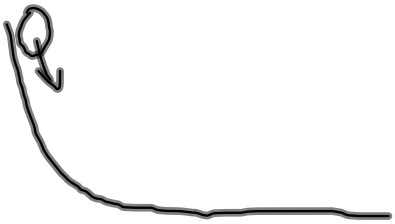
Chapter 4 - Introducing Forces

Inertia - see p126 for definition

Galileo's thought experiment

← about the same height

← about the same level



The ball would keep going forever if there were no friction.

Look at p129 #1

Common Forces

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

weight - is the force of gravity acting on an object (N)
- depends on location

Newton

$F_g \propto m$

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

where $\vec{F_g}$ is the weight (force of gravity) (N)
m is the mass (kg)
$\vec{g}$ is the acceleration due to gravity (m/s^2)
(near the Earth's surface $9.8 \frac{m}{s^2}$)

Look at p132|133 $\div 9.8 m/s^2$ $\times 2.2$

	Weight (N)	mass (kg)	mass (lb)
M	550 N	56.1 kg	123 lb
C	645 N	65.7 kg	145 lb
E	700 N	71.4 kg	157 lb

MP|135

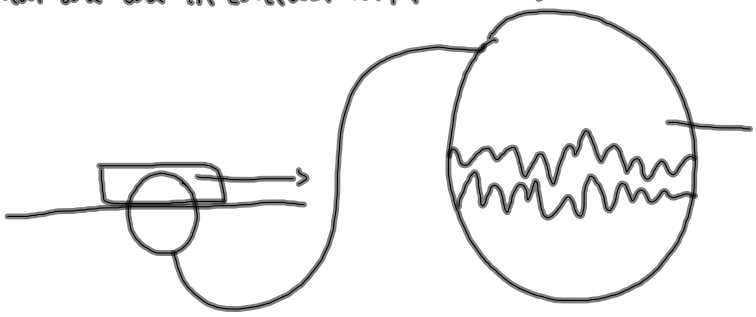
$m = 4.0 kg$
$\vec{g} = 1.64 m/s^2$ [down]
$\vec{F_g} = ?$

$kg \cdot \frac{m}{s^2} = N$

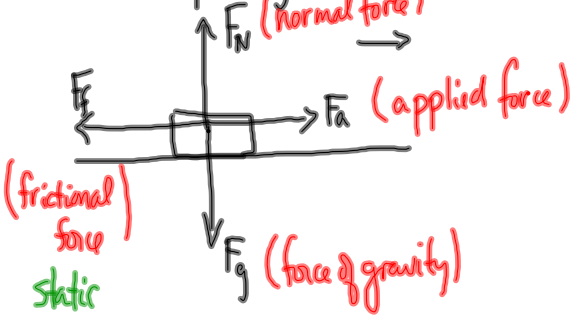
$\vec{F_g} = m\vec{g}$
$\vec{F_g} = (4.0 kg)(1.64 m/s^2)$ [down]
$\vec{F_g} = 6.6 N$ [down]

Friction

Friction depends on the nature of the two surfaces that are in contact with one another.



Free Body Diagram FBD



static
kinetic

Static friction - the frictional force you need to overcome to just start moving

Kinetic friction - the frictional force you need to overcome once moving

$$F_f \propto F_N$$

$$F_f = \mu F_N$$

Where F_f is the frictional force (N)
F_N is the normal force (N)
μ is the coefficient of friction (depends on surfaces)

Look at p 140

Oct 20-2:54 PM