## Weighing

This sounds easy - and with care it is but there are a few things to look out for.

**Accurately weighing approximate amounts** – it may seem odd if you are told to accurately weigh out approximately 1.3g of a substance but it does make sense really.

Approximately 1.3 g tells you that it doesn’t matter if it is exactly that amount but the accurately part means that you need to know exactly how much you actually have. For instance, if the reading on your balance tells you, you have 1.277g, that is fine. You have an accurate mass and it is close to the required amount.

**Weighboats**

For the purposes of this document, we will use the term weighboat to cover all sorts of container to weigh substances out into.

The point is that you can’t just pile your solid onto the pan of the balance. Aside from the fact that you will have difficulty getting it all off, the pan will get contaminated. Liquids are even worse.

For solids, you can buy specially designed plastic weighboats. Most of the time, however, a small piece of paper or aluminium foil will be just as good – as long as the solid won’t react with it.

For liquids, it is possible to get special weighing bottles but again there is not usually any need. Simply use a small beaker instead.

**Weighing by difference.**

most of the time when you are weighing something, you will simply zero the balance, out the substance on the balance and take the reading. For accurate work, however, this is not quite good enough. The zeroing tends to drift and thus give inaccurate results. The way to do it is to:

1. zero the balance
2. Place your weighboat (or bottle or paper) on the balance and take the reading.
3. Add the mass you want to that figure to give you the total to aim for.
4. Carefully add the substance to the container until you reach the required value.

*eg If you want to weigh out 0.75 g of copper chloride*

*1) Your weighboat mass = 1.173 g*

*2) Your target mass, therefore, is 1.173 + 0.75 = 1.923 g*

*3) carefully add copper chloride until you reach a total of 1.923 g.*

1. Where it is important to be as accurate as possible, after you have emptied your solid into the beaker or flask, you should weigh your weighboat again to make sure all of the substance has been removed. This is particularly important with liquids, especially viscous ones.

**Accuracy**

For most laboratory work a 2 decimal place will be quite accurate enough. There are a few occasions when the greater accuracy of a 3 decimal place may be required.

Most commonly this will be when making up standard solutions. It may often be possible to avoid this though if you buy in a few ready made-up primary standard solutions then these can be your ‘fixed points’ for calibrating anything else.

**Using Liquids**

It is quite possible, and in the case of small volumes, can be more accurate to use mass and balances to measure out liquids.

For instance, in the antioxidants experiment solution A calls for 1.08 cm3 of concentrated sulphuric acid. Measuring 1.08 cm3 is beyond the capabilities of most volumetric measurements but measuring 1.08 g is quite straightforward.

However – beware of the fact that unless you are dealing with pure water, the density is not exactly 1.0 g/cm3 so you will have to calculate the mass you need. In the example above, 1.99g of sulphuric acid is needed..