

Spring and oscillators

$$KE = \frac{1}{2}mv^2 \quad \text{or} \quad KE = \frac{1}{2}m(v_f^2 - v_i^2)$$

- **Kinetic energy** can only be positive this is because unlike potential it has mass in its equation and mass cannot be negative also kinetic can only spend or use the amount given so it going into the negatives would kind of mean it borrowed energy which is impossible

- **the energy work theorem**: this states that the net work done on an object is equal to its change in energy

$$W_{\text{net}} = \Delta E$$

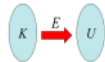
- **gravitational potential energy**: Potential energy caused by gravity

$$U = mgh \quad \text{or} \quad U = mg(h_f - h_i)$$

★ When you have more than one potential energy you can add them all up

- **Conservative Forces**: in a system that a conservative system no energy is wasted potential energy is fully converted to kinetic energy

$$PE + KE = E_{\text{total}}$$



No energy is leaving the system its only being converted

- $F = -\frac{dU}{dx}$: the negative derivative of potential energy will give you the Force to explain the meaning of negative derivative as you do is take the derivative of equation and distribute a negative sign