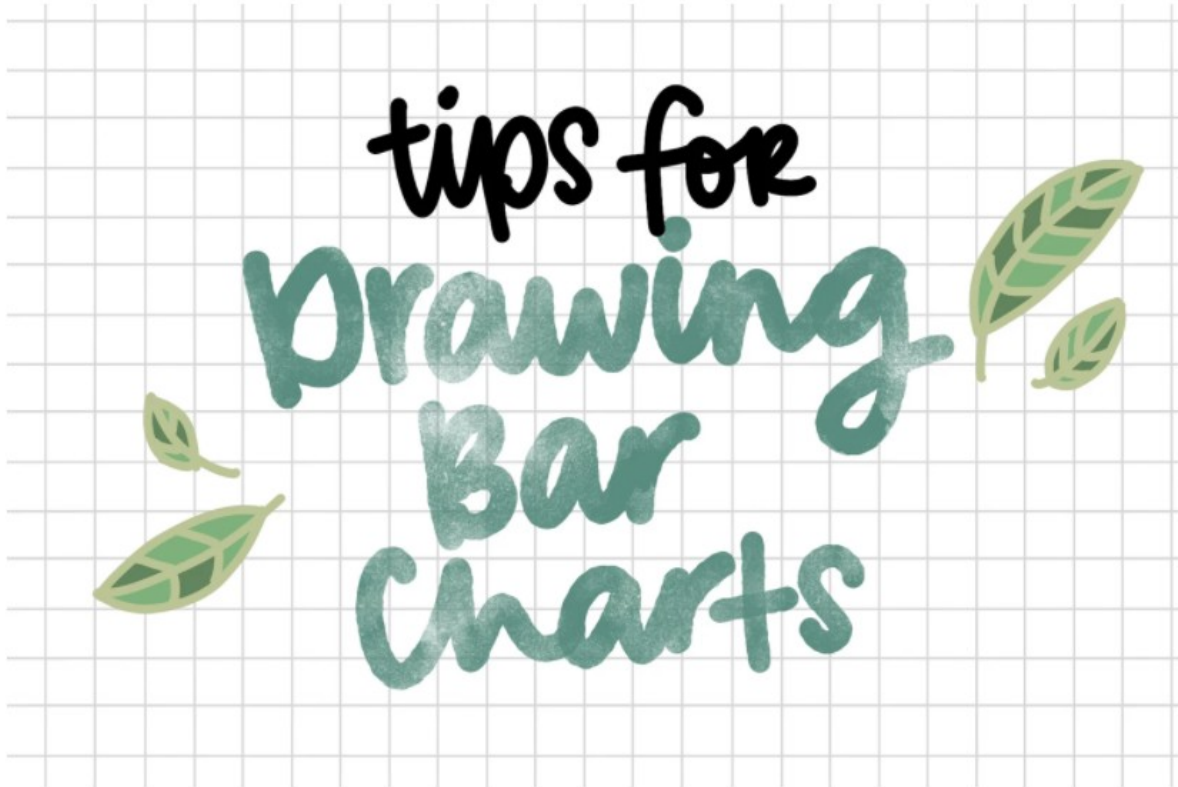


Drawing Bar Charts in Biology

I wrote about drawing line graphs in a previous post. In this short post, I'll highlight some things you should note about drawing bar charts. There are many overlapping points and I would be using the same info from the post on drawing line graphs so skip those parts if you are already comfortable in doing those.



Draw a bar chart, only if you're told to...

Bar charts are used, usually, when the independent variable is non-numerical (e.g. different types of solutions, see the sample bar chart below), and the data is discontinuous. Most often, though, the question explicitly states for a bar chart to be drawn. In fact, unless they specifically state that you draw a bar chart, all other graphs drawn should be a line graph.

Scale (same as in line graph)

The scale you choose should have all plotted points occupying **at least 50% of the grid** provided, in both the x and y direction. To check for this, just make sure the lowest value and highest value fill at least half of each axis. (I've indicated in [green](#) in the sample bar chart below what this means).

Be mindful about the scale you use, **choose one that is easy to work with**.

Examples include:

- "0, 2, 4, 6...." or

- "0, 5, 10, 15...."

for each 2cm square on a standard graph paper (or simply put, each "big square").

You are not to use "awkward scales". These scales are named as such because the scales cannot be read properly and plotting may become inaccurate. An example would be

- "0, 3, 6, 9...." for each "big square". It's difficult to accurately plot a value of 4 in this case.

Next, be careful while labelling your scale on each axis. Make sure there are ***no gaps in the scale***. By gaps, I mean this: "0, 5, 10, 20, 25, 30" where *15* is missing from the scale.

If the values provided are huge, there is ***no need to start from zero***. To maximise the grid provided, start with a comfortable value just below the provided value or use the actual value if it's suitable for your scale.

Always remember to label the origin with the starting value of each axis.

Many students tend to only label the scale on the axes but would forget the point of origin, especially if it doesn't start with "0".

Axes (same as in line graph)

There are a number of things to note to score the 1 mark for this component.

The question provides you with a table of values and wants you to "*Plot a bar chart of these data on the grid.*" Which set of data is for the x-axis and which is for the y-axis?

Remember that ***independent variable is the one on the x-axis***, and the ***dependent variable is on the y-axis***.

Sometimes, the question could be (for example) "*Construct a bar chart to show the height of froth produced in each of the 4 test-tubes after 10 minutes*". In this case, the height of froth is the dependent variable (values measured and recorded during the experiment) and the type of test-tube is the independent variable. So, the type of test-tube is on the x-axis and height of froth is on the y-axis.

Next, do not forget to ***label both axes***. Write the title and the unit (just follow the phrasing given in table) for each axis. Either one of the below 2 ways are acceptable:

- height of froth/mm
- height of froth (mm)

One more thing for this axes component... **Label the scale on the axes**. Use small dashes as markings and make sure the "big squares" are labelled with a value. (See the annotations in pink in the sample bar chart below).

Bars

A few things to note when drawing bars:

- The bars should be drawn **using a ruler**. Use the lines of the grid to guide you so you will not draw a slanted line (especially for the horizontal lines).
- The bars should also be of **equal width** (thickness). Again, use the small squares to guide you. Just standardise the number of squares you use for each bar.
- There should be **a gap between the bars**. And again, these gaps should be of equal spacing (or equal number of small squares between them) as well.
- The bars can be arranged in any order, but my advice is to follow the data on the table of values so you wouldn't miss out on any.
- Don't forget to label each bar below (along x-axis). Use the same phrasing/words from the table of values.

I've highlighted the above points through annotations in the sample bar chart below.

The question and data below are taken from 5090 Biology, Oct/Nov 2017, Paper 61, Question 1.

- (a) (i) On Fig. 1.2 measure the height of the froth in each test-tube and record your results in Table 1.1. The value for glucose has already been entered.

Table 1.1

solution	height of froth/mm	
	after 5 minutes	after 10 minutes
distilled water	5	5
5% glucose solution	25	65
5% lactose solution	5	5
5% sucrose solution	22	62



Sample bar chart with annotations.

- (b) (i) Construct a bar chart to show the height of froth produced in each of the 4 test-tubes after 10 minutes.

