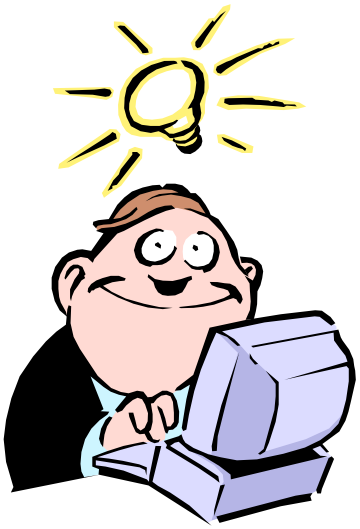
THE CONFUSED UNDERGRAD'S GUIDE TO

GETTING GOOD MARKS IN BIOLOGY



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A WORD (OR TWO) FROM THE AUTHORS

In the following sections we will introduce you to many of the rules and conventions that apply to undergraduate writing at the School of Biological Sciences. Writing in a scientific format may appear difficult at first, but it will become easier once you get used to the various rules that govern the style. We hope that this guide will make it a little easier for you to do it right. Note, however, that this is a guide only, and some lecturers may have preferences which differ to the advice we offer.

P.B. and E.M.

The authors would like to thank the following people for their advice and support during the preparation of this guide: Dr. Dianne Brunton, Dr. Mike Walker, Dr. Judy O'Brien, Melissa Farrimond, Josh Guilbert.

HOW TO USE THIS GUIDE

This guide is formatted as a quick reference "question and answer" document. We recommend that you read the entire guide at least once before you begin your first assignment. After that, use the Contents page to find the information you need, as you need it. Look through the headings and subheadings listed on the Contents page; these will direct you to the page where you will find answers to specific questions such as "*What are the general rules for writing in a scientific style?*" and "*How do I cite references in the text?*". This format allows you to rapidly access the necessary information without having to read the entire document every time.

CONTENTS

1.0 RESEARCHING YOUR TOPIC

1.1: Where do I begin?

If you are given a recommended reading list, then that is the best place to start. The texts and papers listed will also contain other relevant references with which you can expand your literature search. Never limit yourself to the material cited in your reading list; find references of your own. This shows that you have put some effort into your research.

1.2: What resources should I use?

Most markers will prefer that, where possible, you use papers rather than text books; papers are usually more detailed, and textbooks tend to be little more than a condensed version of material sourced from several papers. It is therefore better to reference a number of the original papers rather than a single, simplified textbook. Also, beware of some of the older literature, which may contain out of date information and obsolete methodologies.

Make use of the Library's extensive electronic resources (*Voyager* and *LEARN*) to find relevant papers and books. A good place to start looking for papers using library electronic resources is: http://www.auckland.ac.nz/lbr/bio/biosubj.htm. There is also a link to the above web page from the SBS Home page, under "Library Resources for Biology". If you are unfamiliar with the library system, ask Rachel Chidlow, Biological Sciences Subject Librarian for assistance, her email is r.chidlow@auckland.ac.nz and she can be contacted by phone on 373-7599 ext 87247. It is a good idea to attend one of the database tutorials and workshops run by the libraries at the beginning of each semester. Look for their announcements on the above web page!

The internet can also be a useful research tool, but remember: information sourced from the net should be treated with caution. This material is often unsubstantiated, and may be misleading or downright incorrect. Exceptions are those sites belonging to online journals.

You should also check your public library, as they may have books that are not available at the university libraries.

2.0 WRITING IN A SCIENTIFIC STYLE

2.1: Why write in a scientific style?

Throughout your undergraduate life in Biosciences, you will write **dozens** of essays and reports. But why is writing scientifically such an important component of SBS papers?

In the real world it is necessary for real scientists to write in a clear, concise, boring, dry, humourless manner when presenting their work so that other boring dry scientists can follow what has been done, critique it and then try to repeat the study to prove everything was done incorrectly!

With this in mind, Bioscience papers emphasise the importance of scientific writing. The aim is to teach you how to present your results, ideas and arguments in a scientific manner compatible with the styles used in the real world. From a more immediate point of view, passing Bioscience papers depends on your ability to write well; good scientific writing **WILL** get you good marks.

2.2: What is scientific writing?

Scientific writing style is, by its very nature, formal. There are a number of rules that you must follow, with regard to the structure, format, and style of language that you use. Most of the assignments for your Bioscience papers will take one of two forms: they will either be laboratory/field reports, or essays.

2.3: What is a laboratory/field report?

A laboratory report or field report is a work in which you describe an experiment or study that you have carried out, and the results that you came up with. There is a prescribed structure for writing these reports, although your lecturer may modify the format to suit their requirements; make sure that you know what the lecturer expects from you. The standard structure is of a report is:

Abstract

⇩

Introduction

⇩

Methods and Materials (also called **Methodology**, or simply **Methods**)

⇩

Results

⇩

Discussion and **Conclusion**

⇩

References

⇩

Appendices (if appropriate)

See Section 3.0, *Writing a Report/Essay*, for hints on how you should write each section of your assignment.

2.4: What is an essay?

An essay is usually purely literature-based (i.e. it lacks the practical component of the lab/field report). As a result, you will not have the Methods or Results sections. It is often a good idea to include an **Abstract**, although this is not a necessity (check with your lecturer). You should have an **Introduction** and a **Discussion**. The Discussion can be broken up by subheadings as you discuss the various points you wish to make; this will make your essay easier to read and understand. Finally, you should have a **Conclusion**. **References** come next, followed by **Appendices**, if any.

2.5: What are the general rules for writing in a scientific style?

There are a number of rules/conventions that you must follow when you write a report or essay. Here are some of the important ones:

DO NOT

- use contractions (e.g. you should use **do not** instead of **don't**);
- be "wordy"; scientific writing should be concise and to the point;
- use the same words over and over; try to vary commonly used words and sentence structures;
- use colloquialisms (i.e. slang);
- NEVER use personal pronouns (e.g. **I, we, me**). For example, instead of "I cultured the bacteria…" write "The bacteria was cultured…".

