



(Idealized) Projectile Equations

	<u>x</u>	<u>y</u>
Accel:	0	-g
Velocity:	$v_x = v_0 \cos \theta$	$v_y = v_{0y} - gt$
		(where, $v_{0y} = v_0 \sin \theta$)
Position:	$x = x_0 + v_x t$	$y = y_0 + v_{0y} t - \frac{1}{2}gt^2$
An additional y equation:		$v_y^2 = v_{0y}^2 - 2g(y - y_0)$

Note: The two equations that you will use the most are the two position equations:

$$x = x_0 + v_x t$$

$$y = y_0 + v_{0y} t - \frac{1}{2}gt^2$$

Key Projectile Concepts:

**Only force acting on projectile is gravity.
(Assume no drag force, lift, or wind effect.)**

At apex: $v_y = 0$
 $v_x = \text{constant} = v_0 \cos \theta$

For Level Ground:

Max Range, L, at $\theta = 45^\circ$

