School of Biological Sciences

University of Canterbury

Instructions to Authors of B.Sc. (Hons) Project Reports in the School of Biological Sciences

2014

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The following "Instructions to authors" should be followed closely for the following reasons:

i) Papers published in scientific journals must follow the specified format of the particular journal if they are to be acceptable for publication. Therefore it seems appropriate to have the same discipline imposed for production of the project report.

ii) Assessment of project reports is facilitated when they are all produced in the same format.

1. LENGTH

As a general guide, the B.Sc.(Hons) project report should be 40-60 pages in total length (i.e., when all sections indicated below are included). Aim for quality and not quantity.

2. SECTIONS OF THE PROJECT REPORT

The separate sections of the thesis should be presented in the following order:

Title page (first page)
Abstract (next new page)
Contents (next new page)
Abbreviations and definitions (if necessary, next new page)
Introduction (start on next new page) = Chapter 1
Materials and Methods = Chapter 2
Results = Chapter 3
Discussion = Chapter 4
Acknowledgments
References
Appendices (if necessary, start each on a new page)

There are acceptable and discipline-specific variations on this format. Discuss with your supervisor what format best suits your needs.

All pages should be numbered serially, with the first page the title page then all the way through to the references and appendices if the latter are thought necessary. Tables and figures with their legends should be inserted as soon as possible after their first mention in the text (see Sections 3 and 4 below). All parts of the project report, including the abstract, references, tables and figure legends should be typewritten, one and a half (1½) line-spaced, on one side of A4 paper with left margins of at least 30 mm.

2.1 Title page

This should have the title of the project, your full name, date and the wording, "Project report submitted in partial fulfilment of the requirements for the degree B.Sc. (Hons.) in the School of Biological Sciences, University of Canterbury".

2.2 Abstract

This should be no more than 200 words and should start on a new page following the title page. It must be concise and address directly the main ideas, arguments and conclusions of the paper and be understandable by itself. Aim to present the major results and be precise. As a general rule avoid sentences that require the use of phrases such as “are discussed”. Give specific numerical results wherever possible. It should not contain any references.

2.3 Contents

The Contents is a list of the chapters and sections of chapters together with the page numbers on which these begin. See Section 5 below for more information on numbering chapters and sub-divisions of chapters.

2.4 Abbreviations and definitions

Abbreviations must be unambiguously defined in the text the first time that they are used (e.g., photosynthetically active radiation (PAR)). If there are many abbreviations provide a list of these and their definitions on a separate page.

2.5 Introduction

This is the first part of the main body of the text and should start on a new page. The Introduction should define the problem, and explain why it is of interest. Previously published work should be concisely reviewed as a background to the results that follow. Generally this requires the citation of as many references as are necessary to indicate your understanding of the nature of the problem and knowledge of relevant literature. Questions that the study seeks to answer, and hypotheses to be tested, should be explained in the Introduction. This usually makes up the last few paragraphs of this chapter. The Introduction commonly includes:

i. An explanation of the general area of interest.
ii. An outline of the literature to show the current state of knowledge.
iii. A statement of the aims of the project, showing how these follow from i and ii above.

2.6 Materials and methods

Provide enough information to enable a competent worker in the field to duplicate your experiments. Unusual experimental techniques, chromatography systems, assays or estimations may be described more fully. Refer to the literature where the techniques that you have used are already fully described elsewhere. In this section you should briefly describe the organisms used, their growth conditions, etc.

2.7 Results

The results you have obtained are presented in this chapter. They are often best expressed in tables, graphs or diagrams. (Tables should be numbered consecutively. They are **not** Figures. See section 3 below. Figures should also be numbered consecutively and include all graphs, diagrams, drawings, photographs, etc. See Section 4 below.) It is not necessary to present every result that you obtained. Rather you should include those that enabled you to arrive at definite conclusions, whether positive or negative. Show that you used adequate controls.

The Results chapter should contain text giving a brief, factual description of the data and the analyses, including details of trends, and important or interesting features. Do not repeat at length in the text the contents of the tables and figures, but direct attention to the main results by referring to the relevant tables and figures. Do not interpret your data in the Results section; that should be reserved for the Discussion. Generally there will be few, if any, references to other published work in the Results section.

