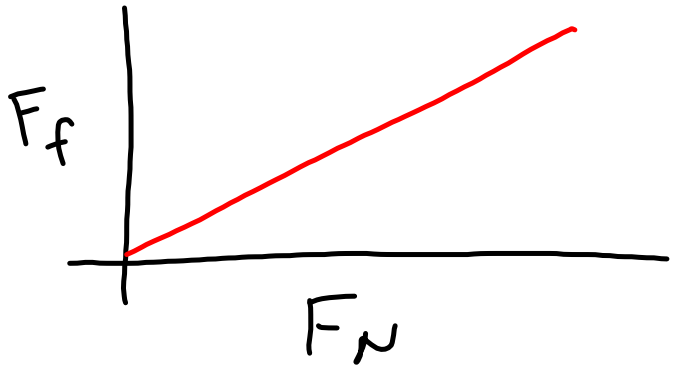
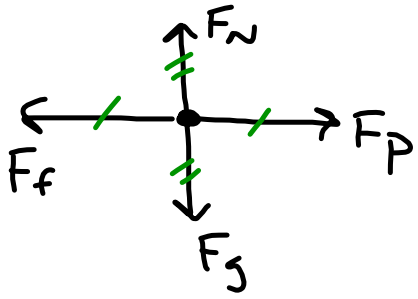
Lab – Friction

1) change mass
measure force it takes to make box move

2) change surface area
measure force it takes to make box move
(keep total mass the same!)

- Whiteboard:
  - Data
  - Graph → function of best fit; interpretation





$$\mu \equiv \frac{F_f}{F_N}$$

F_f → force of friction

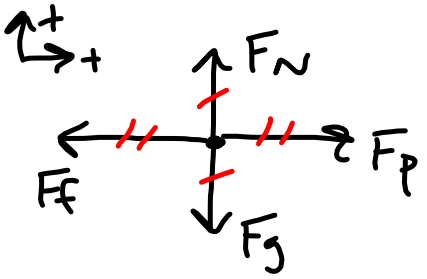
F_N → normal force

μ → coefficient of friction (Greek lowercase "mu")

NO units

Worksheet 5

1) a.



"constant speed" means no acceleration

b. $\mu = \frac{F_f}{F_N}$

$= \frac{50\,N}{300\,N}$

$= 0.167$

$\Sigma \bar{F}_x = \emptyset$

$F_p - F_f = \emptyset$

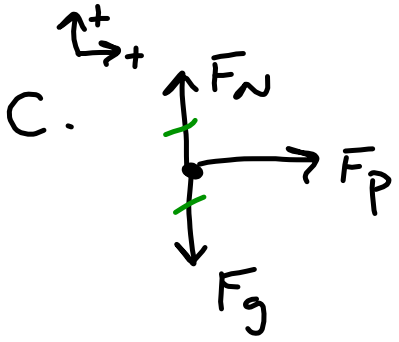
$F_p = F_f = 50\,N$

$\Sigma \bar{F}_y = \emptyset$

$F_N - F_g = \emptyset$

$F_N = F_g = 300\,N$

c.



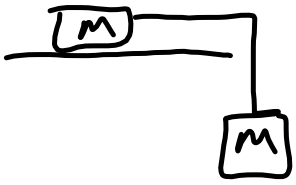
$\Sigma \bar{F}_x = m\bar{a}$

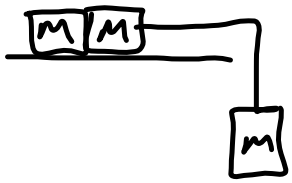
$F_p = ma$

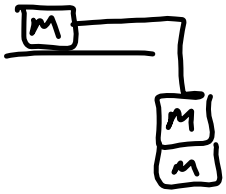
$a = \frac{F_p}{m} = \frac{50\,N}{30.6\,kg} = 1.67\,m/s^2$

$F_g = ma_g$

$m = \frac{F_g}{a_g} = \frac{300\,N}{9.8\,m/s^2} = 30.6\,kg$

a. 

b. 

c. 

What is the acceleration of each system?

$$a = \frac{\text{towing force}}{\text{total mass}}$$

a. $a = \frac{Ma_g}{2M} = \frac{a_g}{2} = 4.9\ m/s^2$

b. $a = \frac{Ma_g}{3M} = \frac{a_g}{3} = 3.27\ m/s^2$

c. $a = \frac{2Ma_g}{3M} = \frac{2a_g}{3} = 6.53\ m/s^2$