GCSE Examiners' Report

Geology

GCSE

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 unitised specifications grade boundaries are expressed on a Uniform Mark Scale (UMS). UMS grade boundaries remain the same every year as the range of UMS mark percentages allocated to a particular grade does not change. UMS grade boundaries are published at overall subject and component level. 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/
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Executive Summary

The two components forming the GCSE Geology assessment in 2024 were both of similar formats to these components in previous years, and it is clear that many candidates were familiar with the typical demands of such papers.

The mean marks achieved by candidates in both components were lower than those in 2023. In particular, candidates found Component 2 more demanding than in 2023 with a drop in the mean mark of 8/80.

In both components candidates performed well on topics such as minerals, rocks and fossils. It is clear however that in some more complex topics areas candidates had not focussed their learning, such as evidence for all three types of stress on the Map Extract in Component 2, or the re-evaluation of plate theory in terms of models of oceanic lithosphere formation in Component 1.

In Component 2 there was a particular emphasis on the assessment of candidates' knowledge and understanding of practical skills and techniques, which accounted for 35 of the 80 marks. The drawing of the fossil in question 2 was generally of a good standard as was the sketching of the igneous body in question 4. However significant number of candidates did not attempt the construction of the cross-section.

In both components many candidates did not understand that questions requiring the comparison of two features demand that answers must mention both features to gain the marks. This was seen in the Component 1 question 2(b)(ii) which compared two models of ocean lithosphere formation, and Component 2 question 4(b)(ii) which compared the rocks inside and outside a baked margin.

The answers involving mathematical skills were answered well by some, but a significant number of candidates did not show their working, particularly in the onscreen Component 1 examination. In this examination candidates should be reminded to type their working before giving their answers.

As in previous years it was notable that candidates are using the names of igneous rocks not on the specification. Teaching candidates these names puts them at a disadvantage compared to those who are not aware of such terms and who therefore have fewer chances of getting the answer wrong.

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.
Recall of more complex topic areas	GCSE KNOWLEDGE ORGANISERS	A collection of knowledge organisers to support the learning of GCSE Geology.

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Component 1 – Geological Principles

Overview of the Component

Component 1 covered specification aspects of the rock cycle, plate tectonics, volcanic hazards, Earth resources, sedimentology, climate change and planetary geology, along with appropriate practical and mathematical skills.

Component 1 was accessible to the majority of candidates but on balance there were more questions not attempted compared to previous examinations, particularly the longer response questions worth between 3 and 6 marks. The spread of marks ranged from 3/80 to 78/80. The mean for the paper was 47.8 down from 50.8/80 in Summer 2023. The Facility Factors for the six questions ranged from 57.1 to 66.4.

A small number of candidates failed to make use of the data sheet as instructed and sacrificed easily obtainable marks.

A minority of candidates failed to tick two boxes on the multiple-choice questions when required.

The QER extended response questions produced a polarisation of responses with many candidates either scoring full marks (6/6) or very few marks (0/6 to 2/6).

The mathematically based questions produced a variety of responses. A number of basic errors were made in measuring from scale bars and graphs.

A significant number of candidates failed to show any working in mathematical based questions when instructed to do so and lost marks here.

Comments on individual questions/sections

Q.1 Facility Factor 60.2 Mean mark 11.4/19

The first parts of this question on the rock cycle were well answered by the majority of candidates with many scoring full marks on parts (a) and (b). The most common error in (b) was to identify the formation of a thrust fault as a gradual rather than catastrophic process. The garnet in part (c)(i) was identified correctly by most candidates with just a few giving haematite as the answer. Describing the texture of the schist in part (c)(ii) was a good discriminator with a variable range of responses depending whether the candidates described the texture as being metamorphic, igneous or sedimentary. Calculating the magnification factor of the garnet was completed successfully by the majority of candidates but fewer could re-arrange the equation to calculate the real size of the garnet. The most common error was to give real size = size of garnet x magnification factor. Question (c)(v) produced responses that either scored very high or very low marks depending on the approach used. Many weak answers showed that candidates failed to interpret the question as they ignored the key phrase 'geological processes occur at different rates'. Instead they just tried to describe the geological history shown in the borehole without any reference to gradualism or catastrophism or lengths of time. A significant number of candidates scored zero marks as a result. The better answers used the idea of catastrophism and gradualism and scored maximum marks in describing the formation of the schist, unconformity, turbidite and black shale.

