

FHS Physics Projectile Motion Concepts

- A projectile is launched with some initial velocity, but the only force that significantly affects it is gravity after launch. For most of our work we will consider air resistance negligible.
- Objects such as Frisbees, which are designed to have high air resistance in order to "foil" gravity, are not what we are interested in here.
- The initial velocity is the "vector sum" of the horizontal and vertical components of the velocity.
- Since gravity is the only force acting on the projectile and vectors at 90 degrees are independent of each other, the horizontal velocity is constant throughout the motion.
- The vertical velocity is affected by the freefall acceleration (abbreviated g) for the planet you are on (approx. -9.8 m/s^2 on earth).
- The path of a projectile is a parabola, or a portion of a parabola. Galileo, the founder of modern science, was the first to put this into print.
- The speed of a projectile is at a minimum at the highest point of its path. This is because the vertical velocity is at a minimum.
- If a projectile is launched upwards at any angle equal to or greater than 0 degrees from the horizontal, its vertical velocity is zero for the instant it is at the top of its path.
- If a projectile is launched upwards at any angle greater than 0 degrees from the horizontal, at any height (y position), the magnitude of the upward velocity is equal to the magnitude of the downward velocity at the same height.
- We often call the launch height zero for a projectile that returns to the same level it was launched from. This simplifies equations.