Rewarding Learning

General Certificate of Secondary Education
2017

Geography

Unit 1:
Understanding Our Natural World

Higher Tier

[GGG12]

MONDAY 22 MAY, AFTERNOON

MARK SCHEME

General Marking Instructions

Introduction

Mark schemes are intended to ensure that the GCSE examinations are marked consistently and fairly. The mark schemes provide markers with an indication of the nature and range of candidates' responses likely to be worthy of credit. They also set out the criteria which they should apply in allocating marks to candidates' responses. The mark schemes should be read in conjunction with these general marking instructions.

Assessment objectives

Below are the assessment objectives for GCSE Geography.

Candidates must show they are able to:

- recall, select and communicate their knowledge and understanding of places, environments and concepts (AO1);
- apply their knowledge and understanding in familiar and unfamiliar contexts (AO2); and
- select and use a variety of skills, techniques and technologies to investigate, analyse and evaluate questions and issues (AO3).

Quality of candidates' responses

In marking the examination papers, examiners should be looking for a quality of response reflecting the level of maturity which may reasonably be expected of a 15- or 16-year-old which is the age at which the majority of candidates sit their GCSE examinations.

Flexibility in marking

Mark schemes are not intended to be totally prescriptive. No mark scheme can cover all the responses which candidates may produce. In the event of unanticipated answers, examiners are expected to use their professional judgement to assess the validity of answers. If the answer is particularly problematic, then examiners should seek the guidance of the Supervising Examiner.

Positive marking

Examiners are encouraged to be positive in their marking, giving appropriate credit for what candidates know, understand and can do rather than penalising candidates for errors or omissions. Examiners should make use of the whole of the available mark range of any particular question and be prepared to award full marks for a response which is as good as might reasonably be expected of a 15- or 16-year-old GCSE candidate.

Awarding zero marks

Marks should only be awarded for valid responses and no marks should be awarded for an answer which is completely incorrect or inappropriate.

Types of mark schemes

Mark schemes for tasks or questions which require candidates to respond in extended written form are marked on the basis of levels of response which take account of the quality of written communication.

Other questions which require only short answers are marked on a point for point basis with marks awarded for each valid piece of information provided.

Levels of response

Tasks and questions requiring candidates to respond in extended writing are marked in terms of levels of response. In deciding which level of response to award, examiners should look for the 'best fit' bearing in mind that weakness in one area may be compensated for by strength in another. In deciding which mark within a particular level to award to any response, examiners are expected to use their professional judgement. The following guidance is provided to assist examiners.

- **Threshold performance:** Response which just merits inclusion in the level and should be awarded a mark at or near the bottom of the range.

- **Intermediate performance:** Response which clearly merits inclusion in the level and should be awarded a mark at or near the middle of the range.

- **High performance:** Response which fully satisfies the level description and should be awarded a mark at or near the top of the range.

Marking calculations

In marking answers involving calculations, examiners should apply the 'own figure rule' so that candidates are not penalised more than once for a computational error.

Quality of written communication

Quality of written communication is taken into account in assessing candidates' responses to all tasks and questions that require them to respond in extended written form. These tasks and questions are marked on the basis of levels of response. The description for each level of response includes reference to the quality of written communication.

For conciseness, quality of written communication is distinguished within levels of response as follows:

Level 1: Quality of written communication is limited
Level 2: Quality of written communication is satisfactory
Level 3: Quality of written communication is of a high standard.

In interpreting these level descriptions, examiners should refer to the more detailed guidance provided below.

Level 1 (Limited): Candidates present some relevant information in a form and using a style of writing which suits its purpose. The text is reasonably legible. Spelling, punctuation and the rules of grammar are used with some accuracy so that meaning is reasonably clear. A limited range of specialist terms is used appropriately.

Level 2 (Satisfactory): Candidates present relevant information in a form and using a style of writing which suits its purpose. The text is legible. Spelling, punctuation and the rules of grammar are used with considerable accuracy so that meaning is clear. A good range of specialist terms is used appropriately.

Level 3 (High Standard): Candidates present, and organise effectively, relevant information in a form and style of writing which suits its purpose. The text is fluent and legible. Spelling, punctuation and the rules of grammar are used with almost faultless accuracy so that meaning is clear. A wide range of specialist terms is used skillfully and with precision.

Assessment of spelling, punctuation and the accurate use of grammar.
Marks for spelling, punctuation and the accurate use of grammar will be allocated to specific questions where there is a requirement for sufficient extended writing to enable the accurate application of Performance descriptions (see below). These marks will be identified to candidates on the question papers.

Performance descriptions

(i) Threshold performance
Candidates spell, punctuate and use the rules of grammar with reasonable accuracy in the context of the demands of the question. Any errors do not hinder meaning in the response. Where required, they use a limited range of specialist terms appropriately.

(ii) Intermediate performance
Candidates spell, punctuate and use the rules of grammar with considerable accuracy and general control of meaning in the context of the demands of the question. Where required, they use a good range of specialist terms with facility.

(iii) High performance
Candidates spell, punctuate and use the rules of grammar with consistent accuracy and effective control of meaning in the context of the demands of the question. Where required, they use a wide range of specialist terms adeptly and with precision.

