Unit 11 – Vocabulary and Equations –Projectile Motion & Vectors

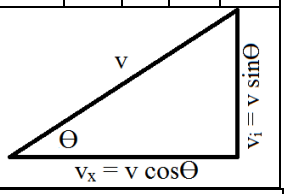
Vocabulary:

previous vocabulary
scale
above (or below) the horizon
pythagorean theorem
soh-cah-toa
horizontal component
vertical component
horizon, ground speed
air speed, wind speed
range (Δx)

parabolic path
resolve, resultant
magnitude, direction

Equation	a	t	v_i	v_f	Δy
$v_{yf} = v_{yi} + at$	√	√	√	√	☹
$\Delta y = \frac{(v_{yi} + v_{yf})}{2} t$	☹	√	√	√	√
$\Delta y = v_{yi}t + \frac{1}{2}at^2$	√	√	√	☹	√
$v_{yf}^2 = v_{yi}^2 + 2a\Delta y$	√	☹	√	√	√

$\Delta x = v_x t$ $\quad p = mv$ $\quad p_i = p_f$
$I = \Delta p = m\Delta v = F\Delta t$
$v_x = v \cos\Theta$
$v_{yi} = v \sin\Theta$
60 mph = 27 m/s



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 can scale things, use scales with representations like maps, and use arrows and length to represent vectors correctly
4. I can add and subtract vectors both mathematically and graphically using head-to-tail or parallelograms
5. I can use vector addition to find relative motions such as boats relative to shore or plane relative to ground
6. I can apply trig to resolve vectors and come up with resultants always using "degree mode"
7. I know which measurement types are vectors & which are scalars and the product of vector and scalar is a vector
8. I understand and apply trig to the individual problem and how it is depicted. For example: $v_x = v \cos\Theta$ is true only where Θ represents the angle relative to the horizon.
9. I know projectile motion assumptions, can contrast it with terminal velocity/freefall & know conceptually how air resistance or external forces beyond gravity alone would change the motion
10. I know for projectiles a_y and v_x are constant, a_x is zero, $v_f = -v_i$, and max height is when $v_y = 0$, but it doesn't "stop"
11. I know and can apply independence of X and Y motion to solve numeric and conceptual problems
12. I am aware of a projectile's constant X motion and constantly changing Y motion with time tying them together
13. I can make, explain, understand & use initial & final motion triangles for a projectile showing v, v_i, v_x ,Θ
14. I know angles that maximize range, hang time, maximum height, etc. & complementary angles have the same ranges
15. I know and can apply both the mapping and horizon methods for vectors
16. I can solve horizontal projectile problems
17. I can solve problems involving projectiles launched at angles
18. I can compute how much time it takes to cross a river and the proper launch angle