



Flipping Physics Lecture Notes:
Dropping Dictionaries Doesn't Defy Gravity, Duh!
Video Proof of the Mass Independence of the Acceleration due to Gravity

In the video I drop 1, then 2, then 3, then 4 books all from the same height and they all take the exact same amount of time to strike the ground. Therefore, all their accelerations in the y-direction are the same.



All four examples share these same Uniformly Accelerated Motion Variables:

$$v_i = 0; \Delta t = 0.64 \text{ seconds}, \Delta y = -2.0 \text{ meters.}$$

If these three variables are the same, then so are their accelerations in the y direction:

$$\Delta y = v_{iy} \Delta t + \frac{1}{2} a_y \Delta t^2 = (0) \Delta t + \frac{1}{2} a_y \Delta t^2 \Rightarrow \Delta y = \frac{1}{2} a_y \Delta t^2 \Rightarrow a_y = \frac{2 \Delta y}{\Delta t^2} = \frac{(2)(-2)}{(0.64)^2} = -9.76563 \approx -9.8 \frac{m}{s^2}$$

Each set of books, regardless of mass, has an acceleration in the y-direction of -9.8 m/s^2 .

Oh, and if you arrange them in a looping sequence, you can dance to it.

Possibly Useful Definitions:

Pummel (verb): to strike repeatedly, typically with the fists.

(yeah, so I didn't use it in its traditional sense, however, my wife really can pummel me in Scrabble)

Dilapidated (adjective): in a state of disrepair or ruin as a result of age or neglect.

Voilà (exclamation): there it is; there you are. ORIGIN French *voilà*.