Q.2 Facility factor 57.1 Mean mark 6.8/12

This was the first time that models of oceanic lithosphere formation had been tested and resulted in the lowest facility factor of the 6 questions on the paper. Many candidates seemed to think that the two diagrams represented different types of plate boundary even though the stem stated 'Figure 2a and Figure 2b show two different models to explain how oceanic lithosphere may be formed at ocean ridges'. 7 out of the 12 marks were multiple-choice responses and the majority of candidates picked up some marks here. Q2(a)(iv) requiring the naming of igneous rock A and igneous rock B produced a large range of incorrect responses that included granite, andesite, schist, slate, marble, limestone, sandstone and shale. The correct answers basalt and peridotite were the least common responses. Q2(b)(ii) was a good discriminator and produced a huge range of correct answers based on the information shown in Figures 2a and 2b. Candidates failed to pick up marks when they failed to describe the differences between Figure 2a and Figure 2b, often just stating that 'Figure 2b has a fault' or 'Figure 2b has thin crust' instead of contrasting with Figure 2a.

Q.3 Facility factor 57.3 Mean mark 6.8/12

A fairly straightforward question based on the eruption of Mount St. Helens in 1980, with only 3 of the 12 marks being gained from multiple-choice responses.

Q3(b) proved to be a high scoring question with the many of the candidates gaining 4/4 marks by correctly referring to earthquakes becoming shallower and the magnitude increasing, followed by quoting some data from Table 3. Candidates scoring 2/4 tended not to quote any data from Table 3. Q3(b)(ii) was a good discriminator with the more able candidates scoring full marks here. Good answers referred to magma rising and expanding in volume as the pressure dropped and gases exsolved leading to an increase in pressure and eventually eruption. Weak answers concentrated on describing earthquake activity without linking it to rising magma. Q3(b)(iii) produced many responses that simply named a technique by which ground deformation could be measured without any further description or elaboration, resulting in only 1 mark. Weak candidates simply quoted one of the six options in Q3(b)(iv) as their answer, which failed to gain any credit.

Q.4 Facility factor 66.4 Mean mark 7.9/12

This question resulted in the highest facility factor of the 6 questions on the paper and only 2 of the 12 marks were derived from multiple-choice responses. Q4(a)(ii) was a high performing question with the majority of candidates scoring 2/3 or 3/3. Marks were generally lost by ignoring the reference to 'structures' in the stem of the question. Only 2 marks could be gained by describing the shale source rock, sandstone reservoir and halite cap rock. Full marks needed reference to the antiform/anticline trap. Q4(a)(iii) produced answers of variable quality with the best referring to the igneous rock blocking the migration of oil upwards, and the sandstone exposed at the surface leading to the oil escaping. Responses failing to gain credit just stated 'igneous rock' or 'too close to the surface'. Q4(b) was a high scoring question based on the graph in Figure 4c with many candidates scoring 4/4 marks here. Some candidates lost 1 mark in Q4(b)(ii) by not showing any working and just stated the answer of 25. Q4(c) was very straightforward, and many candidates scored full marks in this section

Q.5 Facility factor 57.5 Mean mark 7.5/13

A climate change question based on photographs of chalk and tillite with 3 of the 13 marks available based on multiple-choice responses. In Q5(a)(i) many candidates failed to notice the word era in the stem and instead stated a geological period, with Cretaceous being the most common incorrect response. Q5(a)(iii) seemed to encourage responses that involved simply repeating the labels on Figure 5a without giving reasons of their own. Many responses failed to recognise that reacting with hydrochloric acid the rock must be made of calcite, or what the marine micro-organisms might be. Q5(b)(i) was a high scoring question with many candidates scoring full marks here by referring to poor sorting, angular and reference to particle size. A small number of candidates described Figure 5b as of igneous origin being crystalline and porphyritic. Q5(b)(iii) proved to be a good discriminator with responses of variable quality. The better answers recognised that the tillite was deposited by ice and that today ice is only permanent at high altitudes and latitudes. As the tillite in Figure 5b was found at 5 degrees North, it means that ice was present at the equator at that time, so therefore the whole planet must be in icehouse conditions. Many candidates picked up 1 mark for reference to glacial origin.