Some more rules:

- **DATA** is a plural, therefore you should talk about **"these data"**, NOT **"this data"**. You can, however, refer to **a datapoint** on a graph.
- **NUMBERS** less than 10 should be written as a word, except in tables/figures, or when quoting measurement (e.g. 3 km) or a statistical value (e.g. p=0.001). If you must begin a sentence with a number, *always* write it as a word (e.g. Three kilometres).
- **ITALICS:** Latin words (e.g. *in situ*) and the names of computer programmes (e.g. *Excel*) should also be italicised

2.6: Scientific names: what are the rules?

The scientific name of an organism consists of a genus and a species name, e.g. *Tursiops truncatus*. **Note that the genus always has a capital first letter, and the species is always lower case. Both are italicised**, or underlined if writing by hand. Note that in some cases there will be **three** parts to a scientific name (e.g. *Philesturnus carunculatus rufusater*); this denotes a subspecies, and all three names should be used.

Give both the scientific AND the common name of your study organism (e.g. *Tursiops truncatus,* the bottlenosed dolphin) once in both the Abstract and the Introduction. Subsequently, you may use just the scientific name or just the common name, but be consistent (do not jump between the two). If you choose to use the scientific name, once you have written it out in full in the Introduction you may subsequently abbreviate the genus to its first letter (e.g. *Tursiops truncatus* becomes *T. truncatus*). Note the full stop after the abbreviated genus.. For a subspecies, you can abbreviate the genus and species name but not the subspecies name (e.g. the example in the previous paragraph becomes *P. c. rufusater*). Remember, before you use the abbreviated form, you must have previously used the full name. NOTE: be careful if you are talking about two genera that start with the same letter; you will have to write these genus names out in full every time, to avoid confusion.

Higher taxonomic levels (e.g. order, class, family etc) are not italicised, but their first letter is capitalised (e.g. Dolphinidae).

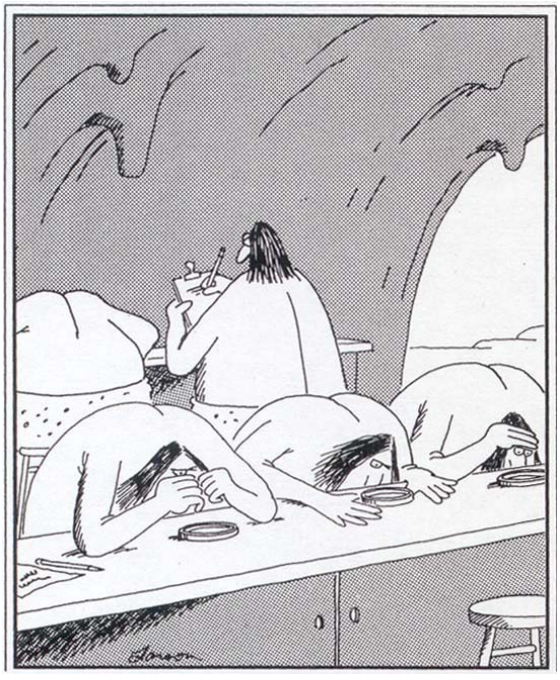
Never refer to an organism only by its genus. If you do not know the species you are dealing with, or if you are making a general statement about a genus which contains a number of species, state the genus and then write "**sp**." for one species, or "**spp.**" for multiple species (e.g. there are several species of penguin in the genus *Pygoscelis*, thus you could talk in general about *Pygoscelis* spp.). Note that sp. and spp. are **not** italicised, but they **do** have a full stop.

COMMON NAMES do not require capitals (e.g. kauri, kakapo, flying fish) unless named after a person (e.g. Thompson's gazelle) or a place (e.g. African elephant, Norfolk pine, North Island saddleback). Note that only the place or person's name is capitalised, not the organism name. Use the full name of a subspecies (e.g. North Island saddleback) to differentiate it from other subspecies.

2.7: How do I get formulae and symbols?

There will be times when you will have to present a formula or use scientific symbols. The standard computer keyboard has the basic mathematical symbols, but you will soon find that you need other scientific and mathematical symbology that you will not find on your keyboard (such as the symbol for sample mean, $\bar{x}$). To get symbols like this in *Word*, go to Insert on the toolbar and select Object. This will bring up a menu. Scroll down and select Microsoft Equation, then click OK. A textbox and toolbar will appear; use the toolbar to select the type of symbology you want to write in the textbox. It may take a bit of playing around with the options on the toolbar before you find the one you want.

Alternatively, much of the non-text scientific symbology (e.g. Δ, º, √, and Greek lettering) that you will need can be found by selecting Insert…Symbol from the dropdown menu on the main *Word* toolbar.



Early Microbiologists
(Larson 1989:136)

3.0 WRITING A REPORT/ESSAY

3.1: What makes up a report/essay?

Your assignment should contain the following sections, *in this order*:

Title

⇩

Abstract

⇩

Introduction

⇩

Methods and Materials (*report only*)

⇩

Results (*report only*)

⇩

Discussion/Conclusion

⇩

References

⇩

Appendices (*report only*)

3.2: The Title

What makes a good title?

Think about the research you have done to prepare for this assignment; you chose particular papers/books initially because their titles provided enough detail for you to assume that the material they covered would be relevant to your assignment. Your title should be just as descriptive. The following example, from a paper published in the journal *Polar Biology*, tells you all you need to know:

> Factors affecting the breeding success of the south polar skua *Catharacta maccormicki* at Edmonson Point, Victoria Land, Antarctica.

As in this example, the title of your assignment must clearly state what the assignment is about. You should name the main species of interest (common AND scientific names). If you are writing a report from field work, state the location where the research took place.

3.3: The Abstract

What is an Abstract for?

Think of it like this: when you look at a paper in a journal, the first thing you tend to read is the Abstract to find out whether it is worth reading the entire paper. An Abstract should therefore give a brief idea of the subject of the paper, followed by a concise account of the findings of the study. Note that the Abstract may also be called the "Executive Summary".

How should I write the Abstract?

An Abstract is usually written as a single paragraph. Do not cite references in your Abstract, or refer to Figures or Tables. The Abstract should be written in the present tense.