Results of statistical analyses, whether derived using a computer program or with a calculator, should be concise showing only means and standard errors, least significant differences if comparisons are to be made, regression or correlation coefficients, or an analysis of variance table showing F_s values and the usual significance levels. Significance levels can be indicated on a figure or table using a system of asterisks, but these must be defined, e.g.

* for $p < 0.05$, ** for $p < 0.01$, *** for $p < 0.001$ and n.s. for non-significant.

If it is thought necessary to include detailed data, for instance for someone who might continue the research, these should be included as an appendix or appendices (see Section 2.13 below) and not in the main body of the text.

2.8 Discussion

The Discussion is where results are interpreted and related to previous work and where, if possible, conclusions are drawn from the study. The conclusions should be worded meticulously as these are your main message to the scientific community. (These should also be communicated in the Abstract.) This section will usually contain many citations to other literature. Also, it is here that you have the greatest freedom in which to express your opinions. However, you must avoid unnecessary repetition of information already presented in the Introduction or results previously presented in the Results section.

One of the main aims of the Discussion is to present **your** answers to the questions and hypotheses you raised in the Introduction. It is important to assess your own work critically as well as the work of others.

2.9 Acknowledgments

This section should briefly thank any person, company or organisation that provided technical or financial assistance. It is courteous to acknowledge the help or advice of members of the academic and technical staff. Acknowledge any bursary or grant. However, beware of acknowledging "...the kind gift of Dr Jones". Dr Jones was the giver, not the gift! Avoid "gimmicky" acknowledgments. Be sensible and straightforward.

2.10 References

2.10.1 Citation of references in the text

Whenever you present a fact or theory that is not your own work, you must include a reference to the source of the information. References should be cited by author and date as in the following examples.

The results of Adams (1956) do not.....
This has been seen previously (Adams 1976).
There are several references to this phenomenon (Usher 1956, Smith & Jones 1982, Adams 1992).

[Note: two or more references may be given in chronological order, as shown in the above example, **or** alphabetically according to author, e.g. Adams 1992, Smith & Jones 1982, Usher 1956. **However,** you must use **one or other** system throughout your report, and **not a mixture** of both.]

Flowering occurs in autumn (Jones 1956, 1962, 1968).

[Note: two or more references by the same author are given in chronological order.]

Barrett & Robinson (1962) found there to be.....

[Note: two authors are both named.]

Barrett *et al.* (1988) disagreed emphatically.....

[Note: for more than two authors use *et al.* The expression should be shown as *et al.* (i.e., followed by a full stop) not *et al* because it is itself an abbreviation of *et alia* or *et alii* (= and others).]

This was first observed by Kennedy (1988a) although surprisingly she did not note the structure in two previous reports (Kennedy 1988b, 1988c).

[Note: where an author(s) has written more than one paper in the same year, these should be distinguished by the letters a, b, c, etc. in the order in which they are mentioned in the text.]

2.10.2 Presentation of reference list in References section

The references should be set out in alphabetical order of authors and in chronological order for a series of papers by the same author(s). In the case of various combinations of a group of authors, alphabetical order should take precedence over date order; groups of two authors come before groups of three, etc. (see below).

Adams. 1976a [Note: "a" indicates first paper mentioned in text where more than one paper for one year by that particular author.]
Adams. 1976b [Note: "b" indicates the second paper mentioned in the text where more than one paper for one year.]
Adams. 1980
Brown. 1970

Brown, Green. 1965 [Note: two authors follow single author.]
Brown, Smith. 1962 [Note: second author in alphabetical order, takes precedence over date.]
Brown, Smith, Adams, Green. 1967

The format for presentation of references differs greatly from journal to journal. The following are examples of the style to be followed in writing out references in your References section. This style gives maximum information for readers in a relatively simple manner without excessive punctuation. Use hanging paragraphs (i.e., with the first line against the left-hand margin and subsequent lines indented - see examples below) for all references.

a. Articles in journals: Give the full title of the article, the full journal name, the volume number and pagination, for instance:

Millerd A, Scott KJ. 1962. Respiration in the diseased plant. *Annual Review of Plant Physiology* 13: 599-594

b. Books: Provide the title of the book, the place of publication, the publisher and the number of pages, for instance:

Stanley SM. 1979. *Macroevolution, pattern and process*. San Francisco: Freeman, 573 pp.

c. Chapters in multi-author books and symposium volumes: Give the author of the article/chapter, the date, followed by the title of the article/chapter, the editor(s) of the book, the book title, place of publication, publisher, page numbers of the article/chapter, for example:

Smith RIL. 1983. Growth and production of *Poa flabellata* in relation to soil nutrient status and exposure at South Georgia. In: Siegfried WR, Condy PR, Laws RM. (eds.), *Antarctic nutrient cycles and food webs*. Berlin: Springer-Verlag, pp. 221-228

2.11 Appendices

Appendices can be used to present material that would otherwise unnecessarily clutter the main text for the purpose of most readers, but may be of use to workers who might directly follow up your research. They might include, for instance, detailed numerical results, floristic data of study sites, descriptions of sample material and sample sites, constituents of culture media. Use appendices conservatively, if at all.

3. TABLES

Tables are lists, usually but not always of numbers, arranged in columns and/or rows, with appropriate headings to the columns and/or rows. All tables must be referred to somewhere in the text and should be numbered consecutively within chapters in the order in which they are first mentioned (e.g., Table 2.1, Table 2.2, etc. for the tables in Chapter 2). For examples of how to cite tables in the text, see below.

At higher temperatures there is an increase in the rate of uptake (Table 3.7).
It is clear from the data presented in Table 3.14 that...

Each table should be inserted as soon as possible after it is first mentioned. Small tables can often be inserted within the pages of text, but large tables are best displayed on a separate page. The same data should not be presented in tabular and graphical form. Bear in mind that it is usually easier to see a trend from a figure, such as a graph, than from a table, but that if the exact values are important, then these are more easily read from a table than from a figure.

Tables should be understandable on their own without reference to the text. This means that each table should have a clear title supplemented by any necessary explanations, which are placed above the table. For instance, the table heading should give the full name of the study species, the location of the study site, and so on, as if the reader does not have access to the Materials and Methods section.

The heading to each column should give the units, and use suitable metric prefixes to avoid long, cumbersome expressions (e.g.,150 μM or 0.15 mM rather than 0.00015 M).

Replicate measurements need not be given. It is better to present the mean and standard error of the mean. Beware of using unjustified decimal places. Usually presenting three significant digits will be sufficient, although there are cases where fewer or more are justified. In some cases results may be better presented semi-quantitatively as +, ++, +++ or something of the sort, which avoids implying an unwarranted accuracy. However, numerical data is preferable so long as a measure of the error is also provided.

Below is an example of a small table.

Table 3.4. Photosynthetic rates for *Carpophyllum mascalocarpum* "leaves" without diatoms using parallel IRGA (emersed phase) and O_2 Winkler (immersed phase) techniques. Incubation PAR 400 μE $m^{-2}s^{-1}$, temperature 15°C.

Trial	Photosynthetic rates (mg C g $DW^{-1}h^{-1}$)		A/B x 100
	IRGA (A)	Winkler (B)	
1	0.382	0.908	42
2	0.390	1.148	34
3	0.380	1.088	35
Mean ±SD	0.384 ±0.10	1.048 ±0.12	37 ±4.4

4. FIGURES

Figures include all illustrative material (but not tables) such as graphs, diagrams, maps, drawings, photographs, and photomicrographs. As for tables, figures should be inserted as soon as possible after they are first mentioned in the text. They should be numbered consecutively within chapters (i.e., Fig. 3.1, Fig. 3.2, etc. for figures in Chapter 3). Whenever possible sequence them in the order in which they are first mentioned in the text. If a single figure is made up of several components label these a, b, c, etc., as in Fig. 3.3a, Fig. 3.3b, Fig. 3.3c. All figures must be referred to somewhere in the text in the following manner.

