Physics 102 - January 24, 2011

- Recitations begin today
- Jury Duty this week

STAY tuned for Wed. lecture plans

Last Time

The Human Experience

How are (Art / Science / Religion) The same ?

Different ?

Is There Religious Truth?

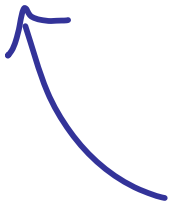
Artistic Truth?

Scientific Truth?

Ambiguity?

Space - The fabric in which we measure where things are

Time - The fabric in which we measure when things are



Must have time if we are to have change!

Position

$x \equiv$ position along x axis

$x_2 - x_1 = \Delta x$ change in x (w/ time)

$$\text{Speed} = \frac{\Delta x}{\Delta t}$$

add direction

$\equiv$ velocity $\equiv v$

$$\text{acceleration} = \frac{\Delta \text{speed}}{\Delta t}$$

$\Downarrow$

$$a = \frac{\Delta \text{velocity}}{\Delta t} = \frac{\Delta v}{\Delta t}$$

x, v, a, t Kinematic variables

if you know x, v, a for a particle as function of time ... pretty much know all you need to know in terms of its behavior and how it interacts with rest of the world.

Newton's Laws

I: Law of Inertia

A body persists in its state of motion unless acted on by an external net force.

II: Force Law

The acceleration of an object is proportional to the net force applied to it and inversely proportional to the mass of the object

$$\Sigma \vec{F} = m\vec{a}$$

III Law of Action and Reaction

For every action there is an equal and opposite reaction

Sir Issac Newton

Sir Issac Newton

The younger years

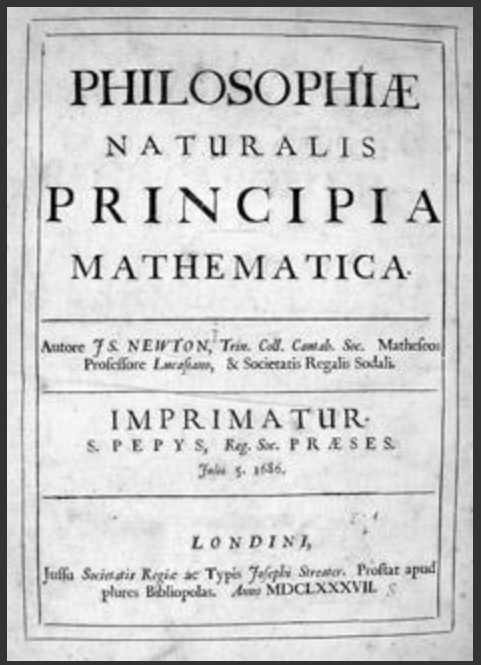
Sir Issac Newton

1643-1727

Born in Lincolnshire, England

Cambridge University

Philosophie Naturalis Principia Mathematica



PHILOSOPHIÆ
NATURALIS
PRINCIPIA
MATHEMATICA.

Autore *J S. NEWTON*, *Trin. Coll. Cantab. Soc.* Matheseos Professore *Lucasiano*, & Societatis Regalis Sodali.

IMPRIMATUR.
S. PEPYS, *Reg. Soc.* PRÆSES.
Julii 5. 1686.

LONDINI,
Juſſu *Societatis Regiæ* ac Typis *Joſephi Streater*. Proſtat apud plures Bibliopolas. *Anno* MDCLXXXVII.

Optics, mechanics, gravitation, calculus

Sir Issac Newton

1643-1727

Newtonian physics

Newtonian universe

Includes everything but …

Electromagnetism

Quantum mechanics

Mechanics of extreme velocities or extreme density

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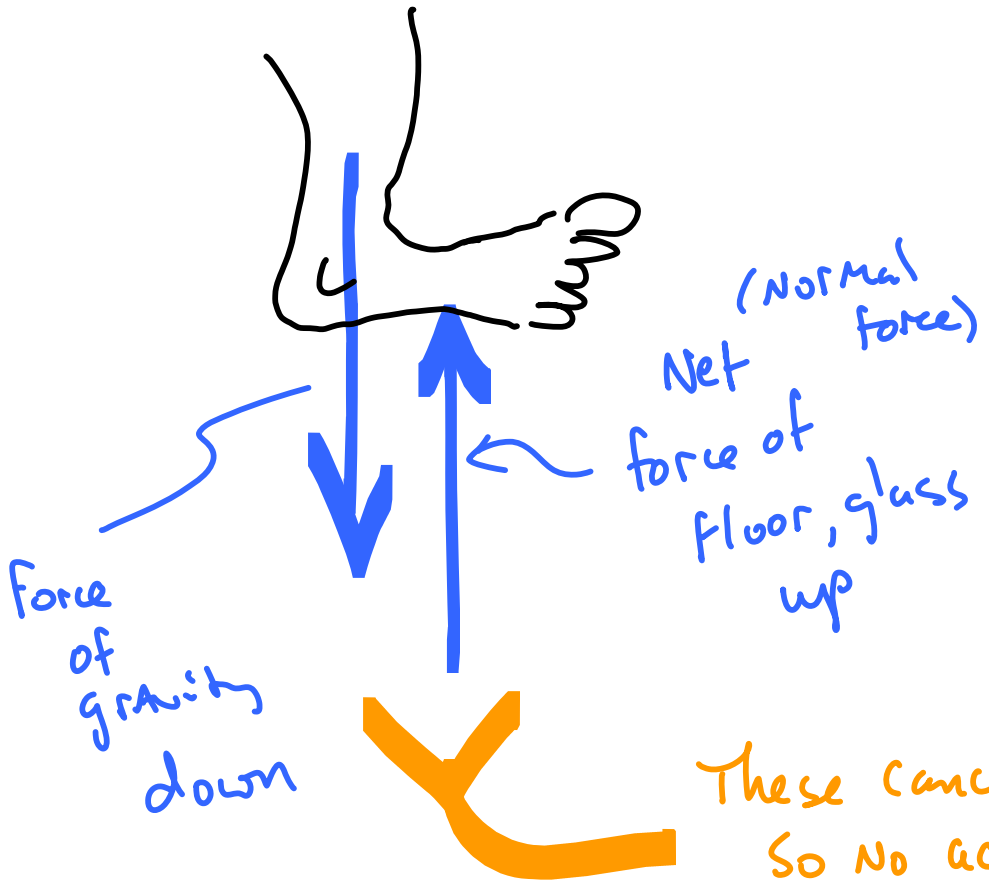
Dancing on glass —

Newton's Laws can be subtle



Spread Normal force out among many bits of glass