Do Now

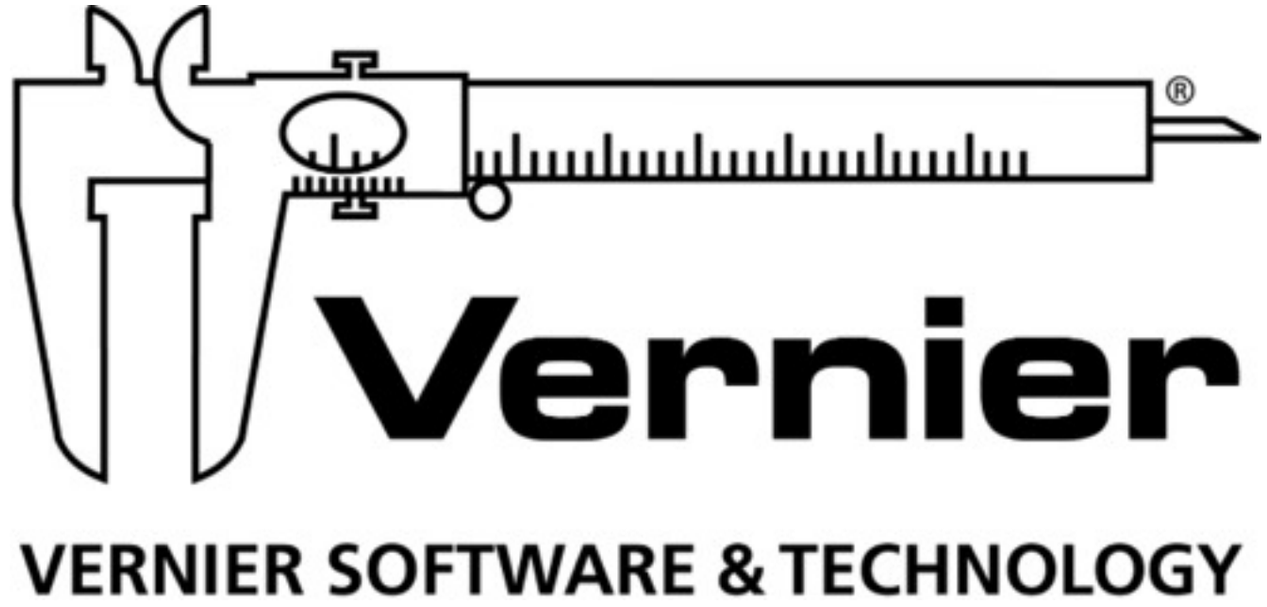
- Take out the homework and check it with the answers on the side of the room.

Vernier Motion Detectors

- Group up with your lab bench (4).
- You will need to get a laptop and a motion detector.
- You will need your whiteboard, but no marker. Clean it off so that you don't get any marker on your clothes.

Logger Pro

- Real-time data collection.
- The motion detector uses sonar to detect displacement, velocity and/or acceleration.



Play in the Sand

- Once you have seen the demo on how to set up your software, you will spread around the room and begin seeing what kind of graphs you can make.
- Begin with making a position-time graph.
- See how many different, distinct slopes you can make. What do each of these slopes represent?

Notes

- See if you can walk the motions that I have drawn on the board.
- Remember: the motion detector is the source.
- Moving away from it is the positive direction.

Your Lab

- Get a track, a barrier, a text book and a cart.
- You will make 3 distinct (different) velocity time graphs with a constant velocity.
- Draw a picture of the cart with arrows that indicate the direction of the velocity and acceleration.

First Kinematic Equation

- See other slide presentation.

- $\Delta x = V_i t + (1/2) a t^2$

  - The second kinematics equation.

  - Δx: displacement

  - Vi: initial velocity

  - a: acceleration t: time

LeSean McCoy is running at 4m/s when he catches a pass. He then accelerates at 1.2m/s for 5 seconds and then scores a touchdown. How far did he run with the ball? Answer in meters.

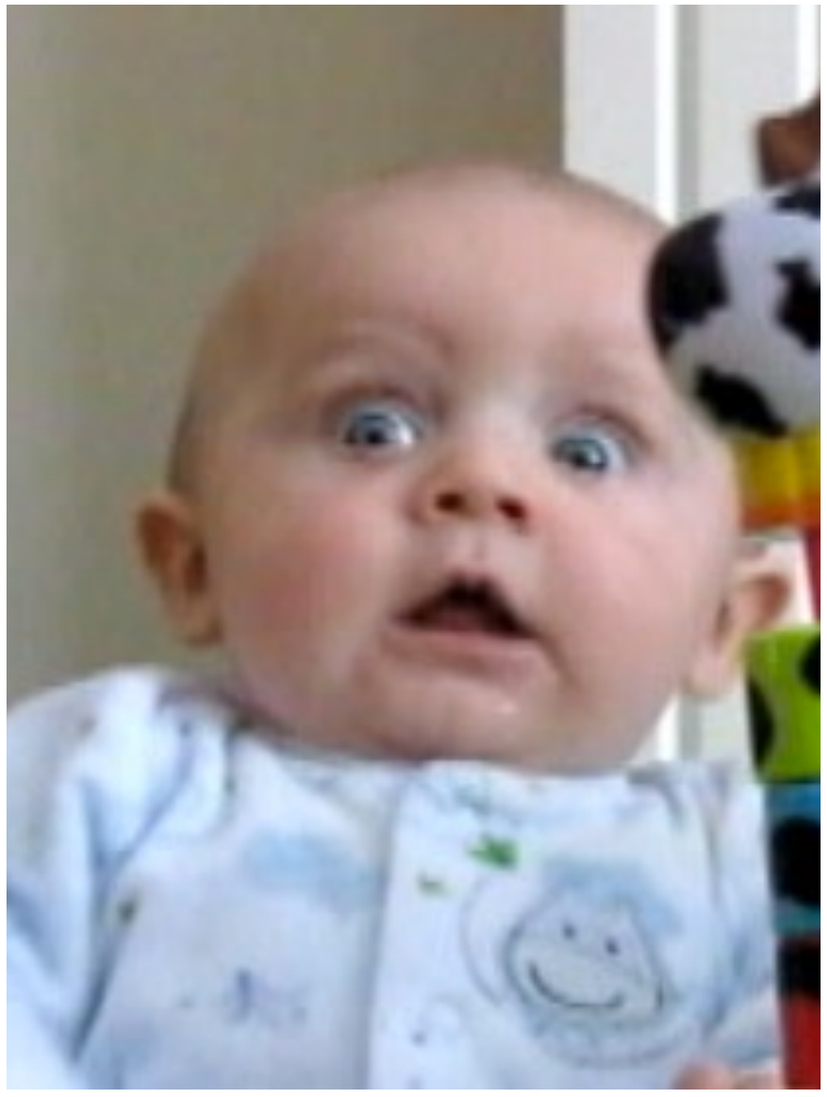
A dog gets away from its owner. It runs 35m in 14 seconds. Assuming that it was sitting when it started running, what was the dog's acceleration?

$$V_f^2 = V_i^2 + 2a\Delta x$$

- The final kinematic equation.
- You do not need time for this formula.
- Units are the same as the other kinematic equations.

Too Many Formulas!

- Don't panic!
- You can only use a formula if you have **only** one unknown.
- If you have more than one unknown, you can't use it.



A speed boat is going 15m/s. It accelerates uniformly at 3m/s over the span of 80m. What is the boat's final velocity?