Unit 02 – Vocabulary and Equations – Freefall

Vocabulary:
previous vocabulary
$g = -9.8\ m/s^2$ (memorize this value!)
freefall
terminal velocity
air resistance
drag
hang time
up down
down time
reaction time
anticipation
reaction

Symbols:
Δ, x, v, t, Δx, Δv, Δt, a, f, i

Equations & constants:
You get these on test:

$$v = \frac{\Delta x}{\Delta t} \qquad a = \frac{\Delta v}{\Delta t}$$

$$\Delta x = v_0 \Delta t + \tfrac{1}{2} a t^2$$

$$v = v_0 + a \Delta t \quad (v \text{ means } v_f)$$

$$v_f^2 = v_i^2 + 2a \Delta x$$

60 mph = 27 m/s; 60 seconds = 1 min.; 60 min = 1hr.

Unit Objectives - Williams
1. I understand all the vocabulary & math of this unit and all demos, videos, equations, and class assignments.
2. I remember objectives & vocabulary from previous units.
3. I have memorized g, the acceleration of gravity on earth's surface including the units
4. I understand what freefall is and can contrast it with terminal velocity
5. I know hang time and that it includes time for both the upward and downward motions of airborne object
6. I understand what g is and realize that g is a constant negative value, it does NOT become zero at the high point or switch signs on the way down
7. I understand motion graphs related to freefall, terminal velocity, reaction time and other topics in this unit
8. I can look at physics problems and know what assumptions to use to solve them including when v = 0 and the concept of symmetry
9. I know when to double the time (hang time) and when not to (reaction time)
10. I remember the objectives from the previous unit since they still apply to this unit!
11. I can apply one-dimensional motion equations and TNEOM to solve freefall and hangtime problems

DuPage ROE Objectives
101. I can distinguish between scalar and vector quantities.
102. I can differentiate between accelerated and constant velocity motion.
103. I can describe and analyze motion based on graphs, numeric data, words, and diagrams.
104. I can differentiate between speeding up, slowing down, and change in direction, based on the direction of velocity and acceleration.
107. I can justify that if the only force acting on an object is gravity, it will have the same constant downward acceleration regardless of mass, velocity or position.

Equation	a	*t*	v_i	v_f	Δx
$\Delta x = \frac{(v_i + v_f)}{2} t$	☹	√	√	√	√
$v_f^2 = v_i^2 + 2a\Delta x$	√	☹	√	√	√
$\Delta x = v_i t + \frac{1}{2} a t^2$	√	√	√	☹	√
$v_f = v_i + at$	√	√	√	√	☹