Q.6 Facility factor 59.6 Mean mark 7.1/12

The final question on the paper contrasted the characteristics of Earth and Mars with specific reference to volcanoes. Q6(a) was correctly answered by the majority of candidates choosing options 3 and 6 in the multiple-choice to score 2/2 marks. Section (b)(i) and (ii) were answered well by many candidates but a significant number failed to show any working in part (ii) and lost marks as a result. The scale bar on Figure 6 was 100 km and average diameter of Olympus Mons was 5 x the scale bar so had a diameter of 500 km. It is worth reminding candidates in questions of this type, the scale bars will normally, for example be exactly 2, 3, 4 or 5 times smaller than the item to be measured, so that a round number like 500km will be the answer. The QER response in (b)(iii) was a very good discriminator and a significant number of candidates scored full marks here, but weaker candidates often only scored 0 or 1 mark due to poor exam technique. The question required candidates to use selected relevant data from Table 4 to explain why Olympus Mons could not be formed on Earth. Weak candidates simply regurgitated the data in Table 4, much of which was irrelevant to the question asked, and offered no relevant explanation. To score full marks candidates needed to address the differences between erosional agents/atmosphere, plate tectonic activity and gravity on Earth and Mars. For example, stating that the Earth has plate tectonic activity and Mars does not gained no credit. An explanation referring to how volcanoes can be destroyed at subduction zones and those on hot spots move away from their magma source on Earth restricts their size. Whilst on Mars there is no subduction and volcanoes remain permanently over their hot spots so can grow much larger. Weaker answers focused on erosional agents alone and explained there would be more erosion on Earth as it has water (rivers, sea) and ice (glaciers/ice sheets) whilst Mars had only wind, scoring 2/6 marks.

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Component 2 – Investigative Geology

Overview of the Component

The Component 2 paper included short and extended questions based on Map 1. The paper assessed a wide variety of topics with an emphasis on the rock groups, minerals and geological structures. It also required the candidates to draw on their knowledge and understanding of practical skills and techniques which accounted for 35 marks. Candidates were assessed on the sketching of a dyke and a cephalopod and on the drawing of an equicrystalline basalt. It was the first time that the candidates were expected to show the percentage of minerals in a diagram of a rock and many achieved the marks. Candidates were asked to record dyke orientations from Map 1 into a tally chart and to represent the data on a rose diagram. However, many only used the pre-existing data in Table 4. Generally, the plotting of data on the rose diagram was done well. Many candidates attempted the cross-section in question 6 although few achieved full marks as beds were not plotted accurately. A significant minority did not attempt the cross-section.
Mathematical skills were also assessed in the paper and accounted for 17 marks. Generally, these questions were answered very well.

The highest performing question was Question 2 with a Facility Factor of 58.2.

The lowest performing question was Question 7 with a Facility Factor of 36.5.

There was a wide spread of results from 0 - 74

The mean for the paper was 37.7/80 down from 45.6/80 in Summer 2023. Candidates found some questions quite demanding, in particular questions 1(a), 4(b)(ii) and 6(a).

Comments on individual questions/sections

Q.1 Most candidates misinterpreted the first part the question by focussing on geochemical and geophysical techniques rather than methods to locate themselves in the field for example, the use of a compass, map or GPS. Many candidates were able to successfully measure the dip angle although many candidates were not able to determine the correct dip and strike direction. In section (d) many students were able to identify the unconformity and explain how it formed. High scoring responses referred to Rock Unit A and B in the answer. Section (d) was the highest performing part of question 1.

Q.2 Generally, a well-answered question. Higher scoring candidates referred to the information provided in Figure 2a. A small number of candidates incorrectly identified the grains as greater than 2mm and subsequently misidentified the rock as conglomerate. The majority of candidates identified the cement as calcite and described how to test permeability. However some candidates confused permeability and porosity. Many stated that ‘if Rock Unit B was permeable then the water would disappear’, rather than stating the result of the test by stating ‘the water would disappear’.

Most candidates scored 1 or 2 on section 2(c)(i). Overall, the fossil sketch was of a good standard. Higher scoring candidates used the scale correctly and sketched a circular shell with ribs. The final part of the question (c) (ii) was a good discriminator with many only achieving the mark for recognising that cephalopods are marine organisms. The majority of candidates failed to use Figure 2b and therefore did not refer to the shape and size of the grains. Lower scoring candidates did not specifically refer to the cephalopod, only the fossil.

