Mass + Weight

mass - the amount of matter in an object. (kg)

Weight - the force of gravity acting on an object (N)

$$\vec{F_g} = m\vec{g}$$

where $\vec{F_g}$ is the force of gravity (N)

m is the mass (kg)

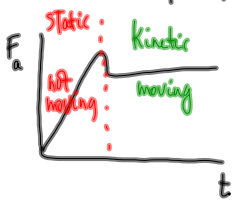
$\vec{g}$ is $9.81 m/s^2$ (near the earth's surface)

Friction

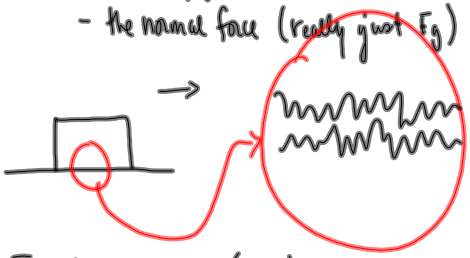
Friction is a force that opposes an object's motion

Static friction - the frictional force that you need to overcome to just get an object moving

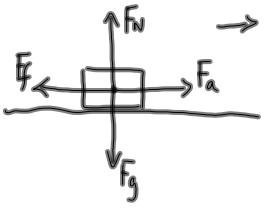
Kinetic friction - the frictional force that a moving object experiences



The frictional force depends on:
- the nature of the surfaces
- the normal force (really just F_g)



FREE BODY DIAGRAM (FBD)



F_g - force of gravity/weig
F_f - frictional force (kin/s
F_a - applied force
F_N - normal force (always ⊥ to surf

Vertically: $F_N = F_g$ (only if the surface is horizontal + F_a is horizontal)

Horizontally: Static $F_a = F_f$ (at the instant the object
Kinetic $F_a = F_f$ (constant velocity)

The frictional force can be calculated:

$$F_f \propto F_N$$

$$F_f = \mu F_N$$

Where F_f is the frictional force (static/kinetic) (
F_N is the normal force (N) ($F_N = F_g$)
μ is the coefficient of friction (depends on the surfaces)

← Drag sled .... used in pol
investigations of traffi