

where D_{exp} and D_{true} are the calculated and accepted values of the experimentally determined quantity (i.e., density). Note that the vertical bars indicate absolute value – do not report a negative PRE.

Report

Begin with a brief **introduction**: what were you measuring, and, in general terms, how were you measuring it? In this exercise, you weren't just trying to determine the density of water – you were investigating how a change in the precision of a measuring device affected the precision of a calculated result (i.e. the density.)

Keep the **experimental** section brief, and provide a proper reference to the lab manual. Outline what was done. Don't state that "a vial was weighed and then filled with water from a 100 mL graduated cylinder and weighed again". How about "A 5.0 mL sample of water was measured with a 100 mL graduated cylinder and weighed by difference into a capped vial. Three determinations were made, and the density of water was calculated. The density determination was repeated for each measurement device."

The **results** section will contain three tables (and some supporting text telling the reader what's in the tables). Here's an example:

Table 1. Masses determined using a 100 mL graduated cylinder to measure a 5.0 mL sample of water.

Trial	Mass of vial (g)	Mass of vial and water (g)
1		
2		
3		

Use a separate table for each different piece of glassware. Notice that tables contain raw experimental data (in this case, masses.) Don't subtract the mass of the vial and make a table of masses of water – that is not what was measured. You're writing to an audience that is sophisticated enough to difference the masses.

Next, you calculated the densities for each of the nine masses – how? If you defined density somewhere in your paper as equation 1, you should state that "Densities were calculated for each piece of glassware using eq 1 and the data in Tables 1-3". The calculated densities were averaged and are shown (with standard deviation) in Table 4". (Don't forget to calculate the standard deviations either with Excel or by hand.) Here's an example (**these are NOT real data**):

Table 4. Average density of water determined using each measuring device.

Measuring device	Average Density (g/mL)	PRE
100 mL Graduated Cylinder	0.97 ± 0.21	2.8
10 mL Graduated Pipet	1.01 ± 0.09	1.20
5.00 mL Volumetric Pipet	0.997 ± 0.020	0.100

Notice in Table 4 that the standard deviation is reported to the same degree of precision as the final answer – not to the same number of significant figures. A good example is the average density of the 10 mL graduated pipet. Even though the density is reported to three significant figures, the standard deviation is reported to the same degree of precision as the final result, which in this case is to the nearest 0.01 g/mL. Expressing the precision to the same