

September 18, 2015

Physics 131

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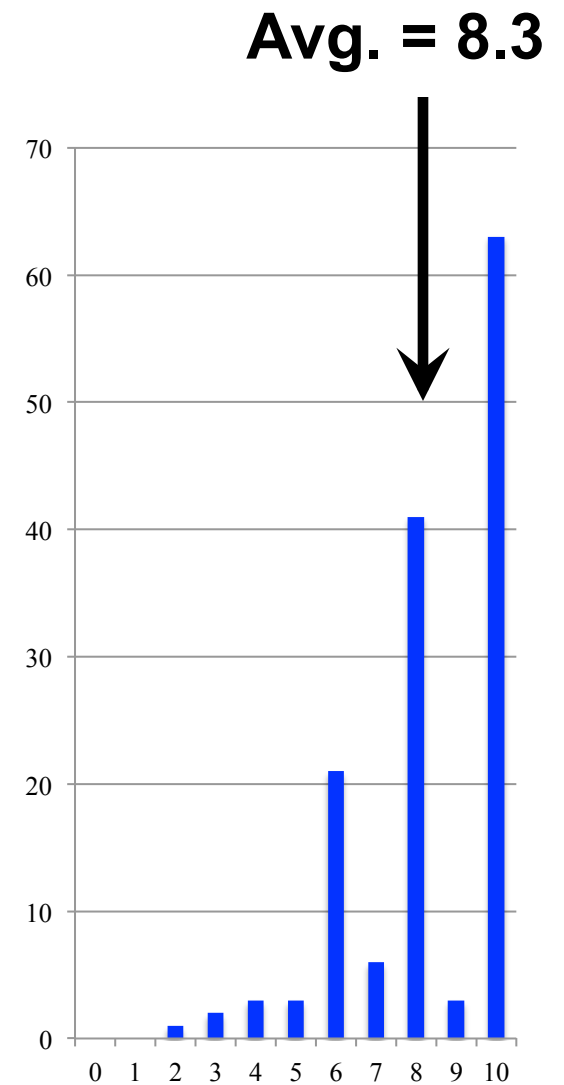
- **Theme Music: When Push Comes to Shove**
Greatful Dead
- **Cartoon: Rick deTorie**
One Big Happy



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Quiz 2

	1a	1b	1c	1d	1e	1f		2	3
	p	m	m	m	m	p		c	e
p	85%	6%	18%	14%	4%	92%	a	12%	1%
m	15%	94%	81%	86%	95%	7%	b	6%	1%
							c	76%	8%
							d	4%	9%
							e	1%	73%
							f	1%	6%



What have we learned?

Representations & consistency



- Position $\hat{r} = x\hat{i} + y\hat{j}$
(where x and y are signed lengths)
- Velocity $\langle \vec{v} \rangle = \frac{\Delta \vec{r}}{\Delta t}$ $\vec{v} = \frac{d\vec{r}}{dt}$
- Acceleration $\langle \vec{a} \rangle = \frac{\Delta \vec{v}}{\Delta t}$ $\vec{a} = \frac{d\vec{v}}{dt}$
- Seeing from the motion
- Seeing consistency (graphs & equations)

Example:

Calculating with acceleration



- In The Fellowship of the Ring, the hobbit Peregrine Took (Pippin for short) drops a rock into a well while the travelers are in the caves of Moria. This wakes a balrog (a bad thing) and causes all kinds of trouble. Pippin heard the rock hit the water 7.5 s after he dropped it. Assuming that the rock fell with a constant acceleration of 10 m/s^2 , how deep is the well?

Approaching a problem

- What's “the story” of the problem?
- What principles/equations do you know that might be relevant?
- What assumptions might we make to create a solvable first model?
- Give names to the relevant parameters and variables.
- Of the variables and parameters that appear in your equation, which do you know?
- How many unknowns do you have?
- How many equations do you have?

One more icon: Shopping for Ideas

- What we need to do here is consider some different possibilities and evaluate them to see how well they work for us.



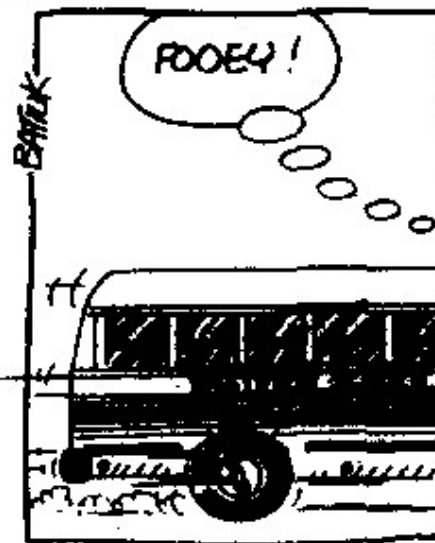
What Causes Motion?

Drawing experience

- What do the following motions feel like?
 - No motion (at rest).
 - Constant velocity.
 - Constant acceleration.
 - Changing acceleration (jerk)

What's wrong with this?

FUNKY WINKERBEAN





What causes motion?

- Do you need an outside influence to cause motion or to maintain it?

Reading questions

- Do theories underlie and structure every model physicists create/produce?
- Is the reason why Newton's theory is still a theory because the rules may not apply to small and large scale phenomena?
- How do we know when our scientific understanding is too immature to resolve a certain problem and when can scientists fundamentally revise a concept?
- Why do different rules about motion apply depending on the scale you are looking at? Shouldn't rules of motion be universal? It seems like Newton's laws universally explain motion, to a certain point.
- What was Aristotle's theory and why was it wrong?

Reading questions:

- Can we discuss in greater detail how acceleration turned out to be the champion concept that made Newton's theory possible, as I still struggle with visualizing it?
- Why is acceleration such a key part of Newton's Laws?
- I know that one of Newton's Laws was that an object in motion stays in motion until a force makes it stop, but why is it that if you roll a ball on a flat surface eventually it will stop?
- A lot of the rules we learn in chemistry are this is always true except these few cases... Do Newton's laws have any exceptions?
- How are Newton Laws flawed when it comes to small objects or really big ones?