GCE AS Examiners' Report

Geology
AS Level
Summer 2024

Introduction

Our Principal Examiners' report provides valuable feedback on the recent assessment series. It has been written by our Principal Examiners and Principal Moderators after the completion of marking and moderation, and details how candidates have performed in each component.

This report opens with a summary of candidates' performance, including the assessment objectives/skills/topics/themes being tested, and highlights the characteristics of successful performance and where performance could be improved. It then looks in detail at each unit, pinpointing aspects that proved challenging to some candidates and suggesting some reasons as to why that might be.[1]

The information found in this report provides valuable insight for practitioners to support their teaching and learning activity. We would also encourage practitioners to share this document – in its entirety or in part – with their learners to help with exam preparation, to understand how to avoid pitfalls and to add to their revision toolbox.

Further support

Document	Description	Link
Professional Learning / CPD	Eduqas offers an extensive programme of online and face-to-face Professional Learning events. Access interactive feedback, review example candidate responses, gain practical ideas for the classroom and put questions to our dedicated team by registering for one of our events here.	https://www.eduqas.co.uk/home/professional-learning/
Past papers	Access the bank of past papers for this qualification, including the most recent assessments. Please note that we do not make past papers available on the public website until 12 months after the examination.	Portal by WJEC or on the Eduqas subject page
Grade boundary information	Grade boundaries are the minimum number of marks needed to achieve each grade. For linear specifications, a single grade is awarded for the subject, rather than for each component that contributes towards the overall grade. Grade boundaries are published on results day.	For unitised specifications click here: Results and Grade Boundaries and PRS (eduqas.co.uk)

[1] ***Please note that where overall performance on a question/question part was considered good, with no particular areas to highlight, these questions have not been included in the report.***

Exam Results Analysis	Eduqas provides information to examination centres via the WJEC Portal. This is restricted to centre staff only. Access is granted to centre staff by the Examinations Officer at the centre.	Portal by WJEC
Classroom Resources	Access our extensive range of FREE classroom resources, including blended learning materials, exam walk-throughs and knowledge organisers to support teaching and learning.	https://resources.eduqas.co.uk/
Bank of Professional Learning materials	Access our bank of Professional Learning materials from previous events from our secure website and additional pre-recorded materials available in the public domain.	Portal by WJEC or on the Eduqas subject page.
Become an examiner with WJEC.	We are always looking to recruit new examiners or moderators. These opportunities can provide you with valuable insight into the assessment process, enhance your skill set, increase your understanding of your subject and inform your teaching.	Become an Examiner | Eduqas

Contents

Executive Summary

The two components forming the AS Geology assessment in 2024 were both of similar formats to these components in previous years, and it is clear that candidates have spent valuable time becoming familiar with the typical demands of such papers. However, the testing of geology in novel situations is an important aspect of these assessments too. There was a slightly greater emphasis on the assessment of fieldwork and laboratory work than in previous years and candidates should make sure that they use their 'portfolio' of lab-based practical work and notes as they prepare for examinations in Geology.

In Component 1, the construction of the cross-section was undertaken well, as were questions involving mineral testing and sedimentary logs.

In Component 2, candidates performed well in topic areas that are less complex, such as in the questions related to fossils and sedimentary rocks. The more demanding question related to rock deformation was also accessed well. However, candidates should also focus on learning more complex topic areas such as mantle plumes, the mechanisms of plate movement and the nature of the Moho.

In both components it was pleasing to see that candidates generally fared well on questions involving the use of mathematical techniques.

It is important that candidates pay attention to answering the question fully, using all the key information given in the stem of the question.

Areas for improvement	**Classroom resources**	**Brief description of resource**
Writing answers that respond to all the key information given in the stem of the question	Online exam review	Annotated samples of candidate responses which can be used to show good practice.
Writing answers that respond to all the key information in the stem of the question	GEOLOGY EXAM WALK THROUGHS	Presentations taking candidates step-by-step through exam papers, highlighting the requirements of exam questions
Recall of more complex topic areas	KNOWLEDGE ORGANISERS	A collection of knowledge organisers to support the learning of AS and A level Geology.

