BIRKBECK, UNIVERSITY OF LONDON

School of Earth Sciences

BSc Project (0056)

BSc Environmental Geology Project (0066)

This booklet gives general guidance on field techniques relevant to undergraduate projects and environmental geology projects, together with guidelines on the preparation and presentation of notebooks, field slips (if appropriate), final copy map (if appropriate), cross-sections (if appropriate) and the project report. Every project is different and students should consult their tutors for specific guidance.

Planning your fieldwork and write -up.

If you are doing extensive mapping for your project, then you are advised to consult the booklet '**BSc Geology Map and Thesis (0018)**' that sets out the specific requirements for the preparation of geological maps and cross-sections. If you are doing field work other than geological mapping, then the following information is relevant to you.

If you are doing field work in a remote or inaccessible area for your project, our general policy for field work at Birkbeck is that we encourage students to work closely together, i.e., that students should be able to get in touch with each other. That means that you will work in overlapping or adjacent areas and use the same accommodation. You can confer in the field regarding the geological problem that you are addressing, but you must prepare a separate project report.

Your area will be chosen with the guidance of your tutor. Areas should be easily-accessible. The area to be covered depends on the type of project that you are undertaking, and will be indicated by your tutor. You should aim to spend up to 6 weeks collecting data in the field, but this will depend on the nature of your project and the amount of time you might spend doing follow-up laboratory work. You can conduct this field work at weekends or during vacations.

Although a visit to a field area in the summer of the first year may help you decide whether you and your field work partner are happy with the area, it may be best to delay collection of data until the second year, when you have better grasp of earth sciences principles. This may not be possible in all cases due to other commitments and it is possible to produce some good work in the summer of the first year. Remember, that it would be best if you can complete your fieldwork before October of your fourth year. Do not let this course unit get in the way of finalising in four years.

The project length should be about 15,000 words and include maps, diagrams, field photos etc (as appropriate).

Course Requirements

The deadline for project report submission is the last day of the spring term in your 4th Year. This must be strictly adhered to so that marking by can be completed in good time. The preparation of the project report will take more time than you expect, so it is wise to start writing it early, preferably in the autumn term of your 4th Year. The project report should be presented un-bound and will be bound by the School of Earth Sciences. It is advisable for you to keep a copy of your project report for your own reference prior to the oral examinations etc. At the time of submission, you should also hand in whatever of the following items that relate to your project:

(a) original field notebooks;
(b) original field slips;
(c) original logging sheets;
(d) final copy map at suitable scale;
(e) final copy cross-sections at suitable scale;
(f) laboratory notebook;
(f) report, with appendices containing tables of data that you have collected (structural, geochemical palaeocurrent, pointcount, etc.)

The marks awarded for each of these pieces of work will depend on the complexity of the field of study you have chosen for your project.

Field Notebooks

It is suggested that you use weatherproof, hardback notebooks which are as large as is convenient (to allow you to do decent sized field sketches and diagrams). These should be at least as large as the pocket-sized yellow Chartwell Notebooks (2056) which are available from Ken Coventry (you could instead use larger notebooks available from any bookshop). Before going into the field, put your name and address into the notebook as well as details of a reward for return to guard against loss of notebooks. It is also advisable to make photocopies of your notebook every so often just in case they are stolen or lost.

Marks will be awarded for the following:
1) amount and quality of field observations;
2) an account of your activities in the field (including dates, details of the locations where you examined the geology and areas where no exposure was found);

3) quality of field sketches;
4) the ease with which the examiner can cross-reference between your notebook and field slips;
5) thoughts, ideas and sound scientific reasoning concerning the geology (or whatever earth science problem you are addressing) of your area;
6) sketch cross-sections, detailed sketch maps and logs of the succession in your area.

General Points

The following sections contain information about the collection of data. **NOTE** that not all of the sections will pertain to your project; pay attention to those which apply to you.

