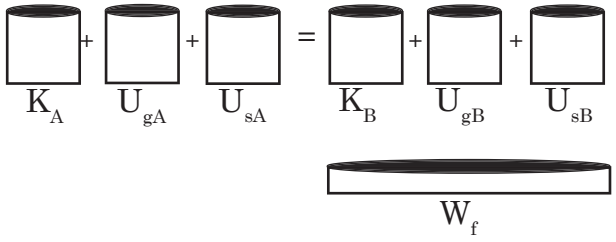
# CONSERVATION OF ENERGY MODEL

## LINEAR MODEL CONSERVATION OF ENERGY

### DRAW REFERENCE LINE

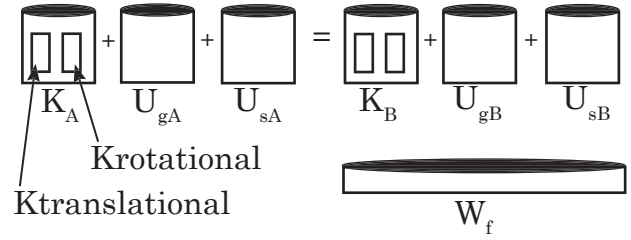
$E_A = E_B$




## ROTATIONAL MODEL CONSERVATION OF ENERGY

### DRAW REFERENCE LINE

$E_A = E_B$




## SUPPLEMENTAL EQUATIONS

$$K_t = \frac{1}{2}mv^2 \qquad U_g = mgh \qquad Us = \frac{1}{2}kx^2$$

$$W = \text{area under F vs. x curve} = \int F(x) \bullet dx = \Delta K$$

$$F = -\frac{dU}{dr} \qquad P = \frac{dW}{dt} = F \bullet v$$

$$K_r = \frac{1}{2}I\omega^2 \qquad v_{com} = r\omega$$

$$W = \text{area under } \tau \text{ vs. } \theta \text{ curve} = \int \tau(\theta) \bullet d\theta = \Delta K$$

$$P = \frac{dW}{dt} = \tau \bullet \omega$$

## SIMPLE HARMONIC MOTION

$$x(t) = x_m \cos(\omega t + \phi) \qquad \omega = \sqrt{\frac{k}{m}} = 2\pi f = \frac{2\pi}{T}$$

**MASS ON SPRING**

$$T = 2\pi\sqrt{\frac{m}{k}}$$

**SIMPLE PENDULUM**

$$T = 2\pi\sqrt{\frac{\ell}{g}}$$

**PHYSICAL PENDULUM**

$$T = 2\pi\sqrt{\frac{I}{mgh}}$$

## GRAVITATION

$$U_G = -\frac{Gm_1m_2}{r}$$