

UNIVERSITY OF THE WEST INDIES

CAVE HILL CAMPUS

Faculty of Pure & Applied Sciences

DEPARTMENT OF BIOLOGICAL & CHEMICAL SCIENCES

Biology / Biochemistry / Ecology / Microbiology Research Projects

A Guide for Students

The Biological Research Project affords the opportunity to carry out research yourself and to add to our knowledge of the living world. Research is time-consuming, often frustrating, but also exciting and undertaking a project gives you a chance to see whether a research career is for you. Several students before you have carried out projects to such a high standard and with novel results that these have been published in internationally refereed journals!

1. CARRYING OUT THE PROJECT WORK

Before commencing work it is important that you have a clear picture in your mind of what you are setting out to achieve. Discuss the project fully with your supervisor and ensure you are clear as to the aim(s) of the project. Your research should not just be an open-ended exercise that finishes when you have a sizeable body of data but must have clear, realistic goals. It is you, not your supervisor, who will have to defend the project design so be prepared to be critical of any aspect of the planned study at this early stage. Your supervisor will help you plan your work schedule. Regular consultation between the two of you on your progress is vital to project success. You will need certain keys to the building and these can be obtained by paying a deposit to the Departmental Secretary and completing the necessary form. It is important you keep a record of all your project work in a notebook dedicated to the purpose - not scraps of loose-leaf paper. Success in this course is based on the effort you put in.

Your supervisor will advise you on the best way to commence writing up your research but you are encouraged to start writing the *Methods* (also termed *Materials & Methods*) section of the report as you go along. You will early on be directed to certain key references to help you understand the nature of the problem you are investigating. This literature review will also be vital to the writing of the *Introduction* section of your report. On completion of the experimental work, cleaning up of your work area is mandatory. Your key deposit will not be refunded unless your supervisor indicates this has been done.

Your practical work will be assessed by your supervisor. This is worth 15% of the total mark and is divided into Quality of work - 5% and Ability to work independently - 5%.

2. THE PROJECT SEMINAR

On completion of your practical work you will be required to present your findings to members of the department. This will be assessed and contributes 15% toward of your final mark. In the case of year-long projects, you are also required to present an initial seminar outlining what you are setting out to do. This is not for credit but will help you build confidence for the final assessed seminar and may provide valuable feedback on your project intentions.

It is vital when presenting your work that you explain to the audience early on what is the aim of your project. Surprisingly, such a key aspect of a presentation is often overlooked. In the time available you should explain why this is a problem that needs investigating, e.g. by referring to previous studies. The methods you have used should be presented in sufficient detail to allow the audience to understand what you have done. You should then present your results, interpret these and maybe suggest future work. The audience will then ask you questions arising out of what you have presented. You will be assessed on both your presentation and your handling of the questions.

You should practise your talk beforehand ensuring you keep to the allotted time. Ideally, you should speak to your visual aids rather than read word for word from notes. If you are using overhead transparencies, ensure that they can be easily read by the audience. If you are going to make a computer-assisted presentation ensure that this will run adequately on the system in the Demonstration Room. A trial should be carried out the day before. In any event, you should prepare overhead transparencies (available from the Departmental Office) beforehand as a backup.

3. THE PROJECT REPORT

The kind of grade you receive in this course will depend on your Project Report since this accounts for 70% of your mark. Good presentation is important but an attractive report that says nothing will not give you a passing grade. Likewise, fantastic results scrappily presented and shoddily written up will not give you even a passing grade. It will take time to compose and type the Report, prepare figures and have it copied and bound. The submission deadline is final so ensure you budget 2-3 weeks for this. Your report must be written in the format of a scientific paper and your supervisor will provide you with a sample paper and or previous report to guide you as to what is appropriate. Typing the report yourself is a major undertaking and depending on your word processing competency it may be better to have a professional typist do the job for you. Doing this will give you more time to devote to the actual writing of the report and let your true talent shine through. Your supervisor will help you in planning how to write the report and will comment on draft portions to ensure you are on the right track. However, do not expect your supervisor to read and correct the entire draft report as this makes final assessment farcical. As a rule, the Discussion section must be solely your effort. You must write in standard English, carefully proof-reading the final draft. **For all sections incorrect spelling and grammar will be penalised.** Your Report will be graded in the following way and notes on what is expected in each of these sections are given below:-

SECTION	%
Abstract	5
Introduction	10
Methods	10
Results	10
Discussion	20
References	5
Style and Presentation	10

Abstract: The abstract summarises your findings and possibly your interpretation of your results. Look at Abstracts from several papers related to your study and ensure you understand what constitutes an Abstract. It is usually about three-quarters of a page of your report. The most common fault here is that the student does not understand what an abstract is and writes what amounts to a mini-introduction.

