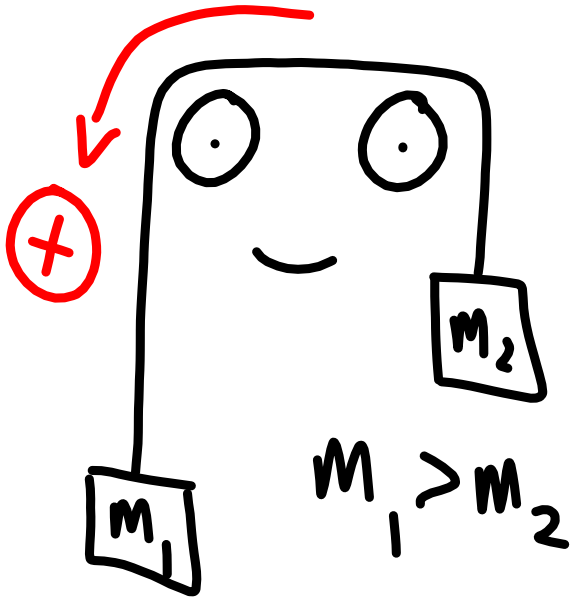
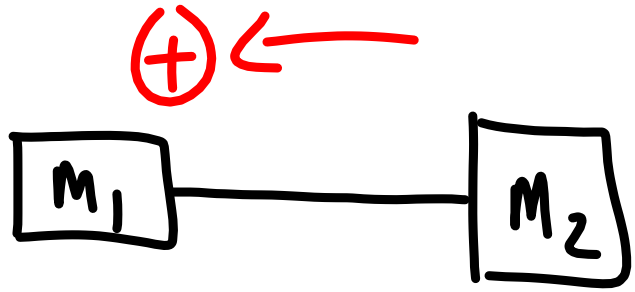
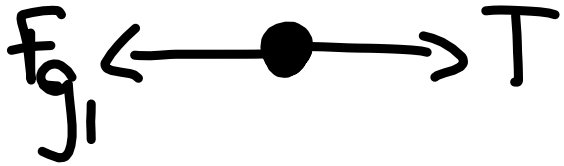
Atwood's Machine



$m_1 > m_2$



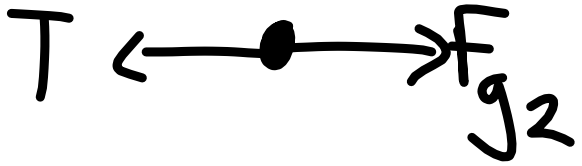
m_1



$\Sigma \vec{F}_1 = F_{g_1} - T = m_1 a$

$m_1 g - T = m_1 a$

m_2



$\Sigma \vec{F}_2 = T - F_{g_2} = m_2 a$

$T - m_2 g = m_2 a$

$m_1g - T = m_1a$

$T - m_2g = m_2a$

$-1(-T = m_1a - m_1g)$

$T = m_2a + m_2g$

$T = m_1g - m_1a$

$m_1g - m_1a = m_2a + m_2g$

$m_1g - m_2g = m_2a + m_1a$

$g(m_1 - m_2) = a(m_1 + m_2)$

$$g(m_1 - m_2) = a(m_1 + m_2)$$

$$\frac{g(m_1 - m_2)}{(m_1 + m_2)} = a$$

$$g\frac{(m_1 - m_2)}{(m_1 + m_2)}$$