

A lab for gravity design

[Design](#)



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However, if you used a weight which was heavy enough, the effect of air resistance would be minimal. For our experiment, we would use several things which would help us gather data so that our calculations would be nearest to the true value of g (acceleration due to gravity). One object which we used was a pulley system. We put a string through the pulley and attached the weight to the string. This supported the object by providing stability so it would fall straight down and not at an angle.

If we were to drop it using our hands rather than pulley, this could increase human error because we would not be able to drop it straight down. When conducting the experiment, we used a ticker tape and ticker tape timer because it could measure the distance traveled by the object (the weight) in a given time. For every second which passed, 60 dots would appear on the tape (6 dots for every 0.1 seconds). We would drop the object from the height of a table (83 CM) and attached to the object would be the ticker tape. We stuck the tape onto the weight and held the timer so that the tape would be leave the tape and going straight down.

If we would place the ticker tape timer onto the table, It would hit the edge of the table and form a 90 degree and angle and then be pulled by the object. This would cause friction and reduce the accuracy of our results and calculations. For us to be able to attain accurate results and reduce the force of friction on the tape, we held It vertically so the tape would be pulled straight down rather than at the angle. When dropping It, we would use the pulley system and let go of the string holding onto the weight. When the object reached the ground, for every 0. Seconds, here would be 6 dots on the ticker tape. This would help us get our displacement (change In distance)

and in turn the displacement in each time interval. However, we would not get the true value of acceleration due to gravity because forces of friction would still be acting on it from the pulley and from the ticker tape leaving the ticker tape timer. In the rest of the experiment, precautions were taken to reduce this effect on our results. The ticker tape would be used to determine how much time it took for the object to fall and the distance of the fall.

After obtaining the ticker tape, we would observe the dots on it and make calculations. We would separate the dots into 6 dot segments, meaning we would count 6 dots starting from the second dot on the ticker tape (we don't count the first dot because the object wasn't moving) and make a line at those 6 dot segments. These 6 dots would represent 0.1 seconds. We would then calculate the distance by measuring the length between each of these 6 dots using a ruler. After making these necessary calculations, we graphed the distance-time graph and an equation of motion to find out the acceleration (a) acting on the falling object.

This acceleration acting on the object, would be the gravity acting on the object. We know it is gravity because the object is falling straight down and there is no horizontal motion. It is only vertical motion downwards. The equation of motion which would be the best option would be the third equation; $s = ut + \frac{1}{2}at^2$. We know the initial velocity is 0 m/s [down] because the object was placed at a stagnant position (not moving) and then dropped, meaning there was no motion occurring on the object. We use the third equation because we can find all this information using ticker tape.

So we would plug in the values at every 0.1 second intervals and solve for acceleration. We would perform 5 trials to show that our experiment and solution is accurate and if repeated would produce results which are near to our results. After conducting five trials, we calculated the average of all the results. We did this because one result is not representative of all the trials and so calculating the average would provide us the typical results of all our trials. If this experiment is executed flawlessly, this value should be 9.8 Mm/s² [down], but it won't be due to different factors mentioned above.