

3.8 General Practicum. Galileo's Experiment and the Acceleration of Gravity

In this experiment, you can verify Galileo's result and also verify Newton's laws.

Needed:

A building of several stories, or a tree, from which you can drop things from several heights

A long tape measure to measure heights

Several compact objects of different weights such as a marble, a baseball, and a heavy stone. The objects should not break when dropped.

Stopwatch with timing in hundredths of seconds

Notebook for records

Instructions:

For the first part of this Practicum, you will measure the time for an object to fall to the ground after being dropped from different heights. Start by measuring a height of two feet, and drop the baseball from this height. Use the stopwatch to measure accurately the time for the baseball to hit the ground. The person with the stopwatch should be close to the point where it hits.

Since there is a lot of possibility for being inaccurate in your timing, do the following. First, use a countdown to make sure you start the stopwatch at the same time you drop the ball. Second, have several people time the fall, if possible. Last, do several trials. Write down all the different times for each trial.

Next, double the height to four feet and do the same thing. Then go to eight feet, and sixteen, and higher, if you can. In your notebook, you should have a clear record of the times recorded for the fall from each height. You will analyze these numbers in the Math Focus sections.

Last, from your highest height, drop each of your different objects of different weights. To see if there is any difference in the time of the fall, drop two objects at the same time and have a witness watch when they hit. Do they hit at the same time? This is the same experiment that Galileo did, dropping two objects from the Leaning Tower of Pisa.