

WORKSHEET ON HORIZONTALLY LAUNCHED PROJECTILES

1. A gun shoots a bullet with a velocity of 440 m/s. The gun is aimed horizontally and fired from a height of 1.8 m. How long is the bullet in the air? How far does the bullet travel?

	x	y
V_i	440	0 m/s
V_f		
a	0	10
d		1.8
t		

$$y = \frac{1}{2} at^2$$

$$1.8 \text{ m} = \frac{1}{2} (10 \text{ m/s}^2) t^2$$

$$t^2 = \frac{1.8}{5} \quad t = 0.36 \text{ s}$$

$$x = V_i t$$

$$x = 440 (0.36)$$

$$x = 158.4 \text{ m}$$

2. A coin rolls off the edge of a table. The coin was traveling with a speed of 0.4 m/s. It lands 0.2 m away from the table leg (which is straight down from the table edge). How long is the coin in the air? How high is the table?

	x	y
V_i	0.4	0
V_f		
a	0	10
d	0.2	
t		

$$x = V_i t$$

$$(0.2 \text{ m}) = (0.4 \text{ m/s}) t$$

$$t = 0.5 \text{ s}$$

$$y = \frac{1}{2} at^2$$

$$y = \frac{1}{2} (10 \text{ m/s}^2) (0.5 \text{ s})^2$$

$$y = 1.25 \text{ m}$$

3. You are on a building with a snowball. You see your favorite teacher walking by about 10 m away from you. How fast must you throw the snow ball to hit her (assume you hit her on the foot and you throw the snow ball horizontally from a height of 5.5 m). How long is the snowball in the air?

	x	y
V_i		0
V_f		
a	0	10
d	10	5.5
t		

$$y = \frac{1}{2} at^2$$

$$5.5 \text{ m} = \frac{1}{2} (10 \text{ m/s}^2) t^2$$

$$t^2 = 1.1 \text{ s}^2 \quad t = 1.05 \text{ s}$$

$$x = V_i t$$

$$\frac{10 \text{ m}}{1.05} = (V_i) (1.05 \text{ s})$$

$$V_i = 9.52 \text{ m/s}$$

4. A baseball is hit horizontally. It leaves the bat with a speed of 40 m/s. The batter hit the ball at a height of 1 m above the ground. How long is the baseball in the air? What distance does it travel before it hits the ground?

	x	y
V_i	40	0
V_f		
a	0	10
d		1
t		

$$y = \frac{1}{2} at^2$$

$$1 \text{ m} = \frac{1}{2} (10 \text{ m/s}^2) t^2$$

$$t^2 = 0.2 \text{ s}^2 \quad t = 0.447 \text{ s}$$

$$x = V_i t$$

$$x = (40 \text{ m/s}) (0.447 \text{ s})$$

$$x = 17.89 \text{ m}$$

5. You knock your phone off of your desk. It is in the air for 0.3 seconds, and your desk is 0.75 m tall. What is the initial velocity in the x direction? How far away from your desk does the phone land?

	x	y
V_i		0
V_f		
a	0	10
d		0.75
t	0.3 s	