

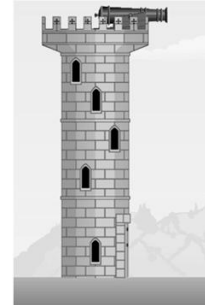
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1. In a lab group open the Virtual Physics Labs, green circle on the desktop. Pick the lab “Firing a cannon: Calculating projectile motion”
2. You are going to use Exercise 1 Simulation to determine the height of a tower we will use in later parts.

A. Open the simulation **Exercise 1 Simulation** and think of a way to use what we have learned about free-fall to calculate the height of the tower.

B. What is the height of the tower?  meters

C. Explain how your group found your answer.



3. You are going to use Exercise 4 Simulation to think about how high a projectile will travel when fired straight upwards.

A. Open the simulation **Exercise 4 Simulation** and think of what initial velocity you need to choose so that the ball arrives at the top of the tower with zero velocity. You can shoot with any vertical velocity you want. The mouth of the cannon is at ground level.

B. What velocity did you use?  meters/second

C. Explain how your group found your answer.



4. What have you noticed about the cannon ball, a projectile, in each of these 2 simulations?

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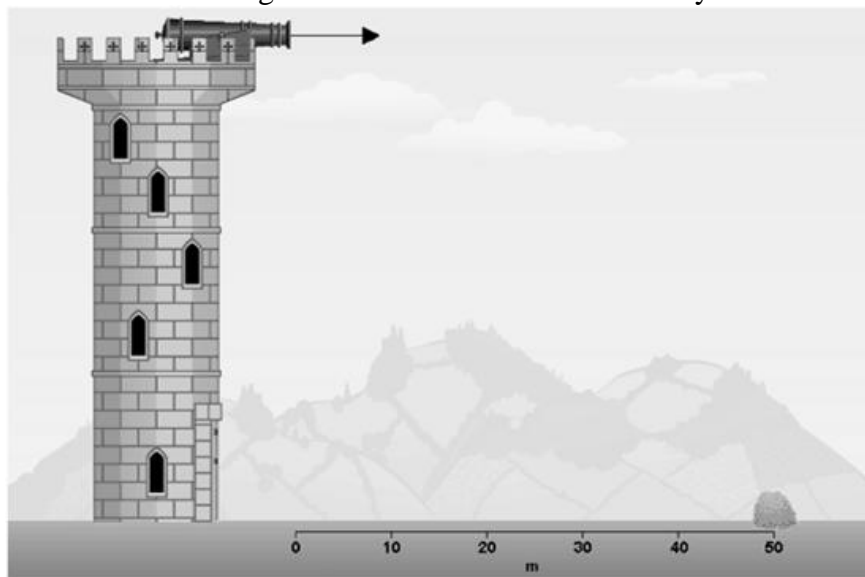
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----- Come back to your seats so we can start the ID-----

ID \_\_\_\_\_

----- Demonstration -----

We are going to continue defending our tower. We need to hit the haystack with our projectile.



----- Predictions -----

This is the same tower we have been using.

1. What velocity do we need to fire our cannonball with so that we hit the haystack?

2. What do we need to consider when calculating an initial velocity?

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----- Partner Discussion -----

----- Class Discussion -----

----- Physics Speaks -----

----- Results -----

1. What was the initial velocity that worked?

2. What happened to the vertical velocity as the cannonball traveled?

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3. What happened to the horizontal velocity as the cannonball traveled?

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4. Make a claim about why there was a difference between the horizontal and vertical velocities.

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----- Extend -----

Make a claim about projectiles in general.

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