Field observations should be made in the field and not added at a later date to your notebook. If comments are added to your notebook at a later date, then this should be labelled clearly so that the examiner can distinguish between your field observations and your interpretations made at a later date.

As a general rule, you do not need to ink-in your notebooks unless on a particular day the rain/perspiration from your hands has made your work illegible.

If you are collecting orientation data, it should be recorded neatly in your notebooks. Lay out your data in columns so that they can be easily located and used in cross-section construction and stereographic projection. The central column of the Chartwell notebooks is particularly suited to this purpose.

Use a whole page for your field sketches. Take your time and sit down when making the sketches. Avoid shading where possible and use single solid lines. In many ways good field sketches resemble detailed cartoons of what you can see. Make sure that all of your sketches, including sketch maps/cross-sections are well annotated. Un-annotated field sketches do not give a good impression. A scale, the orientation of the surface sketched and the direction of viewing should all be included on field sketches.

Construct geological cross-sections (if they are appropriate to your project) in your notebooks as you work in the field, as this will save you hours when trying to draw a cross-section across your final copy map. You may find it useful to save the first page of your field notebook for a particular day to construct a cross-section along the line transect along which you may be working. You may find it useful to add information such as way-up, younging directions and bedding-cleavage relationships to your cross-section as you work in the field.

Feel free to add paragraphs to your notebook in which you speculate about a particular earth science problem. At the end of the paragraph state how you intend to solve each problem (i.e. what exposure or view point you wish to visit to collect more information).

If you are preparing a map, then the fundamental lithostratigraphic units that you should try to map are known as **formations**. Formations are formally defined by a type section at a type locality, which can be distinguished on the basis of readily observable lithological features, from bodies of adjacent rock. Thus, a formations should be separated from other formations by **contacts** on your maps. Formations that you are able to map in the field may differ from those on published maps. This means that you should give your own names to the formations that you are able to map in the field. You can name your formations after the type locality (e.g. Smith Quarry limestone) or use descriptive names (e.g. Belemnite Limestone). Also, the nature of the contact between adjacent formations must be described (e.g. tectonic, unconformable, conformable, intrusive etc.). Remember to mark the contacts between your formations on your field slips when you see them in the field.

Day-to-day procedure

Start each new day in the field on a new page with the day and date. Comment on the weather and any problems/time constraints you may have (e.g. tide times etc.).

Always state in your notebook at the beginning of a particular piece of field work the purpose of the work. Try to give grid references for the observations in your notebook so that the examiner can understand the route you have taken.

If you are doing geological mapping, then consult the booklet '**BSc Geology Map and Thesis (0018)**' for more detailed information on the information you need to collect at each site examined. For other types of projects involving field work, it is important to state the difficulties encountered how and comments on how successful the field work was. This will show future earth scientists what has been achieved and help them to understand the difficulties with working in a particular area. (This includes weather, no exposure, bogs, wild dogs, etc. Do not be flippant or moan in this bit!).

In the evening after you have finished "inking-in" your field maps, you may wish to write in your notebook a synthesis of the mapping achieved that day. Comments should conclude with a list of things that you may wish to pay special attention to in the future.

Field Slips

If you are doing field work, then copies of the topographic maps of your area (or exceptionally, aerial photos) should be provided at a suitable scale (normally 1 : 10 000) by your individual tutors.

Consult the booklet '**BSc Geology Map and Thesis (0018)**' if you are doing geological mapping for more information on recording of geological mapping information on field slips. Generally, marks will be given for

1) the amount and accuracy of information recorded;
2) a clear numbering system for your localities that can be easily cross-referenced with your notebook;
3) a good coverage of annotations justifying the features in poorly exposed areas;
4) geological information (see '**BSc Geology Map and Thesis (0018)**' booklet).

General Comments

You can write directly onto the photocopied field slips, or if you wish you can write onto sheets of drafting film taped over your photocopied field slips. If you use drafting film, then it must be securely taped on top of the photocopied map when handed in. You can discuss the pros and cons of these two styles of field slip with your individual tutors.

