



GCSE EXAMINERS' REPORTS

GEOLOGY

SUMMER 2016

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<https://www.wjecservices.co.uk/MarkToUMS/default.aspx?!=en>

Online Results Analysis

WJEC provides information to examination centres via the WJEC secure website. This is restricted to centre staff only. Access is granted to centre staff by the Examinations Officer at the centre.

Annual Statistical Report

The annual Statistical Report (issued in the second half of the Autumn Term) gives overall outcomes of all examinations administered by WJEC.

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GEOLOGY

General Certificate of Secondary Education

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ON-SCREEN EXAMINATION

The on-screen examination ran very smoothly with virtually all centres being able to complete the on-screen assessment as intended. Feedback from centres suggested that the candidates enjoyed the experience, especially the quality of the diagrams, the style of questioning and they found the examination paper a fair but challenging test.

It is pleasing to report another successful year for centres and that the cohort included some exceptional candidates. The candidates coped well with some difficult questions. The ability of the candidates seemed similar to that of last year. Candidates at the lower end of the ability range showed positive achievement and almost all gained a reasonable number of marks on each question.

General Comments

Candidates should read questions carefully and pay particular attention to the scales on the axes of graphs (Figures 4 and 9) and on diagrams (Figures 2 and 11). It was evident that candidates found the extended writing more challenging than the other styles of questioning. Poor grammar often detracted from the clarity of responses and this was taken into account in Section 2 Q4 and Section 4 Q7. Candidates should be encouraged not to rush through multiple choice questions as all should be able to complete the examination well within the time limit.

As the majority of the paper is now machine marked it is not possible to make detailed comments about every question and the report will concentrate on those questions which were marked by examiners. Sections 4, 5 and 6 proved to be the most challenging whilst candidates achieved a high mean mark on Section 2.

Section 1

This was a question which tested the ability of candidates to interpret granitic landscapes and their understanding of weathering processes. There was also a microscope view of granite. Those candidates who correctly associated the jointing in granite with freeze thaw weathering (Q2) gained most of the marks for describing the process. Other candidates described chemical weathering. Some candidates had difficulty identifying weathering processes (Q3). Many candidates failed to read the instruction in Q5 which highlighted that the use of both Figure 2 **and** the Data Sheet was required.

Section 2

This question included graphs, photographs and maps as evidence of changing sea levels. Candidates interpreted the maps of changes in Arctic sea ice well (Q1) and were familiar with the effects of the enhanced greenhouse effect and volcanic activity on climate change (Q2 and Q7). Some of the candidates failed to read the scales on the graph carefully enough (Q3) and whilst most candidates could explain the origin of raised beaches to a certain degree, fewer candidates could give a full and logical sequence of events to explain raised beaches (Q4). Most candidates actually explained the origin of fossil beaches rather than raised beaches.

Section 3

The question was based on fossils. Most candidates could identify graptolites and corals (Q1 and Q3). Describing the evolutionary changes in the morphological features of graptolites proved quite challenging. Candidates either could not remember the terms stipe/thecae or that stipes increased/decreased with age. Most candidates gained one or two marks for comparing the merits of corals and ammonites as environmental indicators but rarely all three (Q5).

Section 4

This was a question which required the environmental interpretation of turbidites and evidence for the drift of Britain across the equator. The calculation was a bit hit and miss with many candidates calculating the answer as 2.0 and others guessing without any demonstration of a calculation. Few candidates identified the abyssal plane as a reason for the loss of velocity of the turbidity current. Most candidates could describe the textures and structures (Q3 and Q4) although options one and four were common distractors. Candidates found the interpretation of the energy conditions extremely challenging (Q5). Many candidates associated coarse grains with low energy and vice versa. Q6 and Q7 were deliberately linked and a number of candidates used the information as a guide for Q7. In Q7 candidates rarely made use of all of the evidence available but most could gain two or three marks.

Section 5

A wide ranging question based on the interpretation of structures and metamorphism on a geological map. A growing number of candidates have difficulties with geological maps and cross-sections. Map-work is still an important part of the current specification. Obviously cross-sections cannot be constructed by candidates on-screen but the interpretation of maps and cross-sections are important geological skills which need to be assessed. In Q1 the fourth and sixth options were common distractors. The correct cross-section was often picked (guessed) for the wrong or no reasons and vice versa. The geological history was commonly incorrect. All of the boxes in Q7 proved to be distractors and the reasons were generally quite vague or did not include both Figures.

Section 6

A wide ranging set of questions based on the Indonesian plate margin and associated hydrothermal mineralisation. Candidates could describe the plate margin confidently (Q1 and Q2) but made elementary mistakes in the rock associations (Q3). Definitions of terms associated with mineral prospecting were well understood (Q5) and most candidates could describe hydrothermal mineralisation to a certain level obtaining two or three marks at least (Q6). The interpretation of the diagram showing the leaching method of mineral processing was good although the impermeable nature of the plastic lining was often not mentioned (Q7).

