Free Fall

Note Title 8/26/2011

A great example of constant acceleration is

GRAVITY!

an object that is in free fall will accelerate at $-9.8\ m/s^2$

notice that there is a negative sign

this means that gravity's acceleration will act Down. Memorize this value.

Example:

a ball is dropped from a building. how far will it travel in 3 seconds?

Given

$V_i = 0$

$t = 3s$

$a = -9.8\ m/s^2$

Looking For

Δy

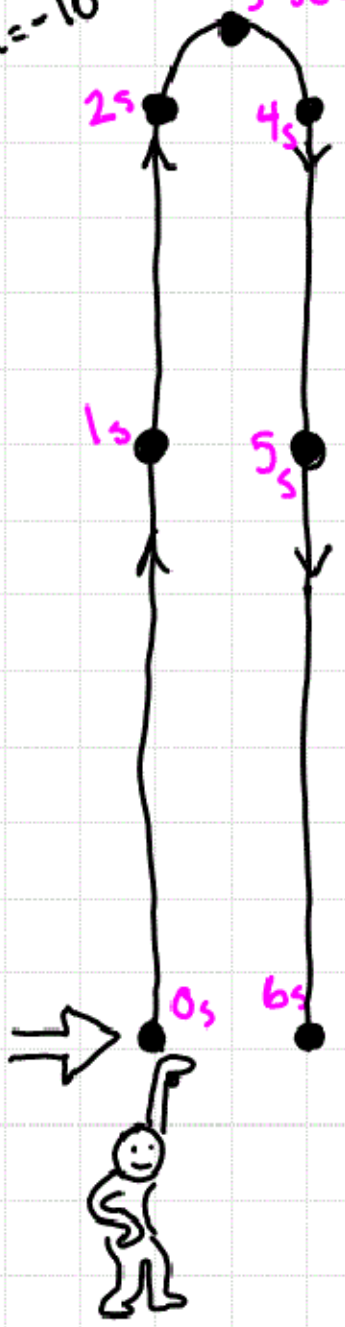
$\Delta y = V_i t + \frac{1}{2} a t^2$

$\Delta y = 0 \cdot t + \frac{1}{2}(-9.8)(3)^2$

$\Delta y = -44.1m$

we recieve a negative displacement because that is what happened. it went down!

Lets Document a ball thrown up...



$t = 3s$
$V = 0 m/s$
$\Delta x = 45 m$
$a = -10 m/s^2$

$t = 2s$
$V = 10 m/s$
$\Delta x = 40 m$
$a = -10 m/s^2$

$t = 4s$
$V = -10 m/s$
$\Delta x = 40 m$
$a = -10 m/s^2$

$t = 1s$
$V = 20 m/s \uparrow$
$\Delta x = 25 m$
$a = -10 m/s^2$

$t = 5s$
$V = -20 m/s$
$\Delta x = 25 m$
$a = -10 m/s^2$

$t = 0s$
$V_i = 30 m/s \uparrow$
$\Delta x = 0 m$
$a = -10 m/s^2$

$t = 6s$
$V = -30 m/s$
$\Delta x = 0$
$a = -10 m/s^2$

Rule of thumb:

if you have a calculator, use $-9.8 \frac{m}{s^2}$

otherwise use $-10 m/s^2$