Cell size increases with age (Fig. 3.14).
Examples are shown in Fig. 3.4.
Data presented in Figs. 3.7-9 show...

All figures should be accompanied by a thorough explanatory figure legend. Remember that the figure and its legend should be fully understandable without reference to the text. Legends should be placed below the figure whenever possible. If the figure fills the whole page and there is no room for the legend, then it should be put on a separate sheet facing the figure.

Graphs.
When graphs are used, they should be presented with the x-axis (abscissa) horizontal and the y-axis (ordinate) vertical. The x-axis is for the predictor or independent variable (i.e., the variable that is controlled) and the y-axis is for the variable showing the response to the controlled variable. All graph axes must be fully labelled with the units of measurement shown. Try to arrange the scales to set the most important graph lines between 30-60°.

If the points on a graph are crowded at one end it may be more appropriate to use a logarithmic or reciprocal plot. This may be done on the computer or using special graph papers.

Avoid putting too many lines on one graph. When there are several lines close together use different symbols (o•) and lines (—, --). It is often better to use several smaller graphs sharing a common axis, as shown on the left below.

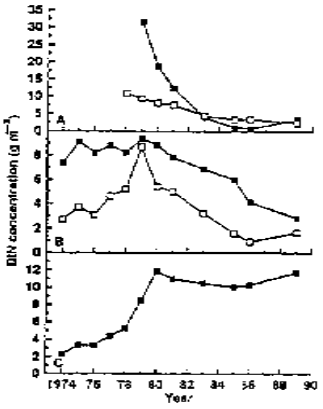
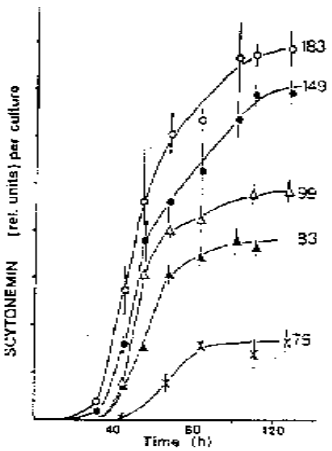


Fig. 3 Examples of DIN concentration changes in the Jacobsbaai groundwater. A, a consistent reduction with time (solid = Site 3, open = Site 9); B, an increase before reduction with time (solid = Site 14, open = Site 16); C, a persistent increase with time (Site 4, near Tangerine Street).



5. STYLE OF SECTION HEADINGS

Distinct headings and their consistent arrangement make the text much easier to follow. The system used in this document is simple, but effective. The key features are indicated below.

1. MAJOR HEADING

Start text after single line space.

1.1. Section

Start text after single line space.

1.1.1. Sub-section.

Start text on next line.

1.1.2. Next sub-section.

Start text on next line.

a. Sub-division within a sub-section.

b.

c., etc.

1.2. Next section

Start text after single line space.

2. NEXT MAJOR HEADING

Use **BOLD** and *italic* script rather than using underlining.

6. UNITS

The International System of Units (SI) and their standard abbreviations should be used throughout, for instance, g, mg, h, min, cm, etc. Do not use a full stop after SI abbreviations except at the end of a sentence. Lists of SI units can be found in several standard textbooks and in the following, which are on the reference shelves in the Physical Sciences Library at QC95.J61 and QC94.C542 respectively.

Chiswell, B.; Grigg, E.C.M. 1971. *SI units*. Sydney: Wiley, 116 pp.

Page, C.H.; Vigoureux, P. (eds.) 1977. *SI the international system of units*. London: HMSO, 54 pp.

7. SOLUTIONS

If % is used to describe the composition of a solution then it must be defined as % (w/w), (w/v) or (v/v). For example, 5% (w/v) NaCl means 5g NaCl in 100 ml of solvent, 5% (w/w) NaCl means 5g NaCl in 95g solvent. For dilute (less than 1% w/v) aqueous solutions (w/v) need not be inserted if it is clear that the concentrations are in terms of weight of solute. Remember that many salts exist in several different hydrated forms and therefore if a 5% (w/v) solution is made with $Na_2HPO_4.12H_2O$ it is essential to indicate that this is the hydrated form used. For this reason the strengths of buffers and similar solutions are better given in terms of molarities: 0.1M Na_2HPO_4 is unambiguous. Likewise, comparisons of the effects of

different carbon sources, substrates or inhibitors are more easily visualised if given in molar quantities.

