Weight

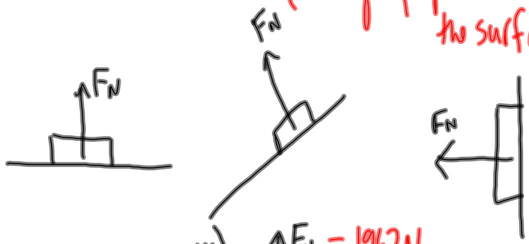
$$\vec{F}_g = m\vec{g}$$

Friction

$$F_f = \mu F_N$$

μ: nature of surfaces in contact

F_N: "normal force" — force that the surface pushes on the object with (always perpendicular to the surface)



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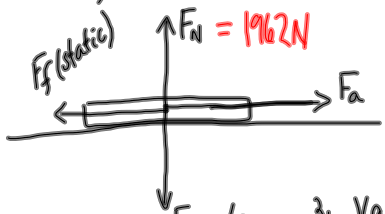
$m = 2.00 \times 10^2\ kg$

$F_{f(static)} = ?$

$\mu_s = 0.10$



$F_g = (2.00 \times 10^2\ kg)(9.81\ m/s^2)$

$F_g = 1962\ N$

$F_{f(static)} = \mu_s F_N$

$F_{f(static)} = 0.10\,(1962\ N)$

$$\boxed{F_{f(static)} = 2.0 \times 10^2\ N}$$

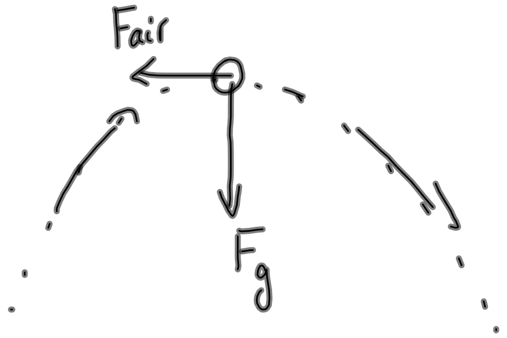
Note about #35 on assignment:
- Draw FBD for each situation
- Be sure to clearly show if the forces vectors should be different sizes.