As shown by the performance descriptions, SPaG marks are awarded in the context of the demands of the question. If the candidate's response does not address the question then no SPaG marks are available. However, if the candidate has attempted to answer the question but produced nothing of credit, SPaG marks may still be awarded.

Theme A: The Dynamic Landscape

AVAILABLE MARKS

1 (a) (i) State the highest spot height found within GR 9477.

123 m [1]

(ii) Using the Ordnance Survey map, complete **Table 1** by **describing** the contour pattern found in GR 9379 and stating what it tells us about the slope of the land here.

Grid reference	Description of contour pattern	Slope of the land
9379	Close together/ packed tightly or pupils can draw lines close together	Steep slopes/Hilly/ Steep Gradient/ Steep valley

Table 1

(2 × [1]) [2]

(iii) State the distance from the nature reserve in Teignmouth GR 931743 to the nature reserve on Dawlish Warren GR 988798.

Award [1],
7.7 – 7.79 km or 8.01 – 8.1 km.

Award [2],
7.8 – 8.0 km. [2]

(iv) State the direction of Starcross (GR 9781) from Exmouth (GR 0081).

West [1]

(v) Erosion occurs along the coastline from Holcombe (GR 9674) to Langstone Rock (GR 9877). Using map evidence state **three** parts of the transport network which may need to be protected.

Road (A379) [1] Train station [1] Railway track/line [1]
Coastal Path [1] Tunnel [1] Footbridge [1]
Station [1] Bridleway path/South West Coast path [1]
National Trail [1] Footpath [1]
Any three valid transport links.
(3 × [1]) [3]

(vi) A floodplain has formed in GR 9584. State the meaning of the term **floodplain**.

Award [1] for a simple definition,
e.g. An area of (flat) land on either side of the river.
e.g. An area of land made up of alluvium/silt.

Award [2] for a correct definition, with reference to location,
e.g. An area of (flat) land on either side of the river that holds flood water.
e.g. An area of flat land either side of the river, made up of alluvium. [2]

AVAILABLE MARKS

(b) A spit has formed at Dawlish Warren (GR9879). Answer the questions which follow.

(i) Name **one** land use on this coastal spit.

Do not accept road/train station/farming.

Award [1] for any of the following:
A visitor centre, a nature reserve, non-coniferous wood, track/path/other road, golf course/club house, parking/buildings, sand/sand dunes, wind pump/wind turbine, pond. [1]

(ii) Explain the conditions and processes needed to form a spit.

Award [0] for a response not worthy of credit.

Level 1 ([1]–[2])
Candidates make reference to the movement of sand, e.g. a spit is formed when sand moves along a beach.

Level 2 ([3]–[4])
Reference is made for top Level 2 both to the conditions required for a spit to develop and the process involved, e.g. Sand is moved along the beach by longshore drift, this sand or shingle builds up to form a ridge. Waves push material up the beach at an angle (swash), before moving it back down in the backwash. This zigzag/sawtooth movement allows material to be transported along the beach. [3] Deposition occurs when the coastline changes direction. [4]

Level 3 ([5]–[6])
Explanations of at least two conditions required for a spit to develop and processes involved, e.g. Sand is moved along the beach by longshore drift. Sand is washed up the beach at an angle (swash) and comes down straight in the backwash. This means over time material moves along the coast in a zigzag/sawtooth manner until it reaches a change in the shape of the coast. The sand or shingle accumulates and is deposited due to a lack of energy where it forms a narrow ridge. The spit grows over time as more material is deposited. All spits need a constant supply of sand to be deposited or they will be washed away. [6]

(c) Name and describe **one** process of erosion which has helped to shape these stones.

(i) Award [1] for naming an erosion process.
e.g. Abrasion/Corrasion, Attrition or Corrosion/(solution).

Award [2] for detailed description of named process.
e.g. Attrition occurs when rocks collide with each other. As they collide, pieces break off and they become smaller (and more rounded). [3]

(ii) Name the process where material is left behind due to a lack of wave energy.

Deposition. [1]

AVAILABLE MARKS

(d) (i) Using **Fig. 1**, name one store.

Trees/Grass/Vegetation, River/Channel, Interception, Soil, Rock, Ground Water storage/Soil moisture storage/surface storage. [1]

(ii) Describe the difference between a tributary and a confluence in a drainage basin.

A tributary is a small stream or river [1], whereas a confluence is where two streams/tributaries meet. [1] [2]

(iii) Explain the impact on both stores and transfers within the drainage basin if the trees are cut down.

Level 1 ([1]) for a simple statement, e.g. Less water will soak into the ground.

Level 2 ([2]–[3]) for statements that start to explain the impact on the stores or transfers. Two named transfers or stores needed for top Level 2, e.g. Runs off the surface. More water will reach the land as the trees no longer take it in. [2]

e.g. Less water will infiltrate into the ground because the soil will become saturated. This will mean greater surface run-off to the river. [3]

Level 3 ([4]) for detailed explanations which mention the impact on at least three named transfers and stores,
e.g. If trees are to be removed, this will reduce the interception layer. Water will infiltrate the ground more quickly leading to an increase in surface run off. This will increase the discharge of the river and the possibility of a flood occurring. [4]

(e) (i) Using **Table 