

### Estimates and Ranges

Even if you cannot weigh out the exact number of grams or moles you need, you can still end up with the specified concentration of material in your solution. Simply adjust the volume in which you will dissolve the substance to reflect the amount you actually weighed out.

For instance, you wanted 18.03 g of sucrose that you would be adding to water to get a total volume of 100 ml. You spooned out some sucrose and note that you actually weighed out 20.5 g.

There's no need to throw the excess away, and, you **MUST** not return excess chemical into the bottle.

Since you weighed out more than you had planned, you would need to dissolve the chemical in more water than you had initially intended. Actually, you should dissolve the sucrose in:

$$\frac{20.50 \text{ g}}{18.03 \text{ g}} \quad \text{volumes of water.}$$

Notice that the “gram” units cancel out (this is Algebra!) and so you have generated a simple ratio for multiplying with the volume (100 ml).

That is, you multiply 100 ml (the planned volume), by 20.5/18.03 or 1.14

The actual value can show up on your calculator as 1.13699..., but this is too many numbers after the decimal point. You are limited by the actual number of digits in the amount you weighed out, which is 20.5.

Answer:

Adjusted volume should be 114 ml to obtain the desired solution strength when 20.5 g instead of 18.03 g were weighed out. The ratio of 20.5 to 18.03 rounds out to 1.14.