

1. What is a projectile? _____

_____.

Examples: _____

2. What is a trajectory? _____

_____.

Examples: _____

3. Equations:

Horizontal displacement: _____

___ = _____

___ = _____

___ = _____

Vertical displacement: _____

___ = _____

___ = _____

___ = _____

___ = _____

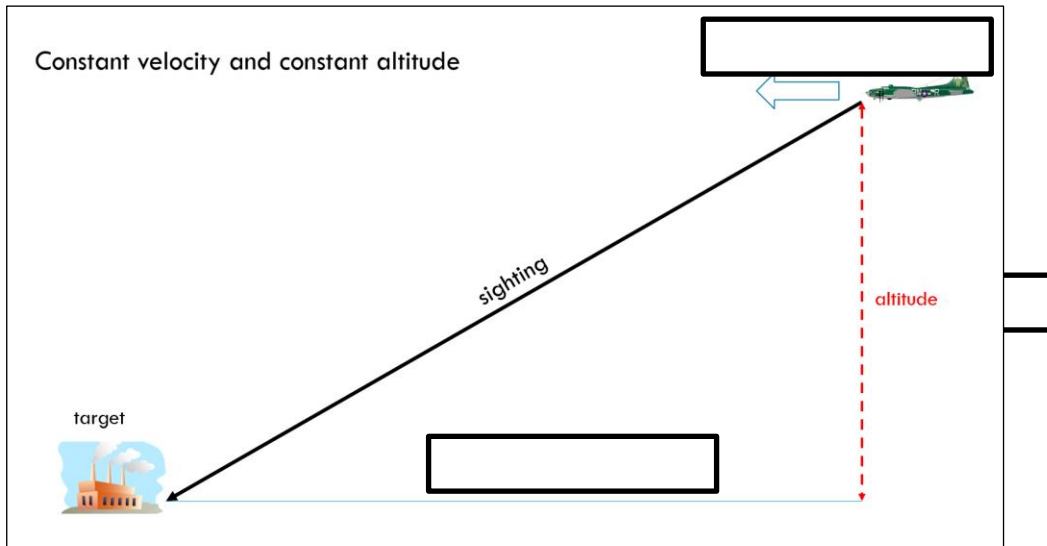
___ = _____

4. What does the demonstration show? _____

5. What does it mean when the vertical velocity is independent of the horizontal velocity?

_____.

6. Approach to target

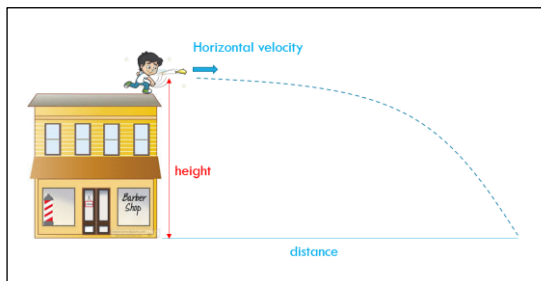


7. There are two types of projectile motion problems:

Type 1: _____

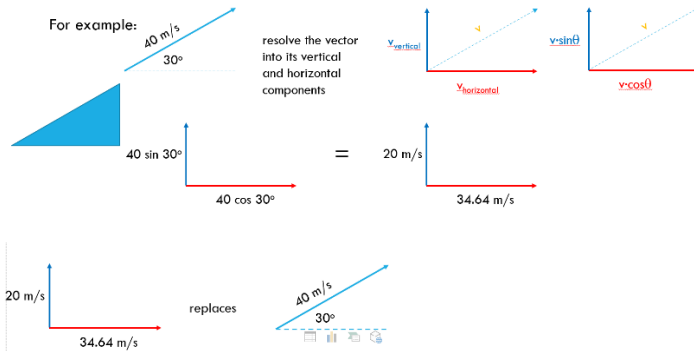
Type 2: _____

8. A type 1 projectile motion problem is where _____



9. As you can see from the last two diagrams, the three variables involved are

13. The initial velocity of the launch is given at an angle. In order to solve the problem, we must separate the initial velocity vector into its horizontal and vertical components. To do this we have to use trigonometry, specifically the sine and cosine ratio.



14. Two common things to solve for in type 2 projectile motion.

1. _____
2. _____

Note: _____

15. To calculate the height of the projectile, _____

To calculate the range of the projectile, _____

16. Calculating for the height knowing the vertical velocity

17. Calculating the time it takes for the projectile to reach maximum height.

Total flight time = _____

18. To calculating the range of the projectile, we use the same horizontal displacement equation as we did in the type 1 projectile motion.

Range = _____.

19. A projectile is fired with an initial speed of 490 m/s and angle of 30° . ($g = -10 \text{ m/s}^2$)

(a) Find the maximum height reached.

(b) Find the range of the projectile.

MYP Physics Projectile Practice Problems

1. An object is projected horizontally at 8.0 m/s from the top of a 122.5 m cliff. How far from the base of the cliff will the object strike the ground?

2. An arrow is shot at 30.0° angle with the horizontal. It has a velocity of 49 m/s (a vertical velocity of 24.5 m/s and horizontal velocity = 42.4 m/s)

a. How high will it go?

b. What horizontal distance will the arrow travel?

3. A person kicks a rock off a cliff horizontally with a speed of 20 m/s. It takes 7.0 seconds to hit the ground, find:

a. height of the cliff

b. final vertical velocity

c. range

4. A ship fires its guns with a speed of 400 m/s at an angle of 35° (328 m/s horizontally and 229 m/s vertically) with the horizontal. Find the range and maximum altitude.

5. A basketball is held over head at a height of 2.4 m. The ball is lobbed to a teammate at 8 m/s at an angle of 40° (6.13 m/s horizontally and 5.14 m/s vertically). If the ball is caught at the same height it was tossed at, how far away is the teammate?

6. A hunter aims directly at a target (on the same level) 140 m away. If the bullet leaves the gun at a speed of 280 m/s, by how much will the bullet miss the target?

7. A ball is thrown horizontally from the roof of a building 50 m tall and lands 45 m from the base. What was the ball's initial speed?

8. A bullet traveling 800 m/s horizontally hits a target 180 m away. How far does the bullet fall before it hits the target?

9. A student threw a ball horizontally out of a window 8.0 m above the ground. It was caught by another student who was 10.0 m away. What was the initial velocity of the ball?

10. A baseball was hit at 45 m/s (31.8 m/s horizontally and 31.8 m/s vertically) at an angle of 45° above the horizontal.

- a. How long did it remain in the air?
- b. How far did it travel horizontally?