

Home » Hobbies & Science » Woodworking Projects » Make Out of Wood » How to Calculate Force for a Vertical Trajectory

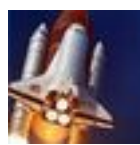
How to Calculate Force for a Vertical Trajectory

By [Andrew Breslin](#), eHow Contributor | updated July 08, 2011

One of the first things a student learns in physics class is that force equals mass times acceleration. This is logical and intuitive. It takes twice as much force to impart the same acceleration to a 10kg weight as it does for a 5kg weight. Using the same amount of force will accelerate the 10kg weight half as much. Suppose you want to apply enough force to an object for it to travel a certain vertical distance. A few calculations will tell you the answer.



Other People Are Reading



[How to Figure a Rocket's Trajectory](#)



[How to Calculate Elevated Archery Shots](#)

Instructions

1 Determine how far vertically you want your projectile to travel. Calculate how long the object would take to cover this distance under the Earth's gravitational acceleration, which is 9.8m/second^2. The equation for an object under constant acceleration is: $x = V_o t + \frac{1}{2} a t^2$ wherein x = distance, V_o = initial velocity, a = acceleration and t = time. Suppose you want your object to travel 30 meters vertically. Initial velocity is zero. So, solving for t , we get this: $t = \sqrt{(x / \frac{1}{2} a)}$. That works out to 2.47 seconds.

Calculate the velocity the object would be traveling accelerating for the amount of time calculated in step one. $V = V_o + at$. If t is 2.47 seconds and acceleration is 9.8m/second^2, that works out to 24.206 meters per second. This is how fast an object would be traveling if it fell from a height of 30 meters. It's also how fast something would need to be moving to travel 30 meters up into the air.

3 Calculate how much force you would need to impart to the object to accelerate it to this speed. You'll be applying this force for a specific length of time. Suppose your object is one kilogram and you want to apply the accelerating force for one second. You would need to apply a force sufficient to accelerate the object 24.206m/second^2. Since the object has a mass of one kilogram, and force = mass times acceleration, the force would be 24.206 kilogram meters/second^2. One kilogram meter / second^2 is a unit of force called a Newton. So the force necessary to send a one kilogram object 30 meters up is 24.206 Newtons, applied for one second.

Sponsored Links



Related Searches:

[Equations of Physics](#)

[Calculate Healthy Weight](#)

[Force One](#)

[Physics Answer](#)

[Travel Distance](#)

[Equations of Physics](#)

[Calculate Healthy Weight](#)

[Force One](#)

[Physics Answer](#)

[Travel Distance](#)

References

[Physics Classroom; Projectile Motion](#)

[Physics Hypertextbook; Force and Mass; Glenn Elert](#)

[Georgia State University; HyperPhysics; Description of Motion](#)

Photo Credit Jupiterimages/Photos.com/Getty Images

More Like This



[How to Figure a Rocket's Trajectory](#)



[How to Calculate Elevated Archery Shots](#)



[How to Calculate the Effects of Wind on Trajectory](#)

Comments



Comment

Facebook social plugin

Slideshows



[Best Foods for Canning](#)



[20 Best College Football Venues](#)



[6 Ways to Get Out with the Gals](#)

Related Ads

[Calculate Distance](#)

[Calculate](#)

[Physics](#)

[Calculate Healthy Weight](#)

[Physics Answer](#)



[View Photos](#)

[Top 10 U.S. Hobbies](#)

You May Like



[How to Calculate the Effects of Wind on Trajectory](#)



[How to Calculate Trajectories](#)



[How to Diagram a Trajectory](#)



[How to Calculate Shooting Angles](#)



[How to Calculate Horizontal Velocity](#)



[How to Calculate Longitudinal Force](#)



[How to Calculate a Pendulum's Trajectory](#)



[How to Increase Your Vertical Jump](#)

Today in eHow



[Top 10 Kindle Tips](#)



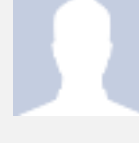
[30+ Paint Projects That Pop](#)



[How to Dress for Coachella](#)



[Graduation Party Food & Drink Ideas](#)



Others Also Viewed

Facebook social plugin

[How to Find Vertical Force](#)

[How to Find Acceleration in G's](#)

[How to Calculate Falling Distance](#)

[Force & Motion Experiment Ideas](#)

[How to Find Force Calculation](#)