

How to write a lab report

So you have been asked to write a lab report and you are not sure where to start. This may feel, at times, like you have been asked to climb a mountain and you have no climbing gear.

This short presentation is designed to provide you with an outline of how to write a successful lab report. Remember, in order to be an active learner, it is advisable to take notes. You can pause and rewind this presentation at any point and watch it as many times as you need to. Let's get started.

Slide 1: Making a plan and researching. All great work starts with a plan, if you are unsure on how to plan, pause this, watch the 'A guide to essay planning' and 'How to research' presentations, which will provide you with tips you can apply to your lab report planning, and come back when you have done.

Once you have made a plan, you may want to choose a title, make sure your title gives a good explanation of what your lab report is about but keep it brief. Some people prefer to leave this to the end, it is entirely up to you.

Slide 2: Writing an abstract. The abstract should provide a quick overview but be concise, it should include methods, results and conclusions but briefly. It allows the reader to grasp what the work is about and allows them to decide if it is appropriate for their needs, without having to read the whole article. This is also something that can be left to the end and again this is your choice. Here is a checklist of what to include in your abstract, you may want to make a note of this or take a screenshot for future reference. Questions to ask yourself are 'does it explain why the work was done?' and 'Does it outline the whole of my work and findings?'

Slide 3: Be aware of the common mistakes when writing an abstract. Sometimes the abstract is not there or it is actually a topic introduction, giving no indication of findings or conclusions. As there are word count restrictions to abstracts, it is often tempting to write less or alternatively write too much if you think you have not stated all the points you wanted to make. Be clear, concise and straight to the point.

Slide 4: Writing an introduction. When writing your introduction you need to think about the broad/overarching topic and provide a brief account of this. So for example, if you were investigating the evolution of a particular species, you might give an overview of what we understand about evolution. You can then focus on the narrower topic(s), what your report will be about. Questions to ask yourself are; 'Is it the correct depth for the reader?', 'Have all technical terms been defined?'

You need to make your hypotheses clear at this point, discuss any previous research or studies and state the reasons and importance of your work. Make sure you clearly define any technical terms and include correct citations.

Slide 5: Here are the common mistakes that are made when writing introductions. Again it is tempting to discuss everything, this is where efficient and concise research comes into play, be selective about what you include.

With the word count in mind you may be tempted to shave bits off your introduction and not provide the reader with enough information, again, proper planning will support you with writing what is required.

Often introductions are underestimated and as a result they can become unclear and have a confused structure, sometimes containing lists. Remember to stick to your plan to avoid going off course.

Try to avoid using the third person in your introduction, it is often tempting to write things like 'I will be investigating', when you have literally done the investigating and invested a large amount of your time into this work. Instead you should write things like 'This report will investigate' or 'The aims of this report are'

Slide 6: Writing a method. Think of your method like a recipe with all the ingredients and instructions needed for a person to do what you have done. If an ingredient or instruction is missed out, you will often end up with an unexpected outcome. You want your method to be repeatable by anyone who wishes to.

Some examples you may wish to include in your method are displayed on the screen, you may want to make a note of these or take a screenshot for later.

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Slide 7: Common mistakes. As we discussed before, not having enough information can mean anyone trying to repeat this and achieve similar results will have unexpected outcomes. It is always a good idea to have someone look over your method to see if it makes sense, you may wish to choose a 'non-specialist' for this.

Try not to include any introduction material here or get excited and start telling the reader your findings, the method section is a set of clear instructions, nothing more. With this said, there is no need to be too verbose here either. Be clear. Be concise.

Slide 8: Writing results. You do not need to include ALL of the results that you achieve, these can be placed in your appendices however you must make sure there is sufficient detail to support your findings. Make sure your results are presented appropriately, this may be as a graph or in a table. Always include correct SI units, you can often lose marks for this.

Your choice of statistical analysis should be appropriate for your data. Ensure all your figures and tables have appropriate headings. Avoid things like 'A graph to show', your reader knows it is a graph. Instead you should write a title that describes the results fully and concisely.

Make sure your results are balanced and well-focused. Nobody wants to read through disorganised results that are half on one page and half on the other. Presentations is key in this section. Some questions to ask yourself; 'Is the data presented in the clearest way possible?', 'Are there any duplications of data?', 'Are the SI units used properly throughout?' and 'Are the results relevant?'

Slide 9: Common mistakes made in the results section. Including raw data. Your reader does not have time to analyse and your data, all data should be processed and presented appropriately. Avoid redundant data, this does not mean omit data that doesn't show what you want, it means avoid anything that is not relevant.

Do not be tempted to discuss or interpret your results here, it may be tempting if you have found something exciting but you must resist.

Occasionally it is tempting to repeat your method here, if you feel the need to explain anything here it could indicate you were not clear enough in your method section.

Slide 10: So now you are ready to write your discussion. This can be a scary part for most scientists, it's the biggest section after all. Again your plan is going to play a key part here. Make sure you map out everything you wish to cover before you start writing. This will avoid confusion and repetition.

Here are some suggestions for your discussion, hopefully at this point you are still actively learning and making notes. Now is your opportunity to discuss your results and what they mean. Make sure you tell your reader why your results are significant, try to do this without overstating your findings though. Discuss any errors or data that does not meet expectations. You may have reasons for this that you wish to include.

It is paramount to compare your findings with that of others, it demonstrates your ability to research and shows that you are forming a well-balanced argument for your findings. Finally you need to say how this research has influenced scientific knowledge and understanding, you may not feel that you have made a massive contribution to the world of scientific research but remember even the small findings have importance.

Questions you might want to ask yourself are; 'Have I explained the significance of my results?', 'Have I compared my data with the data of others?'

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Slide 11: Here are some common mistakes when writing a discussion. As we mentioned before, do not have this mixed in with your results, each are important and deserve their own section. Do not be tempted to include any new findings here or anything that is inconclusive or can be interpreted in other ways than which you have discussed. Remember, no over stating.

Slide 12: Writing a conclusion. So you're nearly at the finish line. Here your reader needs a concise report of your findings, justifications of any conclusions you have made and recommendations for further studies. There should be nothing new in this section. Questions to ask yourself may be; 'Are my conclusions justified by my data?', 'Have I mentioned anything here that has not been covered before?'

Slide 13: Common mistakes are; writing no conclusion at all, you got so excited about your findings that you didn't feel there was anything more to say or perhaps you were already at your word limit and didn't want to risk going over. Mentioning new ideas, just don't do it, if you feel you have missed anything, go back and find the right place for it, not supporting your conclusions with your findings, remember to refer back to them.

Slide 14: Referencing. Although this is one of the last things we will discuss today, it is ideally an ongoing process throughout your report, which begins when you start to research. Keeping a good record of your research will make referencing much more efficient. Here is a checklist you may want to take note of. Remember to check the referencing requirements of your school or lecturer beforehand to avoid mistakes. Guides are available to download here or from the library and you can always contact your Academic Skills Tutors for support with this or any of the other things discussed in this presentation. Just remember, you will be asked what you have done to help yourself first, so please, do have a go first, you may surprise yourself.

Slide 15: Proofreading. Make sure you proofread. We have a whole other presentation on this so head on over there for top proofreading tips.