GEOLOGY

GCE Advanced Subsidiary

Summer 2024

COMPONENT 1 – GEOLOGICAL ENQUIRIES

Overview of the Component

The AS Component 1 comprised 7 questions, which focussed on the practical aspects of AS Geology. It included the study and analysis of two rock samples, a mineral and a fossil. Additionally, it involved the study of several geological photographs and a map, as well as a holistic approach to geological investigations.

A range of sedimentary, metamorphic, and igneous processes were tested in the paper, as well as minerology and fossils studies. Field, laboratory and mapwork techniques were also assessed.

As seen in previous years, there was a wide range of marks achieved. Questions with a familiar structure (1, 2, 3, 4 and 7) typically achieved the higher marks on the paper (while still achieving a good range of marks overall). Question 5, involving fieldwork and mapwork techniques was more of a challenge for many candidates, highlighting an area for development. Question 6, whilst a standard question format, created a challenge for more candidates than in previous years.

Overall, the question paper was like previous years in style and format. There was a greater focus on field and laboratory techniques compared to previous years. This is where the greatest variability in results was seen. Questions involving mathematical skills were generally answered better than in previous years.

The mean mark on this component was two marks fewer than in the previous year.

Comments on individual questions/sections

Q.1 Question 1 was generally approached well by candidates. Part a was well answered with most candidates achieving at least one mark, and many correctly identified the mineral in part b. Part c was posed more of a difficulty, with some candidates struggling to identify clear and distinct differences between the sample and the photograph. There was also a habit of only giving one part of the question (discussing the photograph but not specimen H or vice versa). Part d(ii) was the greatest challenge with many candidates failing to recognise the context of the high heat and pressure, or not giving a clear description of the environment (i.e. orogenic belt)

Q.2 Question 2 was again generally well approached. Part a was usually successful, although a few candidates struggled with the scale and the usual minority did not show that the grains made contact. Item b(i) was usually well answered with most students gaining the mark. In part b(ii) there was a variety of responses. The best marks came from candidates who approached it with some questions themselves i.e. pointing out that there was a lack of information on certain rock beds. Others gave a good discussion of environment and energy. Many candidates were unable to access higher marks because they only focused on energy levels. Very few failed to answer at all, and the overall responses showed candidates have become familiar and more comfortable with this style of question.

Q.3 In Question 3 there was a distinct difference between the beginning and end of the question. Candidates generally scored well in parts a and b. In part a, a few candidates failed to describe the tests by simply writing 'hardness test'. There were a notable number of candidates who suggested adding HCl to galena which is unsafe in this context. For this reason, the provision of HCl was not listed in the 'centre instruction' documents which accompanied this examination. We would ask teachers that this is not suggested as an identification technique. Part c was less well answered, and candidates continued to lean on the 'human error' arguments for which credit was not given. This question focused more on aspects such as impurities, weathering of the mineral etc.

Q.4 Question 4 was very well answered. The drawings were of a high standard and candidates labelled/annotated their drawings as required. A notable minority were unable to identify the foramen and a few incorrectly identified the fossil as a bivalve.

Q.5 Question 5 was the least successful question. Candidates should practise reading grid references and learning to plot notation on maps. Candidates also struggled to explain how different folded beds could have different strikes. While they understood folding itself quite well, the concept of the strike of a bed and the application of directed pressure was less well understood. This is why part a (iii) was not well answered. In part b (ii) candidates again leaned too heavily on the concept of 'human error' instead of the complex nature of taking geological readings in the field.

Q.6 Question 6 had a full range of marks achieved, though few achieved full marks. The relative movement caused the greatest issue, with most candidates able to successfully identify at least one fault type.

Q.7 Question 7, the cross-section construction was generally well accessed. There was a notable group of candidates achieving 10 or more marks and the overall quality of work was very good. This was the first year where a notable number of candidates placed fold axes correctly, though there were more candidates than usual omitting the pluton, presumably because it was overlain by rocks above an unconformity. The folded sequence of beds was dealt with well this year, especially where the sequence was visible on the surface. As in previous years, the AO3 marks were the ones most likely to cause candidates issues but overall, there was a good range of answers.

GEOLOGY

GCE Advanced Subsidiary

Summer 2024

COMPONENT 2 – FOUNDATION GEOLOGY

Overview of the Component

The AS Component 2 tested a wide range of geological skills and knowledge, including those related to sedimentary rocks, fossils, mantle plumes, rock deformation and the structure of the lithosphere. Fieldwork skills and mathematical calculations were also part of the assessment.

