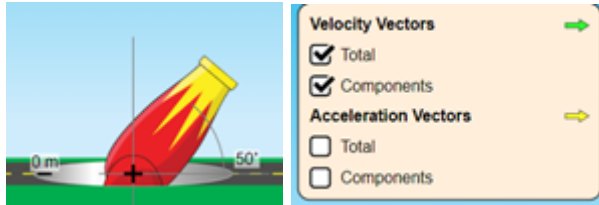


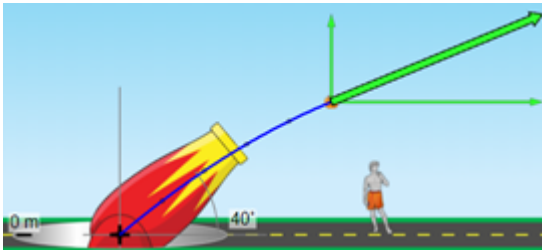
Projectile Motion PhET Simulation

Go to Schoology and click the link to “**Projectile Motion PhET Simulation**”. When the page loads, click the play button.

- Go to the “Intro” tab.
- Drag the cannon to the ground (altitude of 0 m) and make sure to check the two boxes under Velocity Vectors.



1. Describe the shape of the trajectory made by the projectile.
2. Look back at your notes. What is meant by the terms ‘ x -component’ and ‘ y -component’? Label on the picture below which one is which.



3. When you fire the cannon, what happens to the x -component of the vector over time?
4. When you fire the cannon, what happens to the y -component of the vector over time?
5. On the simulation, increase and decrease the initial speed. How are the range (that is, how far across the ground) and height (that is how far in the air) affected by changing the initial speed? Why do you think this is?

Name: _____

Date: _____

Period: _____

6. Change from a pumpkin to a tank shell. The mass of the tank shell is much larger.

<div>Pumpkin ▼</div> <div>Mass: 5 kg</div> <div>Diameter: 0.37 m</div>	<div>Tank shell ▼</div> <div>Mass: 42 kg</div> <div>Diameter: 0.15 m</div>
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What happens to the trajectory when you use this larger mass? Why does this make sense?

7. Now, keep the initial speed constant but change the angle. Figure out which angle gives the projectile the tallest height.

(a) Which angle has the tallest height?

(b) Why does this make sense?

8. Next, figure out which angle gives the projectile the longest range.

(a) Which angle has the longest range?

(b) Explain why projectiles fired at angles close to the ground (like 25°) don't go as far as projectiles fired at 40° , 45° , or 50° .

(c) Explain why projectiles fired at very high angles (like 85°) don't go as far as projectiles fired at 40° , 45° , or 50° .

9. Can you figure out pairs of angles that give the same range? Can you notice a pattern?

_____° and _____°

_____° and _____°

_____° and _____°