



### Problem solving:

**Averages:** - add all the values (numbers) together and divide by how many you have added.

Eg.  $10+15+5$  divide by 3 because 3 numbers were added. Answer = 10.

**Ratios;** you must divide all numbers by the same. Simplify it as much as possible but they must all be whole numbers ie no decimals.

Eg. 35:21:14 all these numbers divide by 7 so the **simple whole number ratio** is.

**5:3:2**

**Percentages** – to calculate a number as a percentage. Divide the number you are trying to find by the total and multiply by a hundred. Eg dividing your test score by the total.

22 out of 30 =  $22/30 \times 100 = 73\%$

**Percentage change** - difference divided by the original value multiplied by 100.

Eg. 50 bacteria at the start, after 5 hours they had multiplied to 700, what is the percentage change in number? Difference =  $700-50 = 650$ . Divided by the starting value = 50

$650/50 \times 100 = 1300$

**Graphs & charts** – remember the SLURP rule. Copy labels directly from the table column headings. Do not miss out anything including the units.

You must put a starting value in the origin for each individual axis. This might be a zero, but not always.

Use a ruler to help you plot your points this will reduce the risk of you skipping boxes.

Remember each box on a scale must be the same value. If you have 10 boxes between 0 and 1 you must have 10 boxes between 1 and 2, 2 and 3 and so on.

**Relationships** – as one thing changes it affects another. You must mention both.

**Variables** – the only variable that can be changed is the one being investigated. Constant variables, you need to give an example not already mentioned in the question text or diagram. **Do not use the word amount.** You must say the **volume** of solution... or **the pH** of..... or the **concentration** of the ..... the **mass** of ect

**Control** – a control is set up to make a comparison. You must state that everything is set up exactly as in the experiment but without the variable being investigated.

**Reliability** – the results can be made more reliable by repeating the experiment in exactly the same way.