The paper had a mean mark of 42.9, slightly lower than last year. The marks achieved on this component ranged from 12 to 81.

Candidates performed strongest on questions 2, 4 and 5, with a notable decrease in performance on questions 3 and 6 where candidates geological knowledge was not as robustly demonstrated. Candidates who were more successful over the whole paper achieved well on questions that required candidates to evaluate.

Comments on individual questions/sections

Q.1 There was a wide range of performances from candidates on question 1. Most candidates identified good comparative points regarding the two images of the sedimentary rocks and the general definitions of porosity and permeability were demonstrated well. However, many candidates were not successful in identifying the two missing elements in part 1 (a), with silicon being correctly identified more often.

In question 1(c) many candidates correctly described textural features that can impact porosity and permeability. In particular, the shape and sorting of clasts, compaction of clasts, and cementation/matrixes were common points. However, many were not successful in explaining the impact of the textural feature on porosity and permeability. The level of detail in candidates' explanations is an area that can be generally improved.

Q.2 Candidates completed question 2a(i) successfully overall, with many calculating the correct answer. In 2a(ii) it was common for candidates to identify the use of half-life, with a high number noting this as being the relationship between parent and daughter isotopes. However, many candidates did not link this to using this ratio to calculate the number of half-lives that have passed, and through this the age.

Characteristics of zone fossils were well known by candidates with many identifying three. Candidates demonstrated a much wider range of understanding when evaluating the given data for the relative dating of rocks. Many were able to identify the impact of the time over which the fossil groups existed as a key factor; however, few discussed the data given on the number of families in Figure 2.

Q.3 Question 3a(i) required candidates to analyse the data given in Figure 3a, which led to all three marks (0,1,2) being common results. It was not uncommon for candidates to incorrectly link the hotspots exclusively to the plate boundaries.

Many candidates did not refer to Figure 3b when answering 3a(ii). It was common for candidates to try and link the magma formation to convergent/divergent boundaries and the characteristics that lead to partial melting at these locations, instead of the formation at hotspots. The best answers discussed the cause of the change to the geotherm due to the hotspot, and the impact of the geotherm crossing the melting point curve.

The best answers to 3b(i) highlighted where the low velocity seismic waves were on Figure 3c, and then explained this as being caused by the reduction in rigidity/ incompressibility due to the increased temperature found there. There were some common misconceptions in candidates' responses to 3b(i). Many believed that the area of low seismic waves travelling down to below 2500km is magma instead of heated, less rigid rock, while others discussed the difference in P and S waves.

Candidates completed the calculation in 3b(ii) effectively, with a range a unit scales chosen by candidates from km Ma^{-1}, through to mm yr^{-1}.

Many candidates highlighted the importance of magnetic reversals in calculating the rate of plate movement in 3b(iii). However, few were successful in highlighting how the distance a specific anomaly is from the plate can be used to calculate the rate.

The best answers to 3c were those that identified that slab pull is the mechanism that contributes the most to plate movement, with ridge pull still being a factor when near divergent boundaries. There was a surprising number of candidates who believed that convection currents are the main driver of plate movement. This is now an out-dated concept and is not supported by the evidence available. There is also a common misconception about the process of ridge push and how this leads to plate movement, with many not understanding the role of gravitational sliding, instead believing that the plate is being pushed sideways by the rising mantle.

Q.4 Candidates demonstrated a good understanding of how to complete field sketches and identifying the fold axis. The only common inaccuracy was not including the fault line in their sketch. Some candidates did not use the box on Figure 4a as a guide to produce the correct scaled drawing, and there were many sketches where candidates produced "model" folds with straight lines and very angular hinges. The ability to draw field sketches that represent an outcrop with a degree of accuracy is a key geology field skill.

Most candidates correctly evaluated that the folds were asymmetrical and possessed rounded (not angular) hinges. However, many candidates are still incorrectly linking symmetry to axial plane attitude and not limb length.

The concept of stress was well defined by candidates. However, many candidates found defining strain more challenging.

