PROJECTILE MOTION: 10/9/15

A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is any object that is launched, thrown, or shot.

For projectile motion, we need to think about the projectile in 2 different directions: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Horizontal and vertical are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of each other.

Therefore, we have formulas for the horizontal direction and the vertical direction.

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| --- | --- |
| Horizontal Motion | Vertical Motion |
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There are 2 important concepts we need to know:

1.) A horizontally thrown projectile will hit the ground at the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_a dropped projectile will.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in vertical and horizontal formulas.

All accelerate downward at \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Picture:

2.) Once released, a projectile will not \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ direction.

 Horizontal velocity remains \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ throughout the objects entire path down to the ground

 Picture:

Example:

 A rock is thrown horizontally from a height of 2 m with an initial velocity of 7m/s.
 Picture:

 a. How long will it stay in the air?
 Formula:

 Plug in numbers:

 Answer:

 b. How far did the rock travel?
 Formula:

 Plug in numbers:

 Answer:

2. A cannon shoots a projectile horizontally at a speed of 50m/s from a height of 10 m.
Picture:

a. How long will it take the cannonball to hit the ground?
Formula:

Plug in numbers:

Answer:

b. How far did the cannonball travel in that time?
Formula:

Plug in numbers:

Answer:

Horizontal Projectile Homework:

1.) A penny is thrown horizontally from the top of Stone Mountain which is 514m above sea level. If the penny’s velocity is 5 m/s.

Picture:

a. How long will the penny stay in the air?

Formula:

Plug in numbers:

Answer:

B. How far from the base of the mountain will the penny land?

Formula:

Plug in numbers:

Answer:

2. A baseball is hit horizontally when the ball is 1.5m from the ground, and the ball travels at a velocity of 75 m/s.

Picture:

a. How long does it take for the baseball to reach the ground?

Formula:

Plug in numbers:

Answer:

b. How far does the baseball travel before it hits the ground?

Formula:

Plug in numbers:

Answer: