Student Guidance Notes for Geology Practical Endorsement

There are two types of specified practical work in this specification

- Investigative practical activities in the laboratory
- Investigative practical activities in the field

In general you should be able to:

- apply investigative approaches and methods to practical activities and think independently when undertaking practical activities;

- use a wide range of experimental and practical instruments, equipment and techniques appropriate to the knowledge and understanding included in the specification.

Planning Investigations

When developing CPAC 2 "Applying Investigative approaches" it may be useful on occasions, where relevant, to produce your own plan for an investigation.

To do this it may be useful to consider points under the following headings. Some points to consider have been suggested although these may not all apply to investigation.

- **Title of the investigation**

- **The focus of the investigation**
  • What question/hypothesis/ problem/idea will you be investigating?
  • What is the geological background/context of your investigation?
  • What factors do you intend to investigate? Why have you chosen these?

- **The predicted outcomes**
  • What do you predict will be the final outcomes of your results? What are your reasons?

- **Data collection procedures**
  • What primary data do you need to collect?
  • How will you effectively and efficiently collect this data?
  • What sampling techniques will you need to employ? Why these?
  • What specific reasons do you have for doing it this way rather than another?
  • How will you ensure/maintain accurate measurements?
  • What controls will you use to ensure a fair test?
  • What equipment will you require? Why will you use this particular equipment?
  • How will you record your data? Why is this the best method?
  • Have you undertaken a pilot study to test out procedures and equipment? What changes, if any, will you make to you original plan.
  • What safety issues have you considered resulting from the implementation of your plan? How will you minimise any risk?
  • What help will you need from others in achieving you goal? How will you achieve this?

- **Anticipated errors/limitations**
  • What unavoidable limitations/sources of error do you anticipate?
  • Is it possible to minimise these errors? What steps will you take?

When planning an investigation you should be able to:

- explain, where relevant, why repeat readings would be needed – an average (e.g. mean, median or mode) is more reliable than an individual reading and it will help identify anomalous results

- where relevant identify the independent/dependent variables

- assess the main risks of your experiment/investigation

Hazard	Risk	Control measure

Hazard - an object/chemical /outdoor situation and the nature of the hazard

Risk - an action in the method that can create a risk from the hazard

Control measure - must be practicable in the context of the practical activity

Tables of results

Your tables should have:

- correct column headings
- appropriate units in headings (not in body of table)
- columns for sufficient repeats
- appropriate recording of readings, time to the nearest second, same number of decimal places throughout table except 0

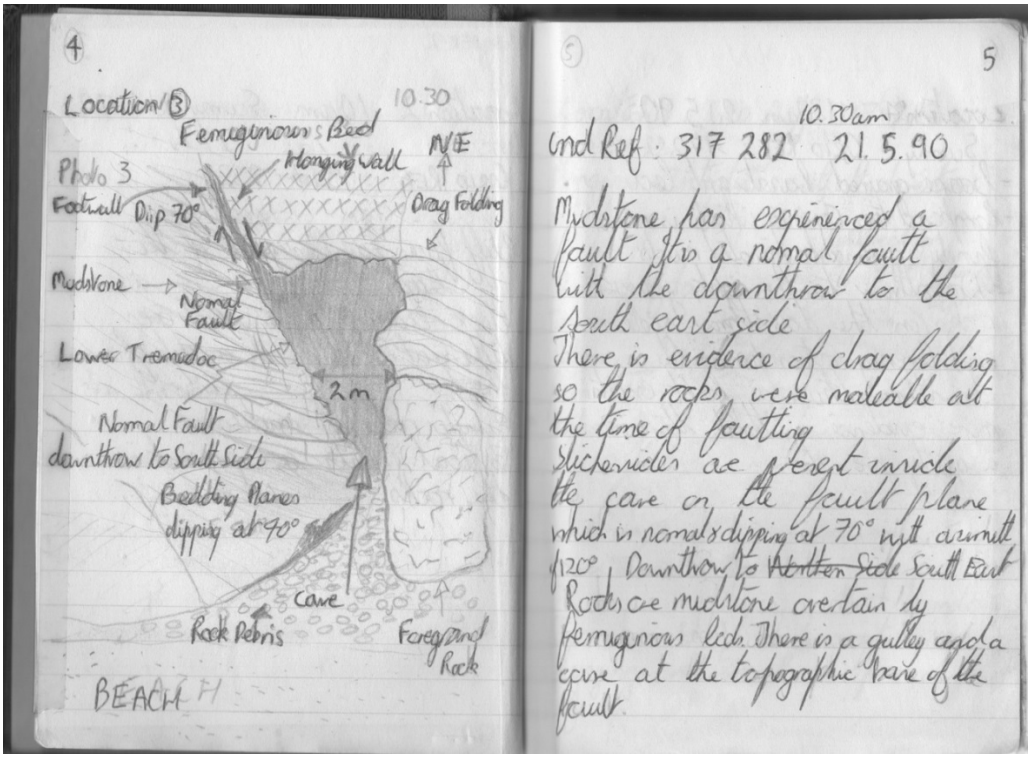
Exemplar table of results of a practical activity

	Limb dip angle°		Limb strike direction°		Cleavage plane dip angle°		Cleavage plane strike direction°	
	Reading 1	Reading 2	Reading 1	Reading 2	Reading 1	Reading 2	Reading 1	Reading 2
Limb no. 1								
Limb no. 2								
Limb no. 3								
Limb no. 4								
Limb no. 5								

