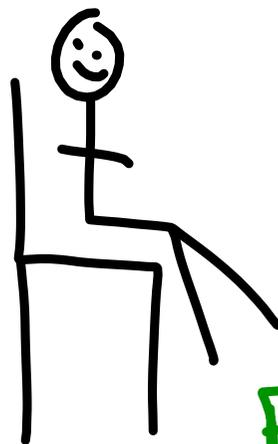


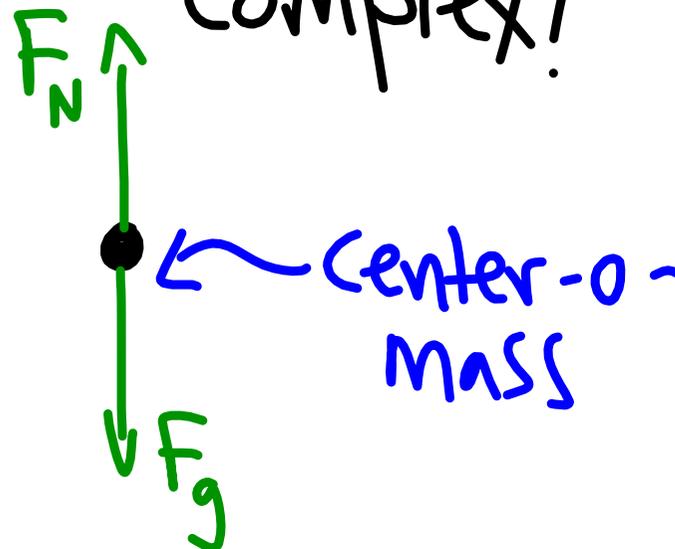
Forces - Represent with vectors

ex: you

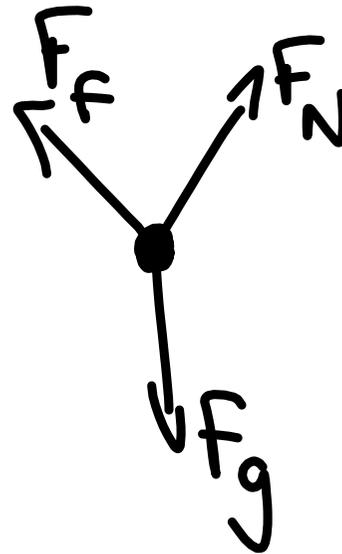
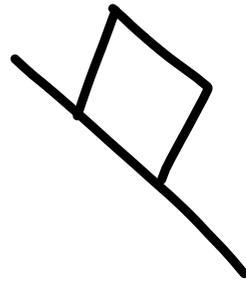
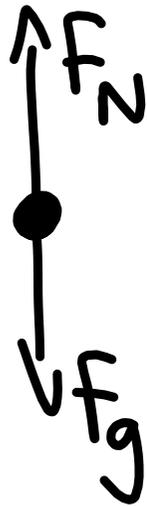


this is too complex!

we'll use this:

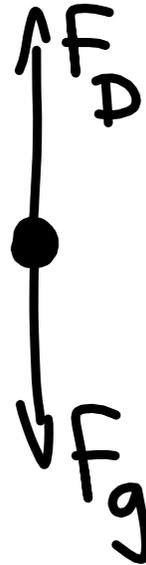


F_N = Normal force: a force exerted
 by an object that counters
 gravity.
 Perpendicular



Friction - force that opposes motion

ex: free fall



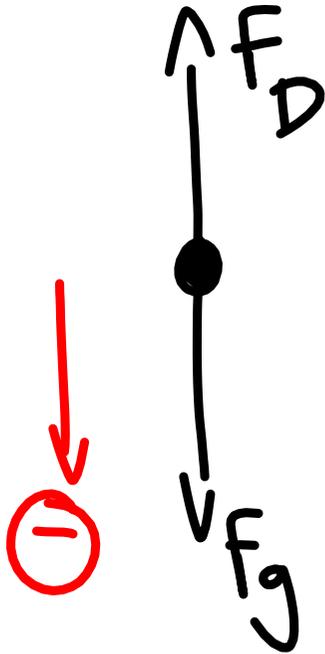
$$F_D = \frac{1}{2} \rho A C_D V^2$$

ρ \leftarrow density of air

A \leftarrow Area of object

C_D \leftarrow Coefficient-o-drag

V^2 \rightarrow velocity



$$F_D = F_g$$

$$\frac{1}{2} \rho A C_D v^2 = mg \rightarrow$$

$$v^2 = \frac{2mg}{\rho A C_D}$$

$$v = \sqrt{\frac{2mg}{\rho A C_D}}$$

a due to gravity
($9.81 \frac{m}{s^2}$)

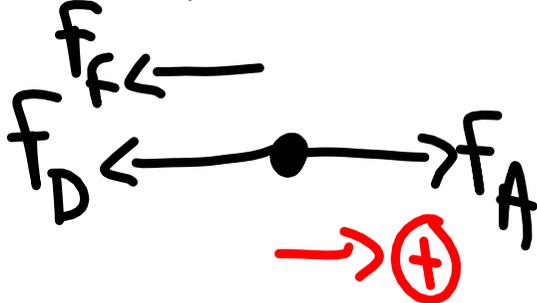
Summation of forces

$$F_f = \mu F_N$$

$$\sum \vec{F} = F_D - F_g = 0$$

$$F_D = F_g \checkmark$$

ex: car



A free-body diagram of a car is shown. A central black dot represents the car. Three force vectors are drawn as arrows: F_A points to the right, F_D points to the left, and F_f points to the left. Below the car, a red arrow points to the right, followed by a red circle containing a plus sign (+).

$$\sum \vec{F} = F_A - F_D - f_f = ma$$