Never fold your field slips as this will damage the paper and you will lose the detail contained on the map. Field slips should be no smaller than ~A4. Do not cut your field slips into individual kilometre squares because it is then impossible to relate your place of work to the surroundings.

You should provide a key/numbering system to the field slips so that the examiner can easily assemble the field-slips and compare them with either the final copy map (if you are producing one) and your project report. This is best accomplished by providing a large scale map in your project report with the position of individual field slips marked.

Day-to-day procedure

Consult the booklet '**BSc Geology Map and Thesis (0018)**' for details on recording information for preparation of your geological map. As a general rule, every time you encounter a new site, start a new section for that locality (with a locality number) in your field notebook and use the number to mark the site on your map (if you are preparing one). Brief comments, or small sketches within boxes should be added close to the sites to give detail concerning the geological features (structures, lithologies and stratigraphic relationships) or other information. These comments should include details of the vegetation, topography and accessibility of the area and these details can only be given whilst in the field. It is very obvious to an examiner when comments are added at a later date.

The point behind all this should be that another earth scientist should be able to take your field slips and notebooks into the field and use them as a guide to see where and what the geology or whatever feature you are examining in the field is.

LOGGING SHEETS

If you are using graphic logs of the rocks or sediments in your area, then marks will be given for the following:
1) the amount and quality of information recorded;
2) the ease with which the examiner can understand the geology or sedimentology recorded on the log;
3) The quality of geological interpretations based on the evidence included in the logs.
4) Suitable choice of logged sections to show features characteristic of the rocks under study and/or contacts between formations, and choice of scale to show the features present.

Logs can be drawn within a notebook, on graph paper or on pre-prepared A4 logging sheets (either of your own design or ones given to you); choose the method that best suits you. The scale at which you choose to log is important, small sections with a lot of information may require logging at a scale of 1:10 or 1:20, whereas, large outcrops may require logging at 1:50. Individual sheets of paper are far easier to use if they have been mounted on stiff card. Logs should contain all sedimentological information available, and should also be extensively annotated with other information on diagenetic features, fossils, characteristic weathering features etc. Logs should be drawn with phenomena as close to the scale and appearance of the features present as possible.

It is important that as much data as possible is recorded on your field logs. Information can always be summarised or condensed for final presentation but should never be added later. Remember that the intention of the field notebook and logging sheets is to convey immediately and clearly the evidence upon which your geological interpretations are based. Another geologist should be able to take your logging sheets into the field and confirm you records.

THE PROJECT REPORT

Your project report should provide a clear, complete and understandable explanation of your project research work and the results. The information should be presented in a logical order, as set out below.

Format

Your project report should first and foremost be a scientific document and your aim is to be clear and concise. The project report should be in double spaced typescript, with a font that is similar in size to this printed page (12pt). Text should appear on only one side of the paper and you should leave a 4 cm margin on the left hand side and 2 cm margin on the right. Every page in the project report should be numbered. The text of your project report must not exceed **15000 words** in length; this corresponds to about 65 double-spaced type-written pages of text using a 12pt font.

The purpose of the report is to summarise, describe and interpret the observations you made in the field/laboratory. Since there is a 15000 word limit it will not be possible to describe all the features that you have observed and therefore it is necessary to systematise and summarise, and to use diagrams, sketches and photographs to avoid unnecessary descriptions. To some extent the organisation of a report will vary according to the area of study. However, the following table of contents on the next page can be used as a general guide.

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With sub-sections, the following numbering systems should be adopted:
1. first order headings used for major chapters;
1.2. second order headings for main sections;
1.1.1. third order headings for sub sections.

The structure of the main text of your report will vary according to the topic of the dissertation and must be discussed with your supervisor early in the progress of your research.

Subject Matter for each section

Declaration. Your project report must contain a declaration that it is your own work (see note below on plagiarism). A suitable declaration is as follows:

The content of this project report is the original work of the author and has not previously been submitted for a degree at this or any other University. Other people's work is acknowledged by reference.

Typed name & signature:
Date:
School:
Birkbeck College, The University of London.

Table of Contents- This should list the layout of your project report.

List of Figures- These should be numbered sequentially. e.g. Figure 1, Figure 2, Figure 3 etc.

List of Plates- These should be numbered sequentially. e.g. Plate 1, Plate 2, Plate 3 etc.

Abstract- This should be no more than one side A4 using 10 pt font and should summarise your findings in the area in no more than 300 words. If in doubt read some scientific journal papers to give you examples of abstracts.

Chapter 1. Introduction

The introduction is one of the most important parts of any document. It should explain clearly the purpose of the document and prepare the reader for what is to come. A good introduction should include the following:

(a) A clear statement of the nature of the project (what is being carried out);

(b) The location(s) where the project has been undertaken (if appropriate) (including a map);

(c) The time period over which any fieldwork was carried out;

(d) An introduction to the key problems/issues being tackled and why these are important. You are putting the work into some sort of context, and therefore you need to set the scene for the reader and clearly explain what the point of carrying out the work in the first place is (i.e., its rationale). Every project should have a well thought out purpose, which should have been identified through discussion with your supervisor at the outset.

At the end of the Introduction chapter you should include a statement of the aims and objectives of the project. These should clearly outline any research questions, competing hypotheses or models that you wish to test, for example:

(a) If there are competing hypotheses that you have set out to test, this section can be used to present them;

(b) If the study is comparative with earlier work (e.g. same area/different method, or different area/same method) you could explain how your study is different from previous studies and why the different approach could lead to different results;

(c) If there is a gap in the current state of knowledge, which poses a set of new questions, you might want to describe how you intend to fill or exploit that gap in knowledge.

Chapter 2. Context/Literature Review/Background

The title of this section will vary with the nature of the topic under investigation but it should aim to give more detail and place the subject of the project in its proper context. This section should aim to contain any information on the following:

(a) Historical background to the issue(s) being investigated;

(b) A summary of the current state of knowledge of the area/topic involved;

(c) The nature of any controversies or opposing interpretations arising from existing research.
(d) An account of relevant theory and methods of investigation.
Remember that this chapter (particularly if it is a literature review) must never become merely an encyclopaedia of other people's work but rather should attempt to interpret and draw conclusions about the current state of knowledge.

Chapter 3. Area of Study (if appropriate)
This may not be applicable to all of the projects. If it is not, you should omit this section, make Chapter 3 the Methods section, and number chapters following this accordingly. If you do include the 'Area of Study' chapter, it should describe the location, topography, access, previous work, etc.

Chapter 4. Materials and Methods
In this chapter you have the opportunity to describe to the reader exactly how the data for the project were acquired. For these reasons, writing a methodology is often like writing a recipe. Make sure everything is clearly explained and described so that someone else would be able to repeat the exercise. It should be as concise a description as possible of the overall approach, the samples you collected, the sampling and the analytical methods, equipment, computer programs, etc. used to generate the data. Remember, though, that 'concise' does not mean 'insufficient'. The material should follow a logical sequence, for example the order in which this work was done or the ranking of techniques employed in order of importance.

Remember that the Methods and Materials chapter should link clearly with the aims and objectives defined in your Introduction chapter. The former should clearly explain how you set out to achieve the intended aims and objectives by the methods and materials you used.

Chapter 5. Results
This is an account of your observations and/or data collected, including descriptions of field and laboratory work if appropriate. The objective is to present the results obtained in a way that is acceptable as evidence to the reader. This can usually be best achieved by presenting the data mainly in Tables and Figures, with the necessary minimum of verbal explanation. It may be appropriate, if you have a lot of data, to summarise them in tables in Appendices at the back of your Project, but to describe the data in the text in this Results Chapter.

This section might give a brief resume of some or all of the following:
(a) How many sites were visited and how many measurements taken;
(b) The coverage and quality of the data;
(c) What the nature of the measurements were and how they differed between sites;
(d) Details of documentary or other secondary data sources investigated.

Chapter 6. Discussion

In this chapter the results presented in the various Results Chapter should be drawn together and discussed in relation to previously published data, giving information on the advances made and presenting conclusions. Speculation about results obtained in relation to other known facts may also be useful. In addition, you should discuss the possible theoretical or practical significance of your results. The purpose is to bring the various findings together in an interpretative manner. The discussion is often the most difficult part of a project to write and you should bear in mind that repetition to emphasise a point usually serves to labour it and often detracts from clarity.

Chapter 7. Conclusions and Recommendations for Further Work

This section should consist of a concise recapitulation of the objectives, results obtained and conclusions and possible future research objectives. However, care should be taken to avoid repeating verbatim the Abstract or material already presented in the Discussion chapter.

References. All cited references should be listed here in full. The list should be in alphabetical order and should conform to the style of the Journal of the Geological Society, London.

Acknowledgements. These should include sources of funding, relatives, pets etc.

Appendices. These should be listed as Appendix 8.1, Appendix 8.2, etc. and should include tables of palaeocurrent, XRD,

Figures and Plates

In general, try to illustrate your report as fully as possible. This does not necessarily mean photographs. Re-drawn field sketches, detailed sketch maps, rose diagrams, stereographic projections, graphs, histograms and summary diagrams will improve your report. Remember to include scale and geographical co-ordinates where necessary and always label diagrams as clearly as possible. Good illustrations with informative and concise captions save words in the main text, and are often more helpful to the reader than long descriptions. Text within the diagrams looks much better if it is done with Letraset or computer-generated text rather than your own hand-writing.

Photographs should be carefully chosen to illustrate specific points, not simply to make the report look pretty. It is, however, worth including at least one view of your area to give the examiners some idea of the nature of the terrain in which you were working. If photographs are used they must include a scale and a comprehensive caption. Letraset arrows and letters or computer-generated text on scanned in photographs should be used to pick-out specific features on photographs. Do not use a grid and lettering system for this purpose.

Tables

Tables should be clearly numbered and have a clear caption relevant to their content. Tables should be included in the body of the text. Large quantities of data, such as ‘raw’ statistical output, should not normally be placed in tables in the text but should be placed in an appendix.

Plagiarism

You are reminded that all work submitted as part of the requirements for any examination of the University of London must be expressed in your own words and incorporate your own ideas and judgements. Plagiarism - that is, the presentation of another person's thoughts or words as though they were your own - must be avoided. Direct quotations from the published or unpublished work of others must always be identified as such by using quotation marks, and a full reference to their source must be provided in the proper form. Remember that a series of short quotations from several different sources, if not clearly identified as such, constitutes plagiarism just as much as does a single un-acknowledged long quotation from a single source. Equally, if you summarise another person's ideas or judgements, you must refer to that person in your text, and include the work referred to in your reference list. Failure to observe these rules may result in allegation of cheating. You should therefore consult your tutor if you are in any doubt about what is permissible. In general, keep quotations from published works to a minimum. The examiner is trying to judge you, not other authors.

Final Copy maps and cross-sections

Consult ‘**BSc Geology Map and Thesis (0018)**’ for information on preparation of these.

Duties of Tutors

Your tutor is jointly responsible with you for the selection of a suitable mapping area and/or project. Your tutor will spend a minimum of one day in the field or laboratory with you. It is your tutor’s job to supply advice, at mutually convenient times, on all aspects of your Project.

