

Hit the Target

Go to: <https://www.physicsclassroom.com/shwave/targetsh.cfm>

Overview:

Students are presented with the challenge of solving a horizontally-launched projectile problem in order to fire a cannonball into a target. Kinematic equations must be used to solve for an unknown quantity. Once the quantity is entered into the answer field, the target position is adjusted and students can fire the cannon. A successful solution is reinforced by the hitting of the target. If the solution is incorrect, the proper strategy and solution is displayed on screen. There are three types of problems selected at random - each corresponding to a different unknown quantity. The unknown quantities are launch height (y), launch speed (v_{ox}), and horizontal displacement (x).

Directions:

1. Once you have read the directions, navigate to the [Hit the Target Activity page](#).
2. Click the [Start](#) button.
3. Once you have received a problem, identify its type based upon the given and unknown information. Then fill in the information in the [Data Sheet \(separate page\)](#) and show the solution to the problem. Organize your work clearly and legibly; label all quantities (e.g., $y = -47.8$ m; $v_{ox} = 21.3$ m/s, etc.).
4. Once you have solved the problem, enter the answer in the appropriate field and click on the [Fire Cannon](#) button. If incorrect, then use the on-screen information to correct your solution.
5. You must correctly solve two problems from each of the three problem types in order to successfully complete this activity. If you miss a problem of a given type, a point will be subtracted from your progress report. You will have to solve an extra problem in order to earn it back.

Problem Type: Launch Speed and Height Known; Find Horizontal Displacement

1. Show your solution here:

$$v_{ox} = \underline{\hspace{2cm}}$$

m/s

$$y = \underline{\hspace{2cm}}$$

m

$$x = \text{????}$$

2. Show your solution here:

$$v_{ox} = \underline{\hspace{2cm}}$$

m/s

$$y = \underline{\hspace{2cm}}$$

m

$$x = \text{????}$$

Problem Type: Launch Speed and Horizontal Displacement Known; Find Launch Height

1. Show your solution here:

$$v_{ox} = \underline{\hspace{2cm}} \text{ m/s}$$

$$x = \underline{\hspace{2cm}} \text{ m}$$

$$y = \text{????}$$

2. Show your solution here:

$$v_{ox} = \underline{\hspace{2cm}} \text{ m/s}$$

$$x = \underline{\hspace{2cm}} \text{ m}$$

$$y = \text{????}$$

Problem Type: Launch Height and Horizontal Displacement Known; Find Launch Speed

1. Show your solution here:

$$y = \text{_____}$$

m

$$x = \text{_____}$$

m

$$v_{ox} = ???$$

2. Show your solution here:

$$y = \text{_____}$$

m

$$x = \text{_____}$$

m

$$v_{ox} = ???$$