Begin the Abstract of a **report** with a statement regarding your study; identifying your study species and where the field study took place. Say why the work was done (i.e. how is it important or interesting?). You can also briefly outline your aim/hypothesis, And how you carried out your study/experiment. Your main results (including *p*-values if appropriate) should be stated in no more than a few sentences. Summarise the outcome of the study/experiment stating whether the aim has been achieved (or perhaps how the study failed).

Essay abstracts should begin with an introductory sentence (or two) about the subject or question that you are writing about, followed by how the essay approaches the topic, and finally you should inlcude brief conclusions and implications.

Whether writing a report or an essay, write the Abstract last. By the time you have written the other sections of the paper (especially the Discussion), you have a better idea of what information is important enough to go in the Abstract.

3.4: The Introduction

What is an Introduction for?

Your Introduction should provide enough background detail to enable a reader to understand the concepts and results presented in your assignment, even if the reader is unfamiliar with the topic. It tells the reader what is covered in the report/essay, and states the way in which the subject is addressed.

What should an Introduction contain?

This section introduces the subject of the paper, and provides background information to help the reader to understand the concepts discussed in the report. For a field study, this means stating where the research took place, and naming the organisms involved in the study (common *and* Latin names). Briefly describe the *relevant* ecology or biology of the study organism(s). You ***MUST*** reference any background information that you source from the literature (see Section 3.9).

The Introduction should state the major points to be discussed in the report (e.g. why was the study done?), and present the aims of the study. Rather than just listing the aims, you should present them in the context of how you intend to approach the subject. For example, if your aims were: (1) to see what crested loons do in their spare time; (2) to compare your findings to published data; and (3) to discuss how draining their lake might change their behaviour, you might end your Introduction with something like:

> This report investigates the behaviour budget of the crested loon, compares the results of this study to previously published data, and investigates the potential impacts of lake drainage on their behaviour budget.

Note: The Introduction should always be *longer* than the Abstract.

3.5: Methods and Materials

Why do I need a Methods and Materials section?

If the reader wants to replicate your study or experiment, they must use similar materials and methods otherwise their results will not be comparable to yours. A Methods and Materials section gives them the necessary information. More to the point for undergraduate assignments, however, a good Methods and Materials section shows the marker that:

- you actually turned up for the lab/field trip;
- you performed the exercise/experiment/study;
- you knew what you were supposed to be doing;
- the results you will present later are in fact yours, not somebody else's.

How do I write my Methods?

You will be given a list of materials and a set of instructions (i.e. methods) in a laboratory or field manual. These are *for your information*, so you know what to do in the lab or field. DO NOT COPY YOUR METHODS SECTION DIRECTLY FROM THE MANUAL OR HANDOUT!

Your Methods should be written in paragraph form (do not list) and in the past tense. Say what you did, not what the next person should do (i.e. do not write a recipe).

Do not give too much detail. Obviously, you should give enough information so that the reader can replicate your methodology, but you should also assume that the reader is a scientist and has some knowledge of basic scientific procedures. Do not make self-evident statements such as "results were recorded". When stating what statistics were used, there is usually no need to describe how they are performed; tell the reader *what* you did to the data rather than how you did it. If, however, you used an uncommon procedure, chemical or apparatus, or are using a common procedure in what may be a non-standard way, you should refer the reader to an Appendix in which you can describe these in detail.

What goes in the Methods?

If you are writing up fieldwork, you should include a description of your study site, and possibly a map showing its location. If the phenomenon you studied has temporal variation (e.g. breeding activity), and this has an important effect on your results, you may want to give the dates or time of day that the research was carried out.

Now simply describe what you did and how you did it.

If you are using methodology that has been used elsewhere (i.e. if you are replicating someone else's experiment, or adapting the methodology from a similar study in the literature), you should reference where the procedure was first used. This means that you will not have to go into a lot of detail regarding your methodology (the reader can check your source for an in-depth description), although you should still give a brief outline of the methods you used.

The final paragraph of your Methods should state the statistics that were used to analyse your data.

It is a good idea to write this section (or at least make notes for it) as soon after the lab/field trip as you can. If you leave it too long, it can be difficult to remember all of the important details (like what you actually did, for example).

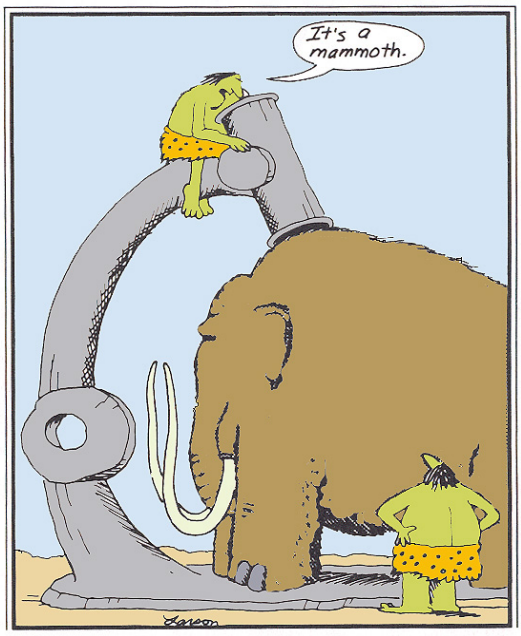
3.6: Results

What is the results section?

The Results section is where you describe the outcome of your experiment/study. Your Results should contain two mutually supportive elements; **Figures** (i.e. graphs) and Tables, and the **text** and statistics that describe them. **Note that the Results section only *describes* the data; it does not *explain* it** (that is what the Discussion is for)**.**

Figures and Tables are used to summarise analysed data: this section should not contain raw data or calculations; these may be presented in an Appendix if you think it necessary (the exception is BIOSCI 209 Biometry, for which calculations should be presented in the body of the report; if, however, you are asked by your lecturer to include calculations, you should do so). See the following Section (*How do I get formulae and symbols?*) for help in writing equations

DO NOT include a Figure or Table unless you write a description of it. Written summaries are just that; they summarise the Figure/Table, pointing out important values, comparisons and relationships. When you write the summary, be careful to only describe the data, **not interpret it**. You may compare/contrast it to other data presented in your study but not to data published elsewhere.



