

296 Lab Week 5 : Simple Pendulum

Measure the acceleration due to gravity on the earth. Locate the simple pendulums hanging near the wall in the MSLC. Allow the mass to swing back and forth through a small angle of about 10 degrees each way. Measure the time (ask at MSLC desk for a stopwatch) for each complete swing (the period T), and the length L of the pendulum. For the period T , let the pendulum swing about ten complete periods and measure the total time in order to get the average period.

Then use

$$g = \frac{4\pi^2 L}{T^2}$$

to obtain the acceleration g due to gravity on the earth's surface.

Repeat the experiment using both the short and long pendulums. Record your measurements, calculations, results and observations in your notebook.

Optional: Acceleration due to gravity on the Moon

Go to the desk of the MSLC and check out the videotape (Code Phys1301) of astronaut David R. Scott dropping a hammer and a feather simultaneously on the Moon. Use the expression

$$h = \frac{1}{2}g_m t^2 \Rightarrow g_m = \frac{2h}{t^2} \text{ to find } g_m$$

First make an estimate of h , the dropping distance. Then, estimate the dropping time t . Here is how to do it. Watch the timer on the TV screen. Note the reading when Scott drops the hammer and the reading when the hammer hits the Moon. Next use the second hand on your watch to estimate what time in seconds corresponds to that difference. Time a couple of hundred numbers. That will give you t . Calculate g_m .

Record your measurements, calculations, results and observations in your notebook.