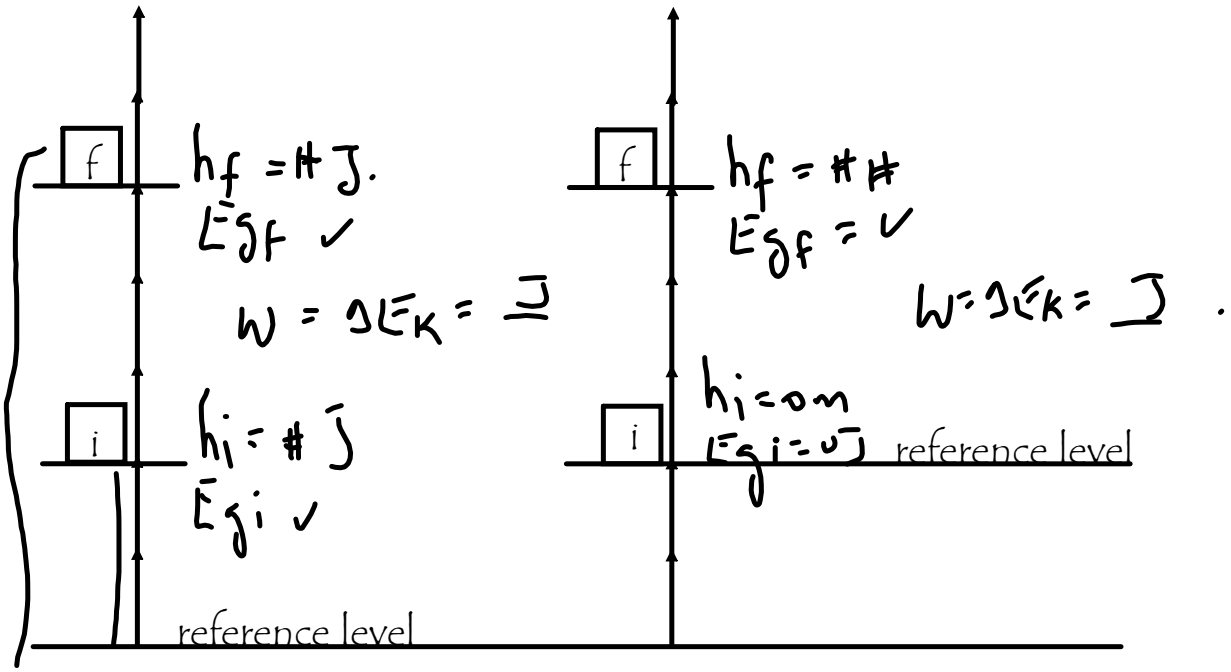
* A reference level must be stated when solving problems involving gravitational potential energy.

* Use a negative h value if the object is below the reference level.

Reference/Zero Lines

For all forms of potential energy, there is **no absolute zero position or condition**. You must establish a **reference line** or **zero line** to determine the potential energy or change in potential energy of an object.

Let $m = 1.0$ kg



Work-Gravitational Potential Energy Theorem

Work done on an object may change its gravitational potential energy.

$$W = \Delta E_g$$

* a reference level must be stated.

$W = Fd = \Delta E_g$

$= E_{gf} - E_{gi}$

$= mgh_f - mgh_i$

$= mg(h_f - h_i)$

$= mg\Delta h$

W and ΔE_g will be negative if an object loses gravitational potential energy.

$W = \Delta E_g =$ (−) loss of E_g.