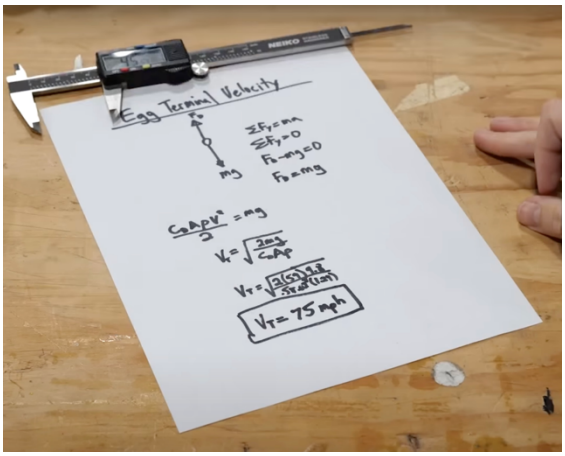
Flipping Physics Lecture Notes:
Dear @MarkRober,
Could You Show Your Work Better, Please?
http://www.flippingphysics.com/mark-rober.html



Dear Mark Rober,

There is a moment in your video "Egg Drop From Space" which irks me. At the 1 minute, 38 second mark, you calculate the terminal velocity of a chicken egg falling through Earth's atmosphere.

The first thing that caught my eye was that the acceleration due to gravity is 9.8 m/s^2 and the terminal velocity is 75 mi/hr. Those two units do not jive. you completely glossed over a conversion.

Then a closer look led me to the mass of 59.
59 what? What are the units on that?

Okay. Then the cross-sectional area which is the area of a circle or πr^2. But what did you write for the radius? Honestly, it is so illegible that I cannot read it.

And then the density of air of 129.
Again, 129 what? The density of air is often given as 1.29 kg/m^3.

Here is my solution for the terminal velocity of a chicken egg falling through Earth's atmosphere.

Knowns: $m = 0.059kg, C_D = 0.5, r = 0.023m, \rho_{air} = 1.29\frac{kg}{m^3}$

$$\Sigma F_y = F_D - F_g = ma_y = m(0) = 0 \Rightarrow F_D = F_g = mg$$

$$\frac{C_D A \rho_{air} v_t^2}{2} = mg \Rightarrow v_t = \sqrt{\frac{2mg}{C_D A \rho_{air}}} = \sqrt{\frac{2mg}{C_D \pi r^2 \rho_{air}}}$$

$$\Rightarrow v_t = \sqrt{\frac{(2)(0.059)(9.8)}{(0.5)\pi(0.024^2)(1.29)}} = 33.839\frac{m}{s}\left(\frac{3600s}{1hr}\right)\left(\frac{1mile}{1609m}\right) \approx 76\frac{mi}{hr}$$

Mark, you are helping educate loads of people. You showed your work, which I much appreciate. In the future, could you please do a better job of showing your work?[1] I would be lovely if you did so. Thanks!

- mr.p / Billy / Bobby / Bo / The Flipping Physics Guy / Some even call me … Jonathan

If you want to learn more about terminal velocity and the drag force, I have many videos for you:

- What is Terminal Velocity? How Do We Find It?
  - https://www.flippingphysics.com/terminal-velocity.html
- Demonstrating and Solving for Drag Coefficient
  - https://www.flippingphysics.com/drag-coefficient.html
- Effects of Drag Force on Free Fall
  - https://www.flippingphysics.com/drag-force-free-fall.html
- Deriving Motion Equations with Drag Force
  - https://www.flippingphysics.com/drag-force-motion-equations.html
- Time Constant and the Drag Force
  - https://www.flippingphysics.com/drag-force-time-constant.html

[1] I have a video about showing how work called "Why "Show All Your Work"?" - https://www.flippingphysics.com/show-work.html