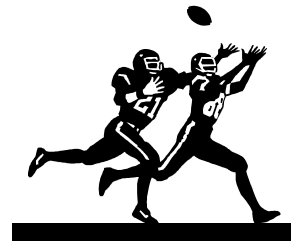


## Section 6.1 Notes: *Projectile Motion*



1. **Projectile**: an object projected into the air, moving only under the influence of gravity...acceleration only in the vertical direction.
2. The path a projectile follows is called a ***trajectory***.
3. Regardless of its path, a projectile will always follow these rules (*neglecting air resistance, of course!*):
  - Projectiles always maintain a constant horizontal velocity (*inertia*).
  - Projectiles always experience a constant vertical acceleration of ***-9.80 meters/s<sup>2</sup>*** ( downward ).
  - Horizontal and vertical motions are completely independent of each other. Therefore, the velocity of a projectile can be separated into horizontal and vertical components.
  - For a projectile beginning and ending at the same height, the time it takes to rise to its highest point equals the time it takes to fall from the highest point back to the original position.
  - Objects dropped from a moving vehicle have the same velocity as the moving vehicle.
4. In order to solve projectile problems, you must consider horizontal and vertical motion separately and independently. All of the equations for linear motion (fab 4) can be used for projectile motion as well.

<b>Horizontal</b> Constant <u>velocity</u> (inertia)	<b>Vertical</b> Constant <u>acceleration</u> ( $a = -g$ )
$d_x = v_x t$	$d_y = v_{yi} t - \frac{1}{2} g t^2$  $v_{yf} = v_{yi} - g t$
$d_y = \frac{v_{yf} + v_{yi}}{2} t$	$v_{yf}^2 = v_{yi}^2 - 2 g d_y$