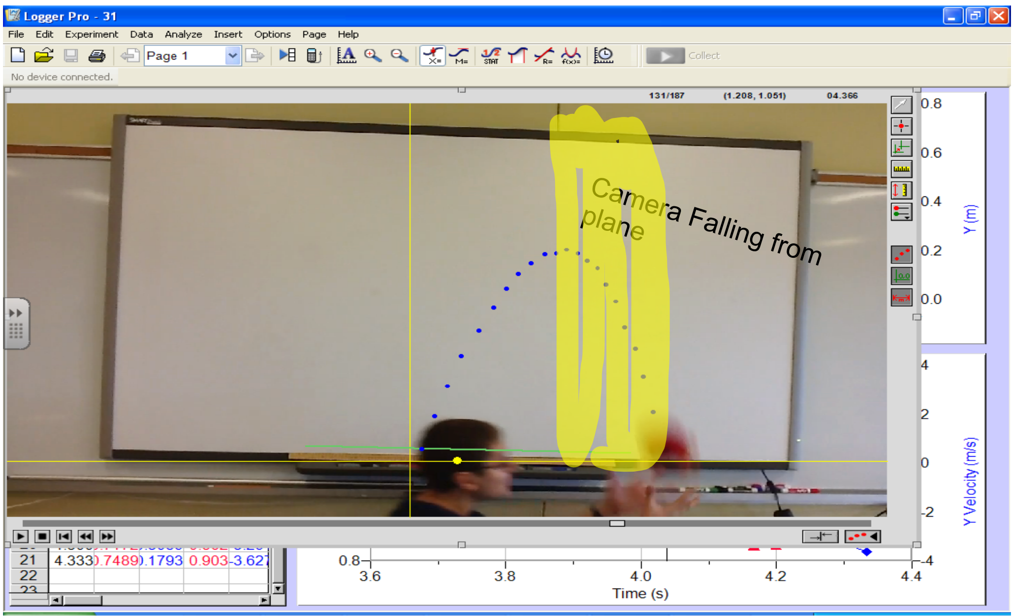
CHAPTER 5 ~ NEWTON'S LAWS

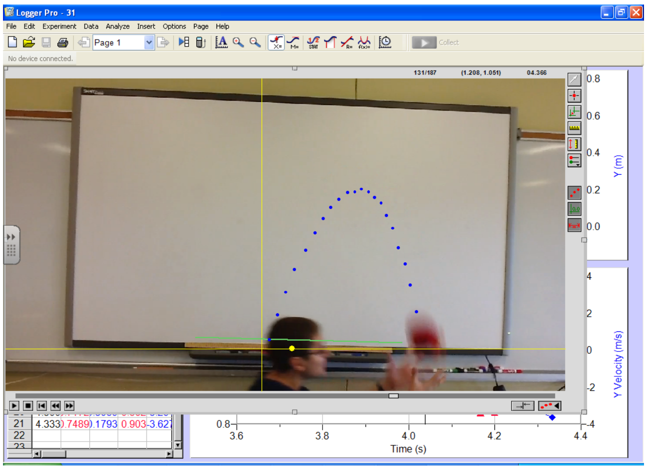
Thought Experiments (p153)

	A	B	C	D
1	0	6	12	7
2	1	1	6	17
3	5	7	4	9

Golf Ball






Logger Pro - 31
File Edit Experiment Data Analyze Insert Options Page Help
Page 1
Collect
No device connected.
Y (m)
Y Velocity (m/s)
Time (s)

§5-1 Inertia + Newton's First Law

Newton's First Law - the Law of Inertia

An object at rest or in uniform motion will remain at rest or in uniform motion unless acted on by an external force.

§5-2 Motion + Newton's Second Law

Newton said that the acceleration of an object depends on two things:

① mass : $a \propto \frac{1}{m}$

② force : $a \propto F$

Combining the two proportionalities:

$$a \propto F\left(\frac{1}{m}\right)$$

$$a \propto \frac{F}{m}$$

$$F \propto ma$$

$$F = kma$$

↳ k is special

$$k = \frac{1\,N}{1\,kg\cdot m/s^2}$$

$$\vec{F}_{net} = m\vec{a}$$

where $\vec{F}_{net}$ is the net (or unbalanced) force (N)

m is the mass (kg)

$\vec{a}$ is the acceleration (m/s^2)

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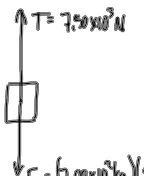
$m = 7.00\times10^2\,kg$

$T = 7.50\times10^3\,N$

$\vec{a} = ?$

+ ↑



$F_g = (7.00\times10^2\,kg)(9.81\,m/s^2)$

$F_g = 6867\,N$

$$\vec{F}_{net} = m\vec{a}$$

$$T - F_g = ma$$

$$7.50\times10^3\,N - 6867\,N = (7.00\times10^2\,kg)a$$

$$633\,N = (7.00\times10^2\,kg)a$$

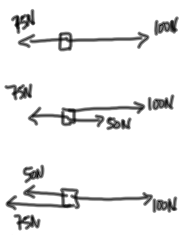
$$a \doteq +0.90\,m/s^2$$

$$\vec{a} \doteq 0.90\,m/s^2\,[up]$$

Remember that + acc has two meanings:

① going up | speeding up

② going down | slowing down.



$\vec{F}_{net} = 25N\,[R]$

$\vec{F}_{net} = 75N\,[R]$

$\vec{F}_{net} = 25N\,[L]$

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Assignment is due Wed

HW Probe Tues

QUIZ Thurs (Weight + Friction)