

## Conservation of Energy

### Gravitational Potential Energy

$$V_g = \begin{cases} W \cdot y_G & \text{when } y_G > 0 \\ -W \cdot y_G & \text{when } y_G < 0 \end{cases}$$

### Elastic Potential Energy

$$V_e = \frac{1}{2} k s^2$$

$$\Rightarrow V = V_g + V_e$$

$$\Rightarrow \begin{cases} T_1 + V_1 + (\sum U_{1-2})_{\text{non conservative forces}} = T_2 + V_2 \\ T_1 + V_1 = T_2 + V_2 \quad \text{for conservative forces.} \end{cases}$$