Q.3 A very accessible question for the majority of candidates. Most correctly identified halite and the desiccation cracks in part (b) and were able to give a good explanation of how they formed, referring to clay, water evaporating and contracting. Weaker answers confused the process with freeze-thaw weathering. Virtually all candidates referred to a hot desert environment in part (c) although few referred to the size of the grains in Figure 3b to interpret a low energy environment. The most common responses identified the environment as shallow marine rather than stating an environment such as a lake or a lagoon where desiccation can form and be preserved.

Q.4 Generally, the sketches in part (a) were of a good quality. The majority of candidates sketched a crystalline texture rather than grains which has been seen in previous papers. Higher scoring candidates used the scale bar and measured the crystals to get a mean size of 0.5mm. Although it is not required to complete the whole circle to achieve full marks many candidates chose to draw half the circle but did not draw a sufficient number of crystals to show a mean size of 0.5mm and an equicrystalline texture, and therefore scored a maximum of 3 marks. Some candidates plotted a pie chart and therefore achieved a maximum of 2 marks for the composition. The majority of candidates correctly identified the rock as basalt, however igneous rocks not in the specification were also used e.g. gabbro and dolerite.

In section (b) the quality of the sketch was good with many achieving 2 or 3 marks. The majority of candidates sketched the igneous body to the correct scale. Lower scoring candidates did not sketch two baked margins accurately nor included joints in the sketch. Section (b) part (ii) was the lowest scoring part of the question as many candidates failed to fully compare the rocks at point P and Q. Many candidates referred to the colour change, however many answers were vague and failed to recognise the changes that would have occurred from contact metamorphism. In part (iii) higher scoring candidate stated the type of metamorphism and referred to the process of recrystallisation.

Q.5 An accessible question for most candidates, however in part (a) many did not record the orientation of the 4 dykes from Map 1. Error carried forward still gave credit for the correct plot of the rose diagram using the values from Table 4. Most candidates found section (b) straightforward and scored full marks. Lower scoring candidates did not convert the length of the transect into metres from kilometres. Many recognised that recording all dykes along the transect was more accurate since all dykes would be sampled, whereas sampling every 50m would miss the recording of many dykes.

Q.6 The cross-section differentiated well. Many candidates plotted the dyke correctly and the horizontal unconformable beds. It was evident that many candidates estimated the dip angle of the beds rather than plotting it using a protractor. There was a significant number of candidates who did not attempt the cross-section. Although the relationship between fold outcrop and limb dip was assessed recently many candidates were unable agree with the statement and give evidence from Map 1. Some achieved 1 mark for recognising different outcrop widths but were unable to achieve the second mark for linking dip angle and outcrop width. Weak answers confused fold symmetry with the dip of limbs. Most candidates were able to identify the fault correctly although often the reasons were vague and did not refer to the dyke or the axial plane trace. Section (d)(i) and (ii) produced many excellent answers with a significant number of answers scoring maximum marks.

Q.7 Responses to this QER question needed to refer to the types of stress and structures and the relative ages. Of those who attempted the question most explained that the folding was formed by compressional stress, and similarly many identified the strike-slip fault as having formed through shear stress. However weaker answers did not include the type of the fault. A small number of candidates recognised that the dykes provided evidence for tensional stress and referred to evidence from question 5 in their answer. Higher scoring answers were well developed and included evidence from Map 1. Many candidates completed a geological history to show that the type of stress had changed over time.

Q.8 An accessible question based on the siting of hazardous waste. Although many candidates attempted the question, a significant number referred to the porosity rather than the permeability of the rocks,and referred to reservoir and cap rocks. For example, many thought that the desert sandstone would be a good location for the hazardous waste as it could be stored in the pore spaces. Many answers also referred to the breccia being a good cap rock. Higher scoring answers evaluated each site, referring to the permeability of the rocks and the problems associated with the fault.

Practical Skills and Map Skills:

The map skills proved to be challenging to many candidates. Strike and dip direction were still confused. Many candidates also confused folds with unequal dip with asymmetry.

Although many were able to identify the strike-slip fault, the reasons needed to refer to evidence from the map, for example the displacement of the dyke and axial plane trace / core bed.

Sketching skills: The quality of the sketching was good; however, candidates needed to accurately sketch the smaller details. e.g. joints and chilled margins. Overall, the rock sketch was of a good standard however the percentages of the minerals need to be represented in the sketch. Candidates should also have drawn enough crystals to clearly show the mean crystal size and the equicrystalline texture.

Identification of rocks and fossils: It was notable that candidates were using igneous rocks not on the specification. Many candidates were able to successful identify the fossil as an ammonite.

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
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