Early microscope
(Modified from Larson 1984:76)

What is the first step for writing my Results?

The first thing you need to do, before you write up any Results at all, is look at your raw data and perform any statistics that are required. You may be told what statistics to use; if not, check the literature to find comparable studies and see what they did. If in doubt, ask yor lecturer, tutor or lab demonstrator.

Think about the aims of the study; what do you want to get out of your data? What data do you need, and what can you do without? Graph your data in as many different ways as you can. Some of these graphs will be useless, but this is a good way to reveal important trends, relationships and other patterns in the data that you might not have noticed when looking at it as a set of numbers. You can then select any graphs that show meaningful information, for inclusion in your Results section. It may be that some data is unsuitable for graphing, but would be better shown in a Table. This is particularly true for a dataset containing a large number of variables, which might end up as a very confusing graph.

REMEMBER: do not just include a graph or table for no good reason. Make sure it relates to what you want to get out of the data, and that it shows the data in the most appropriate manner.

What makes a good graph?

Graphs are usually used for comparison of multiple datapoints or variables. Make sure you use the right kind of graph; discreet data (e.g. counts) should be presented in a scatter plot (sometimes a bar graph, depending on the variables involved), whereas continuous data (e.g. temperature, weight) should be presented in a line graph or histogram. If you plot averages/means or other calculated values, it is usual to also plot error bars (e.g. standard error or standard deviation). Independent variables (the variable set by the experimental design: e.g. sampling times, or distance along a transect at which measurements were taken) are usually plotted on the X (horizontal) axis. The dependent variables (e.g. weight measured at each time interval, or number of organisms recorded at each distance interval along a transect) are plotted on the Y (vertical) axis.

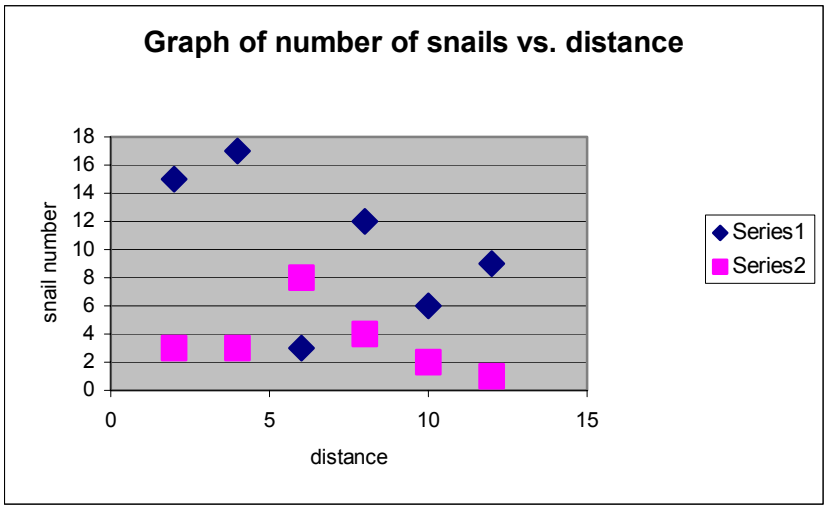
Labels and titles: You must label your graphs clearly and unambiguously. On the Y-axis for example, do not put a general term such as "number". Number of what? Is it a sample mean? If so, what error is plotted (e.g. +/- 1 SE)? If you are plotting time, is it in seconds? minutes? Is temperature in degrees C or F (or even K)?

If you are using *Excel*, do not bother giving your graph a title when *Chart Wizard* gives you the option; this will put the title above the graph, where it does not belong. Graph titles should go below the Figure (you can do this using *Word* when you insert the Figure into your text). Titles should be numbered (graphs are always called Figures, therefore e.g. Figure 1) and should give a full description of the variables that are plotted. Remember that you should be able to interpret a graph without reading the written summary. There is no need to begin your title with "Graph showing…."; the reader can see it is a graph.

Chart junk: Beware of "chart junk"; all of those things which are unnecessary, clutter the graph or make it difficult to read.

- Get rid of gridlines, and do not use a colour background in the plot (this just uses up the ink in your printer, and may distract attention away from the plotted data).
- Make sure your datapoints are not so big that they obscure their true location. Similarly, make the chart area sufficiently large so the graph easy to read.
- Do not try to cram too much information onto a single graph (this can be confusing, which defeats the purpose of graphing your data).
- Do not bother using a legend; all of the information necessary to interpret the graph should be given in the Figure title below the graph.

The graphs shown below both display the same dataset, mean numbers of two species of intertidal snail from samples taken every two metres below the high tide line. The first graph includes several of the presentation faults described above. Figure 1 is a better version of the same graph.



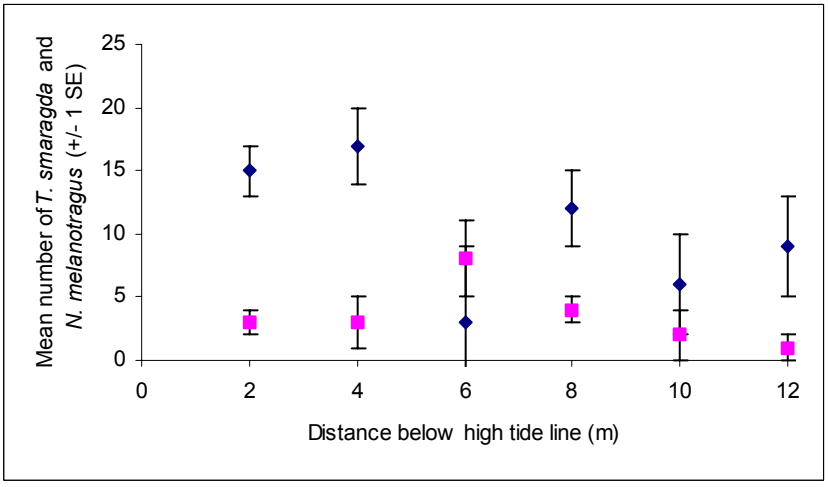


Figure 1: Mean number of *Turbo smaragda* (♦) and *Nerita melanotragus* (■) (+/- 1 SE) found at two metre intervals along transects below the high tide mark

What makes a good table?

