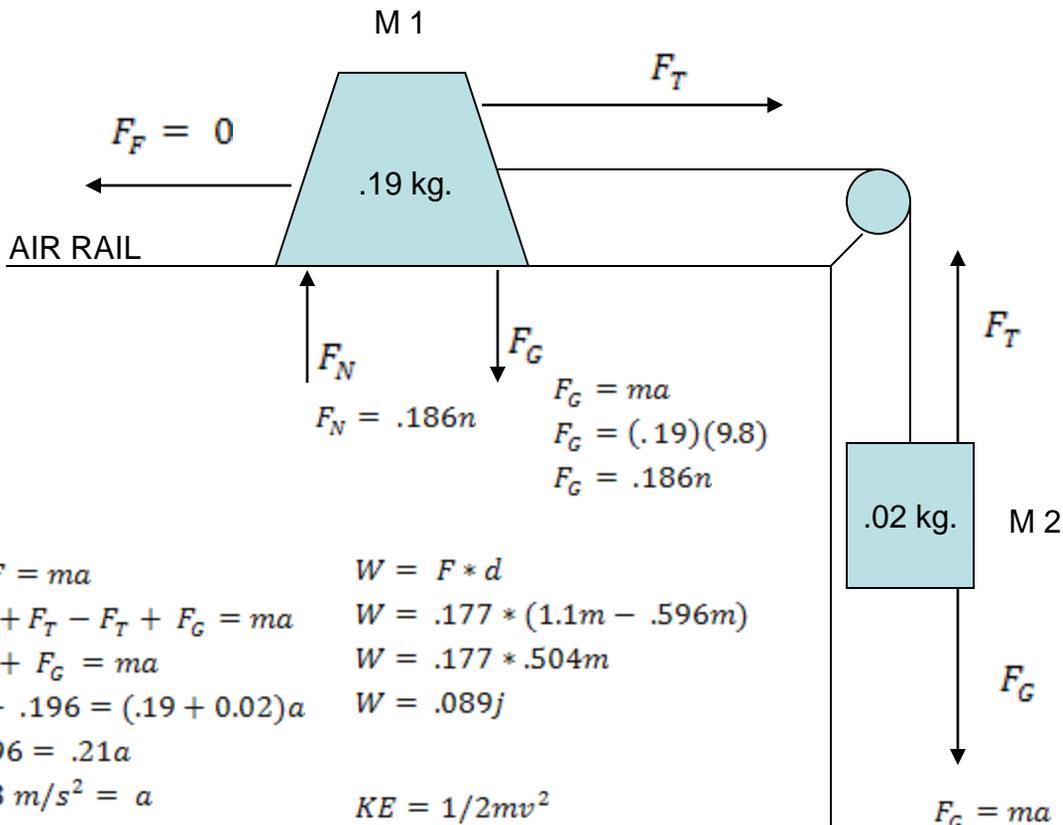


# Frictionless system



$$\begin{aligned} \sum F &= ma \\ F_F + F_T - F_T + F_G &= ma \\ F_F + F_G &= ma \\ 0 + .196 &= (.19 + 0.02)a \\ .196 &= .21a \\ .93 \text{ m/s}^2 &= a \end{aligned}$$

$$\begin{aligned} v &= \frac{x}{t} \\ v &= \frac{0.1m}{.105s} \\ v &= .95 \text{ m/s}^2 \end{aligned}$$

$$\begin{aligned} W &= F * d \\ W &= .177 * (1.1m - .596m) \\ W &= .177 * .504m \\ W &= .089j \end{aligned}$$

$$\begin{aligned} KE &= 1/2mv^2 \\ KE &= 1/2 (.19)(.95)^2 \\ KE &= 1/2 (.19)(.90) \\ KE &= .086j \end{aligned}$$

