

## Pendulum Lab

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The value for gravity that is found on your data sheet ( $9.81 \text{ m/s}^2$ ) is actually the average across Alberta. The true value of the acceleration due to gravity varies from place to place. Although the value does not change very much (you won't "feel" heavier in Calgary and lighter in Grand Prairie), the differences are measurable and important when performing delicate physics experiments.

### **Purpose**

The purpose of this lab is to measure the acceleration of gravity in Edmonton. To accomplish this, you will use a simple pendulum (made out of thread and a weight tied to the end), a metre stick, and a stopwatch. By measuring the period of a pendulum with a measured length, you will be able to calculate the acceleration due to gravity using the formula:

### **Procedure**

There are a few things to consider when you come up with your procedure for this lab:

1. This formula is only reliable and accurate for angles of at most about  $15^\circ$  away from the equilibrium point.
2. It is quite difficult to measure the exact period of just one swing. Hint: If I asked you to measure the thickness of a piece of paper, you would measure the thickness of, say, 100 pages in a book, and then divide that number by 100.
3. Rather than just doing one trial, do several. Do lots. Do so many you start to question your own sanity. Maybe you could even do them with different lengths of string, or for different numbers of swings.

A spreadsheet makes this lab very easy to do. You can easily do a large number of trials and then set up a spreadsheet to analyze data. I highly recommend this as a way to increase your accuracy.

### **Post-Lab Questions**

There are two questions that go at the end of the lab after the conclusion:

- 1) If Galileo tried to do this same lab in his time, what major difficulty would he have had.
- 2) If you did this same lab on the moon, how would your observations be different.