Safety

Before going into the field students must read the pamphlet they received at interview: ‘*Advice to students on Geological Fieldwork Safety and Behaviour*’ issued by the Committee of Heads of University Geology Departments. Students must follow the advice in the field at all times. Further information can be obtained from Dr. Andy Carter, who is the School Safety Officer.

Final Remarks

The work you hand in for this course unit will be closely scrutinised by both the internal and external examiners. It may form the basis for discussions in your oral examination and, therefore,

should be one of the best pieces of work that you produce during your degree. If you take a pride in this piece of work and attempt to shine, then this will stand you in good stead in terms of your final degree.

BIRKBECK
SCHOOL OF EARTH SCIENCES
FIELDWORK RISK ASSESSMENT

You should read the School of Earth Sciences' code of practice on fieldwork safety before completing this form.
The purpose of this risk assessment is to identify possible causes of harm and measures needed to avoid these - before an accident occurs.
A **hazard** is anything with the potential to cause harm. The **risk** is the likelihood that someone will be harmed by the hazard and the severity of the harm caused. A high risk is one which is very likely to occur and/or may cause death or serious injury/illness. A low risk is extremely unlikely and/or would result in trivial or no injury/illness. A medium risk is in between these two.
By carrying out a risk assessment, you can direct attention and resources where they are most needed to prevent injuries or ill-health.
The five steps to carry out a risk assessment are :

1. **Identify the hazards** - find out about the site, the work, where you will be staying, how you will be travelling etc.
2. **Identify who might be harmed and how** - think about risks to yourself and others in your team. People with health problems, disabilities or lacking experience in fieldwork may be at greater risk and need extra protection. Think about harmful effects of your work on the environment and how these can be minimised.
3. **Evaluate the risks and consider how the risk of harm can be reduced** - what arrangements, equipment and training etc. will help to avoid accidents or illness?
4. **Record your findings** - on the risk assessment form below. This assessment should form the basis of safe working practices and local rules. Don't just fill in the form and forget it - make sure everyone in your team knows about the risks and how to avoid them.
5. **Review and revise your assessment where necessary** - you should do this when there are significant changes in materials, equipment, work methods, location or people involved. Assessments should also be reviewed if there are accidents, near-misses or complaints associated with the work.

FIELDWORK RISK ASSESSMENT FORM

TYPE OF FIELDWORK.....……
(e.g. independent student project, research, supervised field trip)

Dates: From.....To.....…...

Location(s) of work.....…….

.....

Address of residential base.....….....

.....

HAZARDS **Physical hazards (e.g. extreme weather; mountains and cliffs, quarries, marshes and quicksand; fresh or seawater)**	**RISK (High, medium, low)**
Biological hazards (e.g. poisonous plants; aggressive animals, soil or water micro organisms; insects)	
Chemical hazards (e.g. pesticides; dusts; contaminated soils; chemicals brought into site)	
Man-made hazards (e.g. electrical equipment; vehicles, insecure buildings; slurry pits; power and pipelines)	
Personal safety (e.g. lone working, attack on person or property)	**RISK (High, medium low)**
Other hazards (specify)	

Steps taken to minimise risks identified above (e.g. procedures; equipment; clothing; skills training; information)

Emergency procedures (e.g. first aid, survival aids, communication)

	(tick boxes)							
Suitable travel arrangements and	**YES**			**NO**			**N/A**	

licensed drivers?								

Adequate insurance cover	**YES**			**NO**			**N/A**	

Permission to work on site?	**YES**			**NO**			**N/A**	

Necessary training and information received	**YES**			**NO**			**N/A**	

Health and next of kin information given to field trip								
Leader/dept. office	**YES**			**NO**			**N/A**	

Provision for disabilities, health problems?	**YES**			**NO**			**N/A**	

Person completing this assessment :
Name .....Title.....Date.....……
e.g. undergrad; research student; lecturer

Checked by :
Name ..... Title .....Date.....
e.g. supervisor; co-ordinator

Approved by Chairman of School of Earth Sciences :
Name..... Date.....