Like graphs, tables are often used to display data for comparison. They are also useful for displaying statistical data (e.g. means and their error estimates). Many of the same rules that apply to graphs also apply to tables. Make sure your column and row labels are clear and unambiguous. If you use abbreviations or symbols in your labels, make sure you define these in your Table title. Remember that, like graphs, Tables also require a written summary.

Where do Figure/Table titles go?

Note that titles go *above* Tables but *below* Figures. Also, Tables should be called Tables, not Figures (graphs, maps, diagrams, photos and pictures are Figures). When you describe the Figure or Table in your written summary, refer to it by its number, NOT by the title (e.g. Figure 1).

3.7: The Discussion

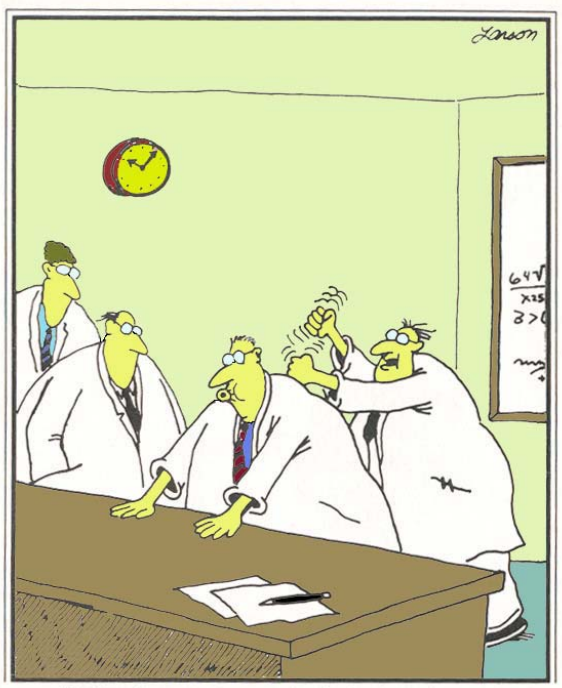
What is a Discussion for?

You have told the reader what you did, and you have told them what you found. Now tell them what it *means*.

The Discussion is where you interpret your results in the context of the aims of the study, and where you compare your findings to those published in the literature. When you discuss your Results, be sure to state important values, and feel free to refer to figures in the results that illustrate your point. Think about the aims of your study; what questions were you asking? Use your data to address the aims.

What should I put in the Discussion?

Make sure that you discuss everything that appeared in your (written) Results section; if it was important enough to present there, it must be relevant to the study and is therefore worth discussing. While you are discussing your own data, think about how it compares to published results. If your results do not agree with the literature, come up with possible explanations why this might be. If your results support the literature, say so. But remember, *your* results support or contradict the *literature*, NEVER the other way around. Look at how they interpret their results; can the same interpretation be placed on your results? If not, why not? What other possible interpretation(s) can you suggest?



"And notice, gentlemen, the faster I go, the more Simmons sounds like a motorboat."

(Modified from Larson 1984:47)

The Discussion is also where you answer any questions included in the assignment. Discuss your Results first, then move on to the questions (exception: if a question relates directly to the data, you will probably be able to answer it while discussing your Results). Be sure to support your answers with references from the literature.

Your Discussion should be structured to flow logically from point to point; do not jump randomly all over the place. You may wish to break this section up with subheadings to make it easier to write and follow.

3.8: The Conclusion

What is the Conclusion for?

You should include a brief Conclusion (usually no more than a paragraph). This section "ties up all of the loose ends" by reiterating the findings that you came up with while you were discussing your data and the assignment questions. Do not reference here, and do not include any new information that you have not discussed previously.

3.9: References

What are References, and why do I need them?

You **MUST** give credit where credit is due. You will have taken ideas and information from the literature; these are someone else's work and therefore you must acknowledge their contributions. **Plagiarism** (the unacknowledged use of somebody else's work) is a serious offence and can get you kicked out of university.

Furthermore, the Reference list informs the reader where to look if they want to find out more about information that you have cited. Possibly of more importance for you, good Reference list suggests to the marker that you have put some effort into your research.

There are two parts to each "reference". Firstly, there is the **citation** in the text, where you name the source from which you got the information. The second part is the **reference** itself, which appears in an alphabetical list at the end of your assignment. The citation guides the reader to the reference, which tells the reader where to find the work that you cited.

How do I cite references in the text?

All citation examples given in this section are referenced on page 26, where you can see examples of how to reference the various sources you will be using.

General citation rules: When you take something from the literature, you must cite the source; in most cases, this will be the author of the work, and its date of publication.

Give the author's last name only, **not** their first name, **not** their initials, then the publication date (e.g. Brown 2000). Exception: if you are citing material written by two different people with the same last name in the same year; only then should you also put their initials.

If the the material you are citing has two authors, name them both (e.g. Webb & Harwood 1987). If there are three or more authors, name only the first and then write *et al.* (this is an abbreviation of the Latin *et alii*, meaning "and others"). Make sure *et al.* is italicised (since Latin words are traditionally written in italics), and that there is a full stop after *al.* (e.g. Marchant *et al.* 1993).

If an author has published two or more works in a single year, these citations are given alphabetical (**a, b** etc.) annotations (e.g: Hardy 1989a), in the order that *you* cite them in your text.

Sometimes you will need to list two or more citations at a time. They should be listed in **chronological** order and divided by a comma or semicolon (e.g. Sugden 1992, Huybrechts 1993).

If you are citing two or more papers by the same author papers in a single citation list, give the author's name once, followed by the dates of his/her papers you are citing (e.g. Hardy 1989a, 1989b).

If you are citing material that is in the process of being published, cite it as as *in press* (e.g. Angehr *in press*).

There are two ways to cite material: you can either make a statement and put the citation(s) at the end of the sentence, e.g.:

> The Ecstatic Display calls of individual Adélie penguins were shown to be distinctive (Ainley 1975, Jouventin 1982).