Introduction: The Introduction sets the scene. It provides a literature review of the area and explains the nature of the problem to be investigated. It will often include the socio-economic reasons why this investigation is warranted. It is important in reviewing the literature to get the balance right, e.g an introduction to a project looking at the biochemistry of softening in mango fruit might have a sentence explaining that mango is but one species of the genus *Mangifera* but to spend a page reviewing the taxonomy of mango would be inappropriate in this case. Another common mistake is in the citing of the literature. Firstly, you must credit the sources of the information you present and you must do so correctly (see References section overleaf). Another common error is to cite the reference but then not list this in the reference section. If you have read about a study by Jones (1990) in a paper by Smith (1999) but not actually read the Jones paper it is incorrect for you to cite the Jones paper directly. Instead, you should cite this as (Jones, 1990, cited by Smith, 1999).

Materials & Methods: Anyone reading this section should be able to repeat what you have done (and get the same results). The focus for this section is therefore accuracy and completeness. Look at relevant scientific papers as a guide to how this section is written. Where you are following a published method cite the reference. It is normal in this section that the full scientific name of the organism being studied is given if it has not appeared first in the Introduction. At the first mention of the scientific name the authority for the name must also be included (but dropped thereafter).

Results: A Results section is not simply Figures or Tables of data. In this section the results obtained are stated, though usually not interpreted. For this reason there is not usually any citing of the literature in this section. In this section, where appropriate there should also be the results of statistical analysis of the data. Raw data is more appropriately included in an Appendix to the report. Your supervisor will guide you on this. Figures and Tables should each bear a legend which provides enough information to make the Figure/Table intelligible without reference to the text. The

Figures and Tables are numbered in order of their appearance in the text, i.e. the first figure referred to is Figure 1. Photographs are also considered Figures. The Figures and Tables should appear in the text rather than en masse at the end.
(See also <http://scitec.uwichill.edu.bb/bcs/courses/BL20B/Graphs&Tables.htm>.)

Discussion: This section constitutes your interpretation of your results - what the results suggest and how these relate to previous published studies. You will therefore be carefully citing the literature where appropriate in this section. Where there has been major experimental failure you will want to discuss here why this transpired and how you would repeat the study so as to actually get data. The Discussion should finish with a concluding paragraph that pulls it all together. In some cases, your supervisor may advise that you combine the Results & Discussion sections but even in such a case the foregoing comments apply.

References: The Reference section must list the References in a standard accepted format and should be complete, i.e. list every reference cited but do not include any which you do not cite. References are usually arranged alphabetically by author and then by year but they may also be assigned a number and listed in the order in which they are cited in the text. **Your supervisor will show you what is an appropriate format** but examples in a commonly used format follow:-

Journal

Smith, D.J. (1998) Growth, maturation and ripening of breadfruit, *Artocarpus altilis* (Park.) Fosb. *Scientia Horticulturae* 76 17-28 .

[Author, Initials (Year) Article title. Journal title volume number pages]

Book

Smith, D.J. (1993) *Plants of Barbados*, Macmillan Education Ltd., London & Basingstoke.

[Author, Initials (Year) Book title. Publisher, City of publication.]

Book chapter

Smith, D.J. (1997) Breadfruit, pp.347-363, in *Postharvest physiology and storage of tropical and subtropical fruits*, ed. S.K. Smith, CAB International, Wallingford.

[Author, Initials (Year) Article title. Pages, Title of book in which article appears, Editor of book, Publisher, City of publication.]

Web pages

See http://scitec.uwichill.edu.bb/bcs/courses/BL21B/internet_references.htm or
<http://scitec.uwichill.edu.bb/bcs/General/INTERNET.REF.pdf>

Acknowledgments & Appendices:

If you wish to acknowledge help given this should be done in an Acknowledgements section following the Discussion. If you have received substantial help from anyone this **must** be pointed out in the Acknowledgements section. If your project involved a survey you might want to include the Survey Form in an Appendix or if there are raw data that need including, the Appendix is an appropriate place for this. This optional Appendix will be the last section of the report.