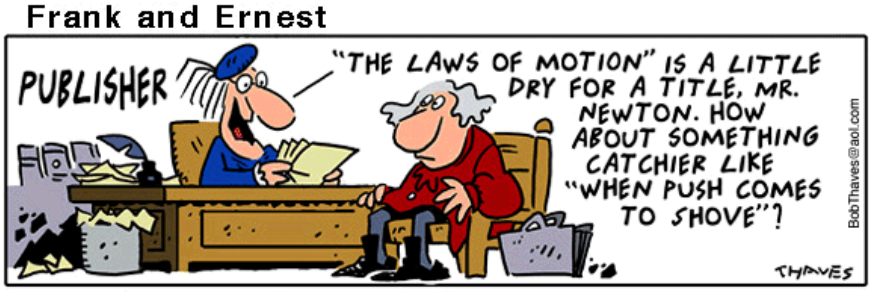
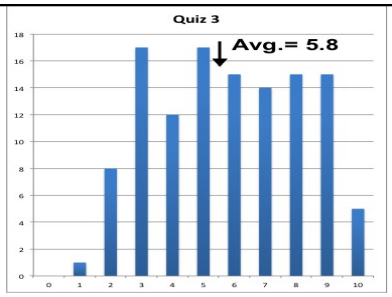
September 26, 2013 Physics 131 Prof. E. F. Redish

- **Theme Music:** Soul II Soul
  Keep on Movin'
- **Cartoon:** Bob Thaves
  Frank & Ernest





	1.1.x	1.1.v	1.1.a		1.1.c
A	49%	94%	4%	Y	93%
B	0%	0%	3%	N	15%
C	2%	0%	0%		
D	1%	12%	90%		
E	2%	0%	9%		
F	0%	0%	1%		
G	1%	0%	2%		
H	2%	1%	0%		
N	51%	2%	0%		

	1.2.x	1.2.v	1.2.a		1.2.c
A	0%	2%	3%	Y	39%
B	1%	19%	31%	N	61%
C	36%	15%	7%		
D	0%	4%	9%		
E	1%	1%	18%		
F	19%	41%	15%		
G	36%	6%	6%		
H	3%	8%	5%		
N	3%	3%	4%		

	2
A	6%
B	40%
C	0%
D	5%
E	8%
A,B	3%
A,C	11%
A,D	4%
A,E	3%
A,B,D	1%
A,C,E,	2%
B,E	14%
D,E	1%

What have we learned?

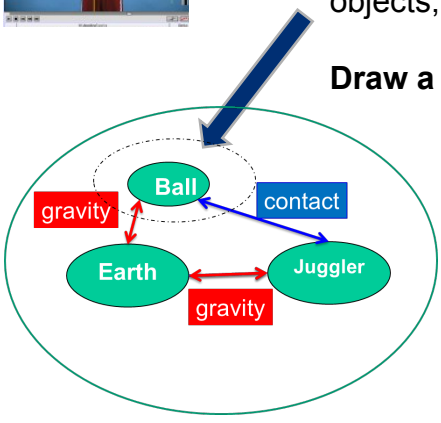
- Position $\hat{r} = x\hat{i} + y\hat{j}$
  (where x and y are signed lengths)
- Velocity $\langle \vec{v} \rangle = \frac{\Delta \vec{r}}{\Delta t}$ $\vec{v} = \frac{d\vec{r}}{dt}$
- Acceleration $\langle \vec{a} \rangle = \frac{\Delta \vec{v}}{\Delta t}$ $\vec{a} = \frac{d\vec{v}}{dt}$
- Seeing from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

9/26/13 Physics 131 4

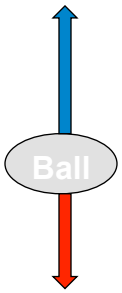
The Free Body Diagram

We want to understand & calculate what causes the motion of one of the objects, **the ball.**

Draw a Free Body Diagram for Ball



$\vec{F}^{net} = ??$



9/26/13 5 **Physics 131**