Or you can incorporate the citation(s) in the body of the text: e.g.

> According to Ainley (1975) and Jouventin (1982), the Ecstatic Display calls of individual Adélie penguins were distinctive.

Do not cite lecture notes, lecture guides, or field/lab manuals. Material contained in these most likely came from published literature. If you want to include any of this material, take it from (and cite) the original source (some guides will include a reference list; if not, ask your lecturer where they got the information, or do a search on *LEARN*).

Direct quotes (i.e. word-for-word "copying" from a source) can be useful, but limit yourself to one or two short ones. Quoting directly "proves" to the marker that you have read the material, but it is better to paraphrase the literature into your own words to show the marker that you understand what the author is trying to say.

If you are quoting directly, you **must** state the page number(s) from which the quote is sourced. Direct quotes of three lines or less may be enclosed within the text surrounded by single quotation marks. For longer quotes, double space and indent the margins, and enclose in double quotation marks. Double space again and return to standard margins to continue the report/essay. An example is shown below.

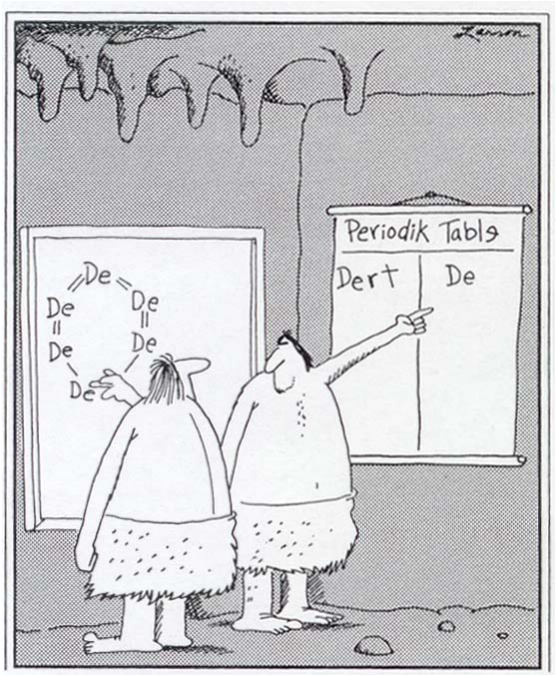
> "Camouflage through alteration of body shape is possible so long as shape does not interfere with that necessary for fast locomotion. Among nektonic vertebrates, the commonest manifestation is to develop a ventral keel to eliminate a conspicuous shadow when viewed from below…" (Nybakken 1988:119)
>
> *page number*

Websites: If you are citing a webpage, give the author(s) name(s) or the name of the organisation, and the date that the page was posted on the web. For example, the Department of Conservation website should be cited as (DoC 2002).

Figures and Tables: If you have copied or modified a Figure (i.e. a graph, diagram, drawing or photograph) or Table from the literature, cite the source in brackets at the end of the Figure/Table title. The general citation format is:

Author(s) name(s), Publication date, Page number.

For example,



Early chemists describe the first dirt molecule. (Larson 1989:72)

Photographs may have been taken by someone other than the author of the book/paper. If this is the case, use the following citation format:

Photographer's name, In Author(s) name(s), Publication date, Page number.

For example,

Figure 1: Stitchbird
(C. Veitch, In: Angher 1985, p. 1)

If you have taken the photograph yourself, or someone has taken it for you, cite it as:

Photo by the author (or the name of the photographer).

For example,

Figure 1. Australasian gannet
(Photo by E. Ross)

Since a photo you have taken (or that someone has taken for you) has not been published, you do not need to cite a date.

Personal observations and Personal comments: Occasionally you may need to include information in your text that you have not sourced from the literature; instead, the information will relate to something you have witnessed, or that somebody has told you about. If you have seen something that you think may be important, you can mention it in your text and follow it with (*pers. obs.*), an abbreviation of "personal observation". Note, however, that what you witnessed has probably been seen before, so make sure you check the literature; you can include your *pers. obs.* as well as the literature citation if you wish.

You may be told a fact that you cannot find in the literature; usually, this will arise from a discussion or interview with an "expert" in the field you are investigating. In this case, follow the information in your text with (persons initial, last name, *pers. comm.*), standing for "personal communication". However, **do not** *pers. comm.* something that you have been told in a lecture; your lecturer most likely found that information somewhere in the literature, and you should therefore look to the source.

What goes on the References page?

Firstly, you will be using a Reference list, ***not* a Bibliography**. A Bibliography lists every piece of literature that you have read on the subject you are writing about. Your References should *only list the literature that you have actually cited in your text*.

Unlike other faculties at the University of Auckland and elsewhere, the School of Biological Sciences does not have a prescribed referencing format; this may relate to the fact that there is no universal referencing format in the scientific literature. There is, however, certain information that must be included in the reference. You should state:

> Author's surname and initial, Date of publishing, Title, Publishing information, Page number(s).

- If there are more than two authors, name **all** of them; **never** use *et al.* on your Reference page.
- List References **alphabetically.** If you have multiple papers from the same author, list them chronologically under the authors name. If you have *a* and *b* annotated citations in the main text these should be presented on the Reference page in the order they are cited in the text. See example the Reference list on page 26.

Look through the Reference pages of several biology journals until you find a referencing style you are comfortable with (but under **no** circumstances should you use the very annoying method favoured by *Science*).

Note that journals and books are each referenced in a slightly different manner.

Referencing a journal article: The following information must be provided:

> Author details, Publishing date, Title of article, Title of Journal, Volume number, Page number(s) of article.

See Reference list (page 26).

On the reference pages of some journals you will see journal names abbreviated; for example, the title of the *Proceedings of the National Academy of Science USA* is often abbreviated to *Proc. Nat. Acad. Sci. USA*. This is accepted practice and you may use it if you wish. HOWEVER, **be consistent**; if you abbreviate the title of one journal, abbreviate them all (note, however, that single-word titles, such as

Evolution or *Nature,* tend not to be abbreviated). You must also be aware that there is a convention by which journal names are abbreviated; if you cannot find examples of how a journal name has been abbreviated in the literature, do not make up your own abbreviation.