In 4c(ii) many candidates were able to link the fault to the fracture point in Figure 4b, with some correctly discussing the reverse nature of the fault and how it looks likely that it occurred after the folding event (or at the same time) due to cross-cutting. Candidates often highlighted how the folds occurred during the plastic section of Figure 4b. The best answers discussed how the initial elastic phase was where the shaping of the folds would have begun, although it is within the plastic region that the deformation became permanent in the rocks, and if the stress had stayed in the elastic region then the rocks would have returned to their original shape.

Q.5 In general, candidates were successful in identifying the fossil in Figure 5 as a trilobite. However, many were not as successful in naming the three regions of the fossil in 5a(ii). Many candidates completed 5a(iii) accurately, with both answers in mm and cm common. The two most common mistakes seen were multiplying instead of dividing, and not giving the units with their answer.

There was a range of answer quality for 5b. Many used the size and shape of the glabella/cephalon, long length of the thorax and small pygidium size as evidence that the trilobite was much more likely a benthonic species rather than pelagic. Evidence of a compound eye on the right of the cephalon was also highlighted in some answers. The strongest answers made clear links between the features of the fossil and how they are likely linked to life mode of the trilobite.

Many candidates were able to use Figure 5 to identify that the brassy yellow mineral was pyrite. In the strongest answers, the process of mineral replacement on a molecule-by-molecule basis was clearly described. Few answers highlighted the importance of anaerobic conditions that are needed for pyritisation to occur. In less successful responses, candidates mistakenly linked the fossilisation process to the formation of fossils through mould and cast.

Q.6 Candidates were mostly successful in identifying the two rock types in 6a(i). Some candidates incorrectly named the dykes as forming from granite, but this was not a common mistake.

In 6a(ii) and 6a(iii) candidates were asked to identify the boundary of the crust and mantle on the two models in Figure 6a. Many candidates were able to successfully identify this location on model 1, however many found applying the principle that the crust and mantle have chemical composition differences more challenging, and many placed their label incorrectly at the base of the partially serpentinised peridotite on model 2.

In 6a(iv) candidates were often successful in identifying that there is an increase in rigidity/incompressibility as you travel down through the crust. However, candidates were not successful in linking in the role of density and how this is not increasing at the same rate, leading to the increase in P-Wave velocity.

Candidates gave a range of responses to 6a(v). Many answered this question in a logical manner, highlighting how the sediment thickness, and age of sediment, will increase moving away from the mid-ocean ridge. Less successful candidates often tried to link different marine sedimentary environments to the age and depth of sediment.

In 6b(iv) candidates' understanding of the implications of model 2 in Figure 6a was very varied. The stronger answers highlighted how the location of the Moho is linked to the chemical composition change and how model 2 would lead to a drastic depth change its location.

Many candidates chose to discuss the use of core drilling (like the JOIDES Resolution) or the use of physical evidence on the surface (ophiolite suites) which was rewarded in this context. Most of these answers were successful in giving reasons for how this evidence could be used. Many candidates incorrectly identified the use of seismic waves in this question, which is not a strategy for testing the models due to the same result for both model 1 and model 2.

Supporting you

Useful contacts and links

Our friendly subject team is on hand to support you between 8.30am and 5.00pm, Monday to Friday.
Tel: 029 2240 4253
Email: geology@eduqas.co.uk
Qualification webpage: Eduqas AS/A level Geology

See other useful contacts here: Useful Contacts | Eduqas

CPD Training / Professional Learning

Access our popular, free online CPD/PL courses to receive exam feedback and put questions to our subject team, and attend one of our face-to-face events, focused on enhancing teaching and learning, providing practical classroom ideas and developing understanding of marking and assessment.

Please find details for all our courses here: https://www.eduqas.co.uk/home/professional-learning/

Regional Rep Team

Our regional team covers all areas of England and can provide face-to-face and online advice at a time which is convenient to you.

Get in contact today and discover how our team can support you and your students.
Regional Support Team | Eduqas

Eduqas Qualifications

We are one the largest providers of qualifications for schools, academies, sixth form and further education colleges across England, offering valued qualifications to suit a range of abilities. Each and every one of our qualifications is carefully designed to engage students and to equip them for the next stage of their lives.

We support our education communities by providing trusted qualifications and specialist support, to allow our students the opportunity to reach their full potential.

WJEC
245 Western Avenue
Cardiff CF5 2YX
Tel No 029 2026 5000
Fax 029 2057 5994
E-mail: exams@wjec.co.uk
website: www.wjec.co.uk