

## Unit 2G

### Horizontally Launched Projectiles

#### Note-Taking Guide and Questions to Consider **TEACHER**



#### Main Ideas, Key Points, Questions:

*After watching the video segment, write down key points, main ideas, and big questions.*



#### Objective(s):

- *Indicate, both qualitatively and quantitatively, how horizontal and vertical components of motion are independent of one another.*
- *Calculate the range and time of flight for a horizontally launched projectile.*



#### Notes:

*During the video segment, use words, phrases, or drawings to take notes.*



#### Summary:

*After watching the video segment, write at least three sentences explaining what you learned. You may ask yourself: "If I was going to explain this to someone else, what would I say?"*

**Answer the following.**

1. What does it mean for an object to travel in two dimensions?

*It means that it is moving both horizontally and vertically at the same time.*

2. Describe what happens to the horizontal component of velocity while an object is in the air.

*The horizontal component of velocity does not change, meaning that*

*the horizontal component of a projectile's velocity is constant.*

3. If an object travels at a constant velocity, how does its average velocity compare to its instantaneous velocity throughout the trip?

*The vertical component of a projectile's velocity changes due to the force of*

*gravity acting on the projectile, causing it to accelerate throughout the trip.*

4. Which equation will you use to make calculations about a projectile's horizontal displacement (i.e., range) and horizontal velocity?

$$v = \frac{d}{t}$$

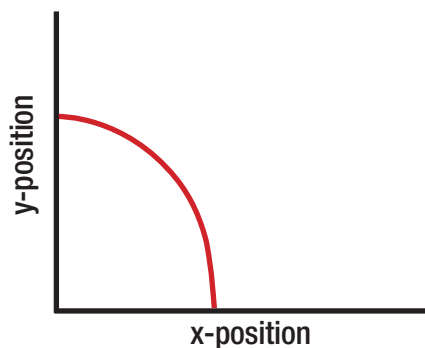
5. What three equations can you use to make calculations about a projectile's vertical motion?

$$v_f = v_i + at$$

$$d = v_i t + \frac{1}{2}at^2$$

$$v_f^2 = v_i^2 + 2ad$$

6. Sketch the motion of a horizontally launched projectile on the axis below:



7. Two balls are released from the same height. One is dropped and the other is horizontally launched. Why do they reach the ground at the same time?

*The two balls reach the ground at the same time because they have the same vertical*

*components of motion: height, acceleration due to gravity, and initial vertical velocity of zero.*