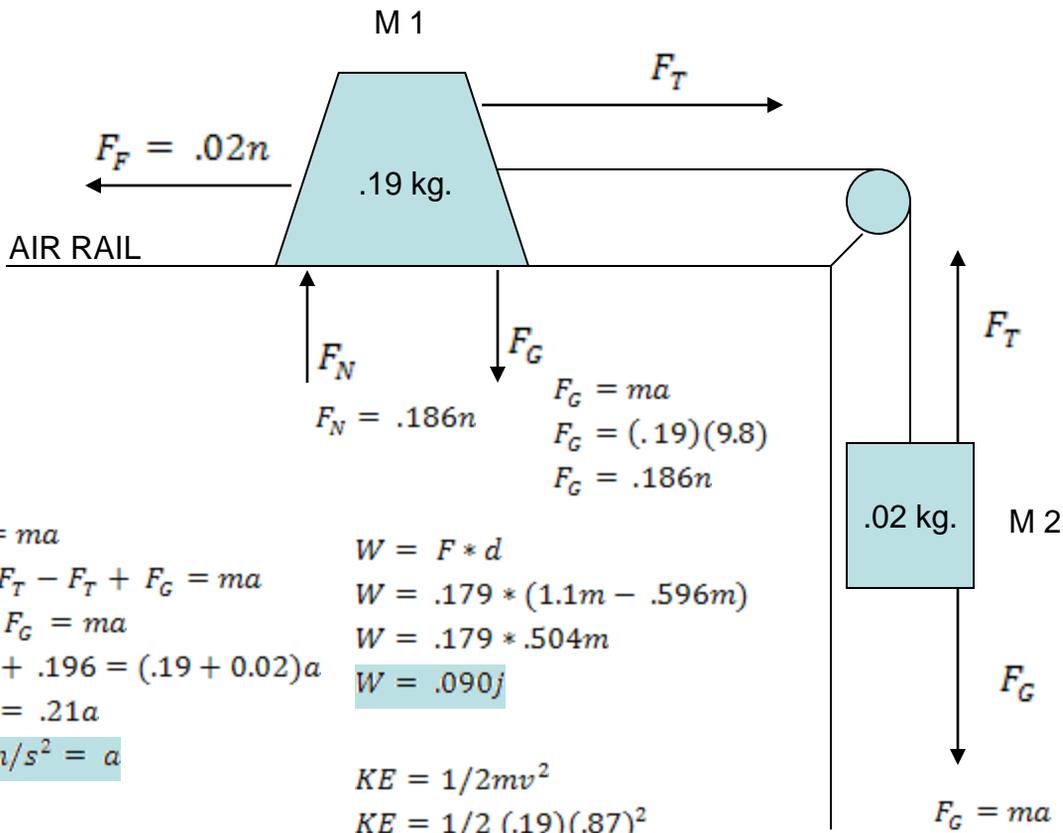
$$\begin{aligned} F_G &= ma \\ F_G &= (.19)(9.8) \\ F_G &= .186n \end{aligned}$$

$$\begin{aligned} F_G &= ma \\ F_G &= (.19)(9.8) \\ F_G &= .186n \end{aligned}$$

$$\begin{aligned} \sum F &= ma \\ -F_T + F_G &= ma \\ -F_T + .196 &= .02 * .93 \\ -F_T + .196 &= .0186 \\ -F_T &= -.177 \\ F_T &= .177 \end{aligned}$$

$$\begin{aligned} PE &= mgy \\ PE &= (.02)((9.8)(.504) \\ PE &= .099j \end{aligned}$$

# Friction Added



$$\sum F = ma$$

$$F_F + F_T - F_T + F_G = ma$$

$$F_F + F_G = ma$$

$$-.02 + .196 = (.19 + 0.02)a$$

$$.176 = .21a$$

$$.84 \text{ m/s}^2 = a$$

$$W = F * d$$

$$W = .179 * (1.1\text{m} - .596\text{m})$$

$$W = .179 * .504\text{m}$$

$$W = .090\text{j}$$

$$KE = 1/2mv^2$$

$$KE = 1/2 (.19)(.87)^2$$

$$KE = 1/2 (.19)(.76)$$

$$KE = .072\text{j}$$

$$v = \frac{x}{t}$$

$$v = \frac{0.1\text{m}}{.115\text{s}}$$

$$v = .87 \text{ m/s}^2$$

.115s = guess

$$F_G = ma$$

$$F_G = (.19)(9.8)$$

$$F_G = .186\text{n}$$

$$F_G = ma$$

$$F_G = (.19)(9.8)$$

$$F_G = .186\text{n}$$

$$\sum F = ma$$

$$-F_T + F_G = ma$$

$$-F_T + .196 = .02 \times .84$$

$$-F_T + .196 = .0168$$

$$-F_T = -.179$$

$$F_T = .179$$

$$PE = mgy$$

$$PE = (.02)((9.8)(.504))$$

$$PE = .099\text{j}$$