Referencing a book: There are two kinds of book that you will need to reference. These are:

i) a book written and published under the name(s) of a single author or a team of authors

ii) a book published under the name(s) of the editor(s), but containing chapters written by a number of contributing authors.

Slightly different information is required for each.

Referencing a book published under the author's name: This is the simplest of the book referencing formats. The following information must be provided:

> Author(s) details, Publishing date, Title of book, Publisher's name, City of Publication.

See example Reference list (page 26).

Referencing a chapter from a book published under an editor's name: This is slightly more complicated than the previous method. Not only will you have to name the book and the editor(s), you will also have to name the chapter of interest and the author(s) of the chapter.

The following information must be provided:

> Name(s) of chapter author(s), Publication date, Title of chapter, Title of book, Editor(s) name(s), Publisher's name, City of publication, page numbers of chapter of interest.

See example Reference list (page 26).

Referencing a thesis: Theses are unpublished works but are referenced in a similar manner to published books. The reference includes the abbreviation "unpubl.", followed by the type of dissertation (e.g. MSc Thesis). See the reference for Brown (2000) on page 26.

Referencing a website: If you insist on referring to a website, reference it in the following manner:

> Author(s) name(s) or name of organisation, date of posting, title of web page, website address.

See example Reference list (page 26).

Personal observations and Personal comments are not referenced.

Reference automatically!: The computer programme *Endnote* allows to to automatically manage your references and insert them into an assignment correctly. The library runs tutorials to introduce you to *Endnote*, and copies of the programme are available from the the Electronic Campus helpdesk for $5 each. While it is not essential that you use *Endnote* (proper referencing is really not *that* difficult!), the programme does make life a little easier.

3.10: The Appendix

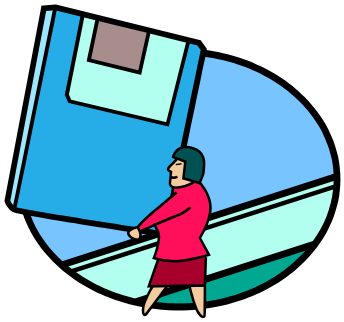
What do I put in an Appendix?

You may have some data or information that does not belong in the main body of your work, but that you feel should be presented anyway; if this is the case, put this material in an Appendix. Make sure that you refer to the appropriate Appendix (by number, e.g. Appendix 1) somewhere in your text.

The Appendix is a good place to put bulk data or calculations that you have performed; if you have come up with an incorrect answer, the marker may be able to tell from these data or calculations what you did wrong.

Note that Appendices come **after** the References.

4.0 PRESENTATION AND HANDING IN



While the marker will be mostly interested in the content of the work you hand in, presentation is also important. Good presentation implies that you have put some effort into the assignment and, although you usually will not get extra marks for presentation, the marker may (unconsciously or otherwise) mark slightly harder if the work is untidy or illegible.

Here are some useful suggestions to avoid a marker's wrath:

- **FONT**: Use a "formal" font (e.g. Times New Roman or Helvetica); avoid fancy fonts that are difficult to read. Font size in the main text should not be smaller than Times New Roman 12 font (graph and table titles may be smaller or in a different font, to differentiate them from the main text). If you are writing by hand, *make sure your writing is legible*.
- **SPACING**: Use 1.5 line spacing. This leaves room for the marker to make corrections or comments directly above the line of text they are referring to.
- **PARAGRAPHS:** Make sure you break up your text into paragraphs. This is far easier to read than a long, solid block of text.
- **SPELLING**: Your computer software was designed in the United States, and therefore defaults to an American dictionary for the spellchecker. Make sure that the English (New Zealand or Australian) dictionary is selected, and *make sure you use the spellchecker*. However, a word of warning: if you are unsure about a recommendation made by your spellchecker, look the word up in a dictionary. Spellcheckers have a disturbing tendency to occasionally suggest entirely inappropriate words.
- **PROOFREAD**: You should always have someone else proofread your work (at the very least, proofread it yourself). Have them look for spelling and grammatical errors. Also, make sure that they can understand the points you are trying to make; since you wrote it, you know what you were trying to say, but you may not have written it in a way that is easy for someone else to understand. This is particularly important if English is your second language. DO NOT RELY ON THE SPELL/GRAMMAR CHECKER TO CORRECT YOUR WORK FOR YOU.
- **REFERENCING**: Make sure that every citation is referenced and that everything in your Reference list is actually cited in the text.

Ideally, you should try to prepare your assignment on a computer. While this is not compulsory at SBS, and you should not lose marks for writing an assignment by hand, some lecturers may insist that your assignments are typed. Make sure you check. Note that if you must write by hand, it is important that you be as neat as possible. Nothing annoys a marker more than having to decipher somebody's scrawl.

The Student Learning Centre provides introductory courses for people unfamiliar with computers. If you do not have your own computer, SBS has several available for student use; ask at your Student Resource Centre.

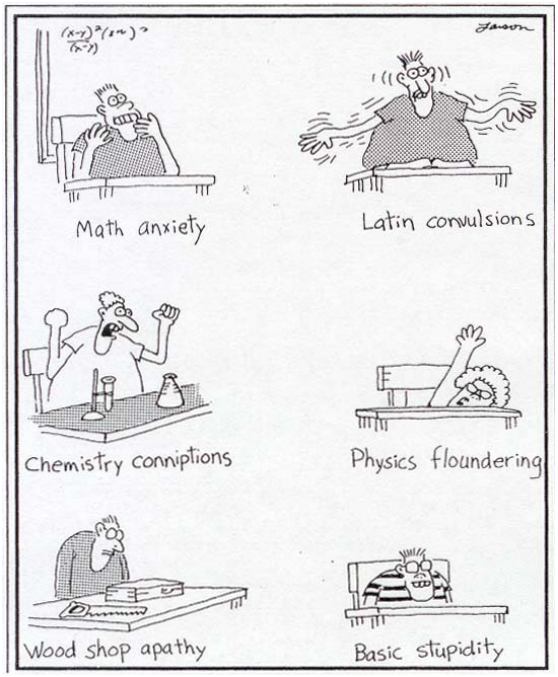
The best way to present a report or essay is on plain A4 paper, stapled at the top left corner. Please do not put your report in a folder or plastic envelope; these cost you money, often make the assignment difficult to mark, and **will not** gain you extra marks. Feel free to put a picture on your title page if you wish; just make sure the picture is relevant to the contents of the assignment.

