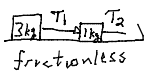


frictionless

$\mu_K = 0$

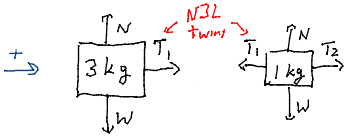
$\Rightarrow a$

Which is greater?

A) T_1

B) T_2

C) Both same



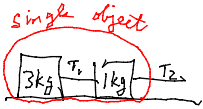
$T_1 = (3\,kg)a$

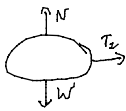
$T_2 - T_1 = (1\,kg)a$

$T_2 = T_1 + (1\,kg)a$

$T_2 = (3\,kg)a + (1\,kg)a$

$= (4\,kg)a$





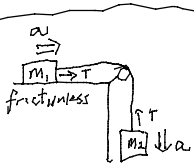
$F_{net} = T_2$

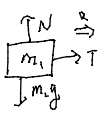
T_1 is an internal force and doesn't affect object as a whole

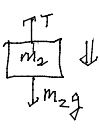
$F_{net} = ma$

$T_2 = (4\,kg)a$

Only external forces affect object's overall motion.







$T = m_1 a$

$m_2 g - T = m_2 a$

$m_2 g - m_1 a = m_2 a$

$m_2 g = (m_1 + m_2)a$

$$a = \frac{m_2}{m_1 + m_2} g$$

Try certain "limits" of m_1 & m_2

e.g suppose $m_1 = \bigcirc$

$$a = \frac{m_2}{0 + m_2} g = \frac{m_2}{m_2} g = g$$

Suppose $m_2 = \triangleright$

Try certain "limits" of m_1 & m_2

e.g suppose $m_1 = \bigcirc$

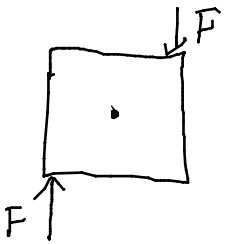
$\downarrow 9.8\ m/s^2$

$$a = \frac{m_2}{\bigcirc + m_2} g = \frac{m_2}{m_2} g = g$$

$= g$

Suppose $m_2 = \triangle$

$$a = \frac{\bigcirc}{m_1 + \bigcirc} g = \triangle$$



$F_{net} = 0$

but block spins!

$F_{net} = ma$

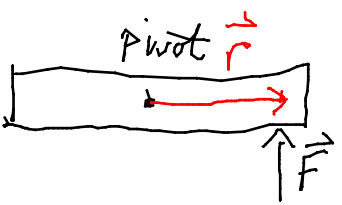
$a = 0$?

Here, a means acceleration of the center of mass

center is stationary, but block moves

Torque

- tendency of a force to cause rotation around an axis (3D) or a pivot (2D)



$\vec{r}$: "lever arm" vector from pivot to where the force is applied

IF $\vec{r} \perp \vec{F}$,

torque: $\tau = rF$ (tau)