Unit 3 Physics Study Guide: Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What is the difference between vector and scalar?

2. What are 3 examples of a vector quantity?

3. What are the 3 components used to draw a vector correctly?

4. Draw a vector

5. Add or subtract the following vectors:

 a. 5 m positive & 8 m positive

 b. 7 m north & 3 m north

 c. 6 m negative & 3 m positive

 d. 12 m north & 3 m south

 e. 6 m positive, 3 m positive, 2 m negative

6. Add the following right angle vectors using Pythagorean Theorem

 a. 10 km south & 35 km west

b. 50 m north & 28 m east

c. 7 m north, 8 m east, 10 m south & 5 m west

8. If you are given the angle at which an object is traveling and the total speed of the object, you can find the horizontal and vertical components using COS and SIN in your calculator.

a. The plane is flying at a 45ᴼ angle to the horizontal and has a total speed of 350 m/s. How fast is the plane traveling horizontally and vertically?

b. The boat is traveling at a 15ᴼ angle on the river with a total speed of 50 m/s. How fast is the boat moving horizontally and vertically?

9. Define projectile motion

10. The path of a projectile is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and it is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

11. The horizontal and vertical motions of a projectile are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of each other.

12. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ only affects motion in the vertical direction. It does not affect the motion in the horizontal direction.

**Horizontally Launched Projectile Practice**

14. A bullet is shot with a horizontal velocity of 110 m/s and is shot from a height of 1.3m.
What is the horizontal distance the bullet travelled?

15. A penny is thrown horizontally from the top of the Eiffel tower which is 300 m tall. The penny was thrown with an initial horizontal velocity of 11 m/s. How far from the base of the Eiffel tower did the penny land?

**Projectiles Launched at an angle Practice**

16. A pumpkin was launched at 44˚ to the horizontal with an initial velocity of 14 m/s.

a. Draw a picture of the scenario using the 2 numbers from above:

b. What is the initial vertical velocity of the pumpkin?

c. What is the horizontal velocity of the pumpkin?

d. How long did it take the projectile to reach maximum height?

e. What was the maximum vertical distance the projectile went?

f. How long was the pumpkin in the air?

g. What is the horizontal distance the pumpkin traveled?

h. What is the final total velocity of the pumpkin right before it hits the ground?