Before you hand in, make sure that the following information is clearly and legibly displayed on the front of your assignment:

- your name
- your ID number
- the paper number and name
- the assignment number or name.

It is also a good idea to put your name and ID number at the top of every page, in case your pages become separated.

Make every effort to hand in your assignment on time; marks **will** be deducted if you hand in late. And remember: it is always better to hand in something than nothing at all.



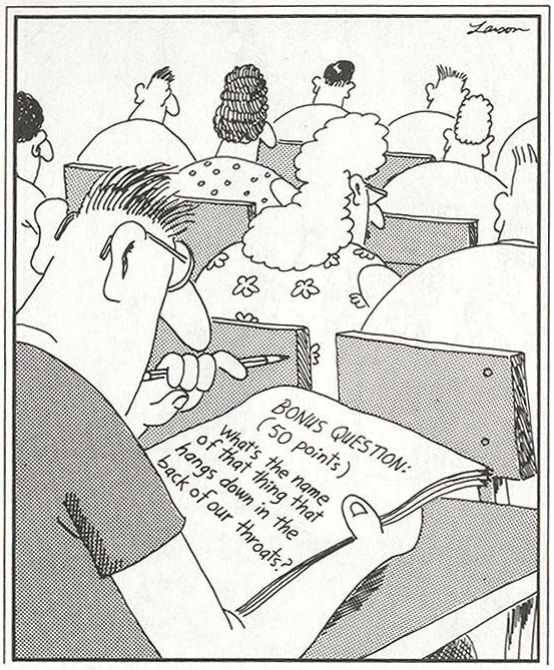
Classroom afflictions
(Larson 1989:105)

5.0 WRITING ESSAYS IN EXAMINATIONS

Examinations for Bioscience papers usually include one or more essays; at Stage Three, the majority of exams consist of nothing but essays. By their very nature, exam essays can be stressful; you don't know what the question will be until you get into the exam, you are under a time constraint, and you want to write a particularly good essay. Here are a few hints that might help.

Exam preparation:

- Get copies of past examinations for each of your papers; these are available for photocopying at the General Library and (in some cases) the Student Resource Centre. An exam website is also available, containing exams from 2001 onwards (go to http://examdb.auckland.ac.nz/ or follow the link from the *LEARN* startpage). Look at essay questions that have been set in earlier years; is there a pattern in the type of question being asked? This may give you a clue about what material you should concentrate on as you study. However, a word of caution: make sure that the lecturer *you* had for that paper was the same one who set the exam in previous years; a different lecturer is likely to set a different type of question.
- Write practice essays for the questions given in past exams. Use your lecture notes to help you; this is a good way to learn the material. Try to keep the essays to the same length as the essay in the exam (i.e. expect to write approximately 1500 words in an hour). Write these by hand, especially if you are used to using a computer; you will be surprised how sore your hand will get if you are not used to prolonged writing.
- Lecturers tend to spend more time talking about important examples, and exam essays may be related to these examples. It is therefore often a good idea to learn material that lecturers have particularly concentrated on. However, to write a good essay you will also have to know the underlying concepts and ideas, so do not concentrate solely on the "important" topics. Also, show initiative and find an appropriate example not given to you in the lectures.
- Learn several graphs and diagrams so that you can sketch one or two of them in your essay. You do not necessarily need to reproduce them exactly; for example, be able to reproduce a general trend on a graph rather than trying to remember specific values.
- Some lecturers will hold a revision session at the end of the semester. **Always attend these!** This is where you may get a better idea about what will be in the exam.



Final page of the Medical Boards
(Larson 1989:25)

In the exam

- You will be given time before the exam begins to read through the questions. Choose which essay looks to be the easiest or that you know you can answer well, and plan to write this one first; if you leave it until last, you may run out of time before you are able to write everything you know.
- You should try to structure your essay. Do not bother with an Abstract, but you should have an Introduction, a Discussion, and a Conclusion. You may wish to break up your Discussion with subheadings.
- Before you start on the essay itself, write a very quick essay plan. Do this in your answer book, above where your essay will begin. Take two or three minutes to make bullet points on what you want to talk about in each section of your essay. This serves two purposes: i) it helps you to keep your essay on track if you find yourself losing the plot; and ii) if you run out of time, it shows the marker that you knew more material than you were able to include in the essay.
- The use of examples to illustrate the point shows the marker you understand the material. Essays can often be structured using examples to aide your argument.
- Try to include relevant diagrams or graphs in your essay. Make sure you take several coloured pens (but **not pencil**) into the exam for this purpose. Remember to refer to the figure in your text. Take a small ruler for graphs, but remember: the marker will not expect you to take the time to make your figures perfect; freehand sketches are fine.
- Keep an eye on the time (take your watch off and put it on the desk in front of you; this saves you having to look up at the clock all the time). You will know how long you have to spend on each essay (usually one hour); be sure to keep to the allotted time, even if you could write more. It is possible that you will not be able to write for the entire hour on one of your essays, and you can use the remaining time to return to an essay you were unable to finish. If you find

yourself running out of time but want to include a lot more material, bullet point; you will not get marks for structure, but at least the marker will realise that you know your stuff.

- You will be writing by hand; make sure that your writing is legible. Write quickly, but neatly.
- Write only on every other line of your answer book; this will make your rushed and not-so-tidy handwriting much easier for the marker to read.
- Do not take twink into the exam, it wastes time. Simply cross out any mistakes you make. The examiners will not expect your presentation to be perfect.
- And remember, the general rules for scientific writing also apply to exam essays.

Good luck!

References

Note that the style of referencing shown here is intended as an example only. Look through biological journals until you find a style that you are comfortable with.

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