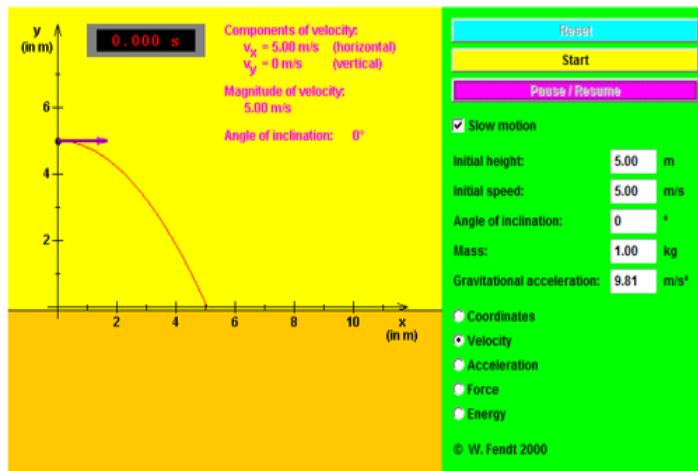


# Projectile Motion - Introduction

Open your browser and follow the link below: [Projectile Motion Applet](#).

[http://www.walter-fendt.de/html5/phen/projectile\\_en.htm](http://www.walter-fendt.de/html5/phen/projectile_en.htm)

[<http://bit.ly/1Qeaw1z>]



1. Set the angle to  $0^\circ$  so that the object is *projected horizontally*.
2. Set the initial height to 5.00 m.
3. Select the *Velocity* radio box (this will show you the components of the velocity as it is moving)
4. Check the the *Slow Motion* check box.
5. Set the initial speed to zero (0 m/s). Press start. Describe what happens. Note the  $V_x$  and  $V_y$  values. [up is positivie]
6. Record the **impact distance** (estimate), **time**, **speed** (both  $V_x$  and  $V_y$ ) and state the impact **velocity**,  $\vec{V}$  (size and direction)
7. Set the initial speed to 2.00 m/s and repeat steps 6 for initial horizontal velocities of 4.00 m/s, 6.00 m/s, 8.00 m/s, 10.00 m/s.
8. What did you notice about the time it takes the object to reach the ground in each case?
9. What did you notice happens to the distance it lands at when the object is shot with a greater initial speed.
10. What happens to the angle of impact as the initial speed increases.
11. What is the overall shape for the motion of the object? What must we neglect for this to be true?

# Projectile Motion

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Aristotle believed (incorrectly) that objects shot into the air followed a straight line until they lost their “impetus” at which point they dropped suddenly out of the air!!

## **Motion of Objects Projected Horizontally**

**Key Point:** All objects near the surface of the earth fall with the same uniform acceleration; thus if dropped from the same height, two different objects will hit the ground at the same time.

### **Galileo was the first to devise that:**

***An object is controlled by two independent motions. So an object projected horizontally will reach the ground in the same time as an object dropped vertically. No matter how large the horizontal velocity is, the downward pull of gravity is always the same***

Until Galileo no one was sure what the shape of the path followed during projectile motion was. Careful observations found that the path was a *parabola*.

### **Projectile Motion:**

*Motion with a constant horizontal velocity combined with a constant vertical acceleration due to gravity.*