8. NOMENCLATURE

8.1. Names of organisms

Latin names for species and genera should be in *italics*. If your names follow a standard reference work such as a Flora or Fauna, state this in the Methods section (e.g., "Nomenclature follows Allan (1961) and Edgar (1986)"). Otherwise, the complete scientific name, its author and the date of publication of the name should be cited for every organism when first mentioned (e.g., *Griselinia littoralis* Raoul, *Pseudopanax discolor* (Kirk) Harms). A standard form for each author's name has been in use since 1992. This can be found in *Authors of Plant Names* by Brummitt & Powell (copy in library). Later in your text the name can be shortened by using the initial of the generic name and omitting the author (e.g., *G. littoralis, P. discolour*. Note that there is a space between "*P.*" and "*discolor*".) However, the full generic name should be used if there is the chance of confusion (e.g., two generic names commencing with the same letter). In tables the full names should always be given as tables should be fully understandable without reference to the text (see section 3 above).

Common names may be used if commonly accepted and accompanied by full scientific names at first mention. They should have lower case initials and are not underlined, for instance cabbage tree or ti for *Cordyline australis* (G. Forst.) Endl.

8.2 Names of chemicals

Chemical names should follow the standard conventions, but some common or trivial names may be used if the full chemical name is quoted in brackets at the first citation, for example, ferulic acid (3-methoxy-4-hydroxycinnamic acid). Use proper terminology such as ethanol not alcohol, diethyl ether not ether, sodium hydroxide not caustic soda. The B.D.H. Chemical Catalogue and the Merck Index are useful guides to chemical nomenclature.

Complex organic structures may be drawn with Chem Word or Chem Windows (see Graeme Young).

9. THE WRITING PROCESS

Start writing early. Seek advice from your supervisor before and during the writing of your project report. Give your supervisor drafts of all sections of your report for comment. Do this early so that you can act on any feedback. This is an important part of the learning experience.

10. SUBMISSION OF HONOURS REPORT

You are required to submit an electronic copy of your report, **as a PDF file**, emailed to marie.hale@canterbury.ac.nz. Your report must be submitted **by 5 pm Monday 3rd November 2014**. If you are having trouble converting your report to pdf, please contact Matt Walters (room 432, ext 7799, matt.walters@canterbury.ac.nz), and he will be able to

help you to convert to pdf. It is important that you copy is in pdf (NOT doc, docx, txt etc), because a) pdf files are small enough to email, and your report will need to be emailed to your examiners, and b) pdf will ensure you formatting, special characters etc display correctly no matter what operating system your examiners are using.

Make sure you allow enough time to proof-read your report after converting to pdf, before you submit it. In particular, make sure all tables & figures are displayed completely, correctly and where you want them, and make sure any special characters you have used display correctly.

Any BSc (Hons) student taking a course worth $\geq$ 30 points that has its final examination in the formal University examination period is eligible for a 1 week extension of the deadline for submission of their Honours project report. **However**, this must be **discussed** with the 4th Year Coordinator **prior to the end of August 2014**. There will be a **penalty for late submission** of the project report if the 4th year coordinator has not granted an extension prior to the due date. Five marks will be deducted from the mark out of 100 for each day after the deadline.

11. THE EXAMINATION PROCESS AND FEEDBACK

Three internal examiners (from the School of Biological Sciences), including the supervisor, will mark each project report. Each examiner will be required to provide a brief written report in addition to recommending a grade and a mark out of 100. Guidelines that examiners will be given about marking the report will be posted on the Biological Sciences website (at http://www.biol.canterbury.ac.nz/biol_postgraduate.shtml). An external auditor from another university will also assess a subset of the project reports in order to maintain quality control of the internal marking and to ensure that the standards for Biological Sciences at the University of Canterbury are comparable to other universities. After the examination process is complete each student will be able to obtain copies of their examiners' comments from their project supervisor.