Sample Lab Report

This is an example of a well-written report from the elementary labs. As explained in the lab manual, it contains only the significant details of the experiment, the analysis and some conclusions. Particularly pertinent features are called out in the marginal notes. Background material is not needed because the reader is assumed to have the lab manual available.

Although this document is typed for legibility, you are not expected to type reports nor to produce fancy graphs. A carefully hand-written paper is entirely sufficient.

Physics 007
Experiment 101a The large amplitude pendulum
by: I. M. Student
partner: A. Bumbler
February 30, 2001

We are trying to measure the amplitude dependence of the period of a simple pendulum. By extrapolating to zero-amplitude we determine g.

Short statement of intention

Procedure

The procedure was as in the lab book, except:

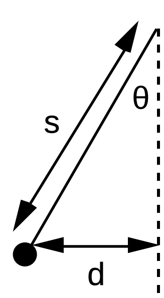
1. Rather than measure the pendulum length directly, we used a meter stick with caliper jaws to measure from the support to the bottom of the pendulum ball. We measured the diameter of the ball with calipers, and found the distance from the support to the center of the ball by subtraction.

Only changes are described, with a diagram for clarity.

2. To get the angle we measured the distances s and d shown in the sketch and used the relation

$$\sin \theta = d/s$$

This seemed more accurate than using the small protractor provided.



Data

total length = 0.757 m ± 0.002 m
ball diameter = 0.0256 m ± .0005 m
pendulum length = 0.744 m ± .002 m
string length s = 0.731 m ± .002 m

Single items of data are just listed, with uncertainties.

The period was measured three times for each angle and averaged

Tables compactly display a set of data.

d (m)	T (s)	aver T (s)	θ (rad)
.164 ±.002	1.7326, 1.7330, 1.7328	1.7328.226	
.104	1.7294, 1.7296, 1.7297	1.7296.143	
.043	1.7286, 1.7288, 1.7288	1.7287.059	
.226	1.7380, 1.7381, 1.7382	1.7381.314	
.385	1.7606, 1.7609, 1.7609	1.7608.555	
.292	1.7460. 1.7460. 1.7462	1.7461.411	

We used Graphical Analysis to plot T vs θ^2 and fit a straight line. The straight line is an acceptable fit, showing that the relationship

$$T = T_0 (1 + \theta^2/16)$$

is reasonable. The graph is attached.
To get g we use the results from the program:

Explain calculations, but don't show arithmetic.

intercept = $T_0 = 1.728 \pm .0002$ s
slope = $T_0/16 = 0.108 \pm 0.001$ s => $T0 = 1.73 \pm .02$

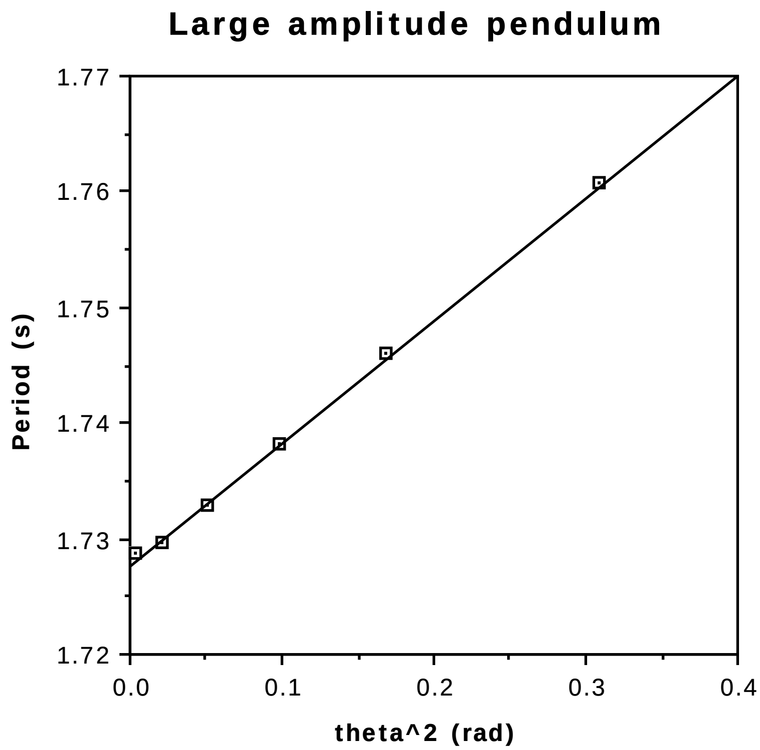
and the pendulum equation

$$T_0 = 2\pi\sqrt{g / \ell}$$

to find g = 9.84 m/s. The length of the pendulum is the largest uncertainty, at 0.3%, so it determines the uncertainty in g = 9.84 ± 0.03 m/s.

<u>Comments</u>
Our results are consistent with the claims in the lab manual. The value of g is about the same as we found in the free-fall experiment.

Be sure your conclusions agree with your data. Comparison to "accepted" values not usually appropriate.



Axes are labeled, with units. Data points marked clearly.