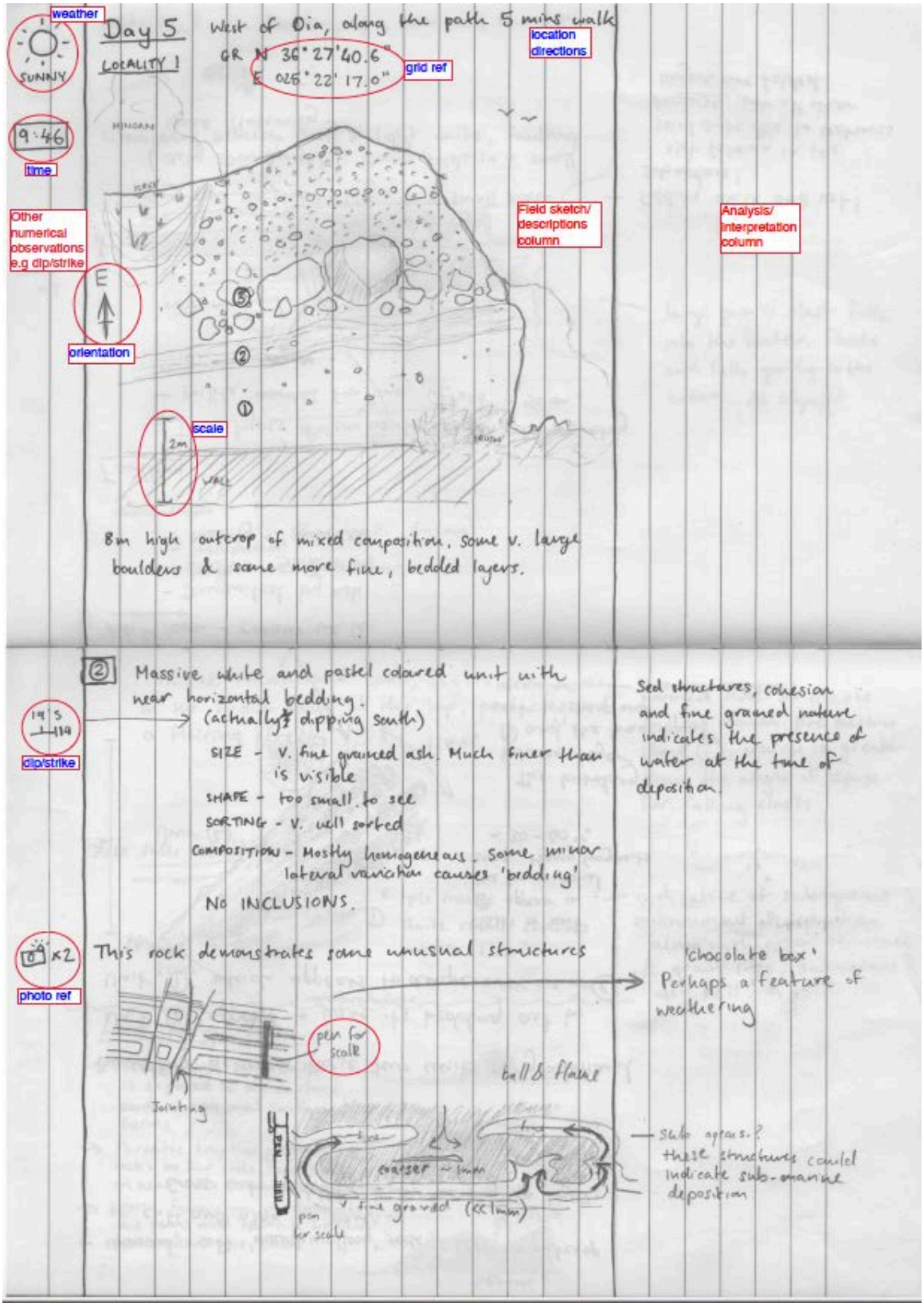
Field Notebook

Whilst there is not specifically a 'correct' way to collect field notes, there are some important points to remember; the most important being that they must be the *original* record of observations made in the field *at the time the notes were written* (and not written up later).

Two examples of good practice.



An alternative



Scientific drawings/field sketches

Your drawings and field sketches should have:

- a scale
- annotations
- orientation (on field sketches)
- a title which clearly identifies the feature drawn

Rock descriptions (from photomicrographs or hand specimens)

Your rock descriptions should:

Describe the texture of the rock:

- clastic/fragmental/granular or crystalline
- grain or crystal size (s)
- grain or crystal shape
- the degree of sorting of the grains/range of crystal sizes
-

Describe features of the composition of the rock:

- colour(s)
- identify the minerals within the rock

Observe and record any other features in the rock such as sedimentary structures, fossil content, foliation.

Graphs

When plotting a graph you should have:

- the independent variable plotted on the x axis
- the dependent variable plotted on y axis
- the axes labelled correctly
- used at least half of the grid on both axes
- the correct units on both axes
- a suitable linear scale used on each axis, including a figure at the origin for both axes
- all plots accurately plotted
- the points accurately joined with a suitable line with no extrapolation. Point to point using a ruler through centres is advised for most graphs.

Analysis of results

You should be able to:

- identify a trend in the results
- comment on the consistency of the readings
- comment on the accuracy of the readings
- suggest improvements for any inaccuracies identified
- give an explanation of results using relevant and sound geological knowledge
- draw suitable valid conclusions