Section 7

The theme running through this question was evaporates or halite. Most candidates successfully distinguished between halite and calcite (Q1) but by no means all. The model of evaporate formation was well known (Q2). Surprisingly correct answers to Q3 and Q4 were rare. Many answers of 19% were seen whilst others just guessed with no calculation present at all. There were a lot of drill holes in Q6 and Q7 and this was hopefully a nice question for candidates to finish on.

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CONTROLLED INTERNAL ASSESSMENT

WJEC and the Moderators recognise the effort and enthusiasm that geology teachers invest in their candidates, which certainly shines through in the quality of work that they produce. Work was submitted for moderation by 59 centres.

Administration

The administration and moderation of the coursework samples ran smoothly once again this year. The Moderators are very grateful for the efficient organisation and punctuality of the majority of centres. The system of task accreditation assisted centres by highlighting possible problems at an early stage. The use of inappropriate tasks was not entirely removed but this is now a problem at only a very small number of centres. However there is quite a turnover of centres with some centres submitting work one year and not the next and other centres submitting work for the first time - so that it is a continuous requirement on the part of Moderators to ensure, as far as possible, that the work is of similar standard across the board.

Some centres did not complete a Task Accreditation Form (Option 2) for 2016. All centres should ensure that this form is submitted at least one month before the field work for the 2017 assessment is to be carried out.

The following points are emphasised:

- Please enclose a copy of the Task Accreditation Form when the sample is sent to the Moderator;
- Where a Centre has some candidates who have completed Option 1 and others Option 2, this should be made clear on the GL2 form. Examples of both options must be included in the moderation sample, even though this may require more than 10 candidates' work being sent;
- Mark totals should be double-checked and great care taken to ensure that these are correctly entered into the electronic mark input system.

Packaging Coursework

When packing the coursework samples, please try to reduce bulk and weight as far as possible. A4 hardback ring binders should not be used. It is helpful (and cheaper for centres) to use slim plastic folders that can be packed efficiently. The use of large and heavy field notebooks containing only a few pages of assessed material is to be discouraged. Please consider detaching or photocopying the relevant pages of field notes and attaching them to the front of the report e.g. with a treasury tag. Please label field notes with candidate's name and centre number as notebooks are often separated from reports in transit.

Option 1 Virtual Fieldwork

A growing number of centres attempted this option. Centres experiencing difficulties with Option 2 might consider switching to this option in the future. Centres should be aware that Option 1 narrows candidates' experiences and opportunities and this can manifest itself both in the internal assessment and the examination. Candidates attempting Option 1 often have difficulty with the evaluation and planning sections because of their lack of field experience. Attempting Option 1 should not be a replacement for fieldwork.

Candidates handled the data efficiently and logically and demonstrated some geological skills well. The observations in the field notes were accurate in the main and clearly recorded, particularly the specimen descriptions. However, one or two centres had no distinguishable field notes or merely annotated the photographs without drawing field sketches. The rose diagram of coral orientation was accurately drawn in the main but there were few bar charts of coral length. It is also difficult for candidates to demonstrate any individuality with this option.

Marks awarded were sometimes on the generous side and it was felt that in order to justify the higher marks, candidates should have included most of the following:

Field notes

- location 1 photograph 1 labelled field sketch of thrusting overturned antiform
- dip of beds; bed thickness; axial plane of the fold
- graphic log of location 1
- locality 2 labelled diagram of trilobite
- locality 3 description of granite specimen B
- location 4 description of hornfels specimen C
- locality 5 photograph 2 labelled sketch of vein with fault
- location 6 description of red sandstone specimen D
- labelled field sketch of cross bedding location 6 photograph 4 with scale
- location 7 length and orientation of corals in table 1
- description of calcite specimen E location 7

Report

- annotated photographs
- graphic log of location 1
- description of style of folding
- interpretation of environment from trilobite
- intrusion of cross cutting pluton and associated dykes
- contact metamorphism around granite
- mineralisation and faulting and sequence of fault movement
- interpretation of events forming the unconformity
- direction of current in cross bedding
- bar chart of coral lengths and interpretation (e.g. young, current sorted)
- location 7 rose diagram of coral orientation in table 1
- location 7 rose diagram interpretation of coral orientation in table 1- SW current
- interpretation of calcite mineralisation
- cross-section of map
- conclusion
- interpretation of changing geological environments from fossils/rocks/data
 - trilobite - shale fine grained low energy/age/ marine
 - breccia red sandstone (desert) limestone (shallow marine tropical current direction)

- geological history table summary
 - deposition sandstone shale
 - folding
 - granite pluton dykes
 - metamorphism
 - uplift erosion unconformity
 - deposition of breccia red sandstone limestone
 - tilting

In the absence of such evidence it was difficult to justify some of the high marks awarded.

Option 2 Actual Fieldwork

There were some excellent field investigations seen, which are being perfected by the centres and well suited to the specification. The best investigations allowed candidates to demonstrate essential field skills (such as rock descriptions, field sketching, fossil identification, dip and strike and sedimentary logging) and perform suitable analytical techniques on the data collected. It is good to see geological field skills being demonstrated with a high degree of competence. The work produced by the best candidates would be a credit to candidates at a higher level and centres are congratulated on the continuing quality of work submitted by their candidates.

A mixture of field tasks was undertaken with a rough break down being investigations into:

- interpretation of sedimentary environments
- mapping exercises leading to geological sections and history
- structural analysis such as assessment of the degree of crustal shortening and joint analysis
- fossil studies
- clast analysis of pebble beds and interpretation of environment
- igneous structures e.g. dykes

Centres are to be congratulated on the variety of opportunities given to candidates in areas of outstanding geology such as Purbeck, Lulworth, Walton on the Naze, Shap, Peak District, Castleton, Traeth Bychan (Anglesey), Wirral, Lindisfarne, Bude, Budleigh Salterton, Arran, Ogmere, Crookdale Crag (A6 Shap), Broad Haven Pembrokeshire, Marloes sands Pembrokeshire, Black Mountains, Amroth Pembrokeshire, Ballycastle (Northern Ireland), Woolhope, Falkland Islands, MacDuff, Kentmere Valley, Forest of Dean, St Mary's Island, Kimmeridge Bay, Trearddur bay and Barry. Other centres used a variety of local geological locations.

Centres need to take note of the following as a result of this year's submission.

1. Some candidates had little or no data in the field notes yet were able to produce lots of data in a report.
2. In a number of cases, opportunities for the collection of basic field data have been missed. Observations such as rock identification, grain size, sorting, direction of cross-bedding, clast roundness/orientation, field sketches, dip and strike measurements and sedimentary logs should normally be part of every investigation (where appropriate).
3. Some thought has to be given at the data collection stage as to whether the form of the data to be collected is suitable for processing and analysis, e.g. histograms, cross-sections, logs, rose diagrams, maps and geological histories.

4. There is no need for candidates to repeat observations made in the field notebook within a report unless it contributes significantly to the analysis. It is more advantageous for candidates to concentrate their efforts on the analysis and evaluation.
5. It is strongly recommended that candidates practise field sketching from photographs or slides prior to fieldwork being carried out. The field notes provide the basis for the report and should be considered an important part of the investigation.
6. Evaluation is a difficult skill which requires more attention within the teaching scheme. The emphasis of this skill has now changed to an evaluation of the methods of data collection, which includes an awareness of the accuracy of the equipment and methods used for making the measurements. Evaluation is not a list of excuses. Simplistic statements regarding lack of time and bad weather do not form the basis of an evaluation with any merit.
7. Presentation of work was generally good and many centres have found a suitable way to allow candidates to use ICT in the production of their reports without them being able to access their work outside the classroom. This will not be possible for all centres and well-presented hand-written work is perfectly acceptable – however the hand writing must be legible. Quality rather than quantity is to be encouraged. The reports should be concise, relevant and clearly focused. Please dissuade candidates from including large amounts of photocopied material from secondary sources.
8. Some centres did not heed the advice given in previous Moderators' Reports.
9. Centres using tuition at Field Studies Centres should make sure that staff are fully conversant with the assessment criteria and regulations for report writing.
10. When constructing rose diagrams of 'dip' candidates should make it clear as to whether the diagram is of dip direction or strike direction (in which case strike direction and plus 180° should be shown). Dip angle is not usefully displayed on a rose diagram.

Assessment

Many centres are to be congratulated on the accuracy of their assessment but some examples of over-marking were seen. In these cases mark adjustments were applied. Problems arose in the following circumstances.

- Marks awarded for inappropriate tasks e.g. lack of focus for the investigation or lack of opportunity for candidates to collect suitable data. Advice given to centres at the Task Accreditation stage should prevent these issues from arising.
- Failure to recognise that candidates have not met some aspect of the assessment criteria, e.g. not planning an extension to an investigation already carried out or not completing an evaluation. This can be avoided by careful reading of the specification. No marks can be awarded for any aspect of the criteria not completed.
- Candidates who are absent for *Option 2* should complete *Option 1*.

Support

The Moderators are always willing to provide as much support as is requested by the centre. Centres should be aware that there is help available from WJEC. Published exemplars of coursework investigations are available on the WJEC website. Centre Moderator's Reports should be downloaded from the WJEC secure website. Centres are urged to act on any recommendations made therein.

The fieldwork proposal for Option 2 should be submitted to the subject officer David Evans (david.evans@wjec.co.uk) at WJEC at least one month before undertaking the field work. Details of the specification can be downloaded from WJEC website where the appropriate forms and guidance for teachers can also be found. For further support contact David Evans or Sarah Price the subject support officer at WJEC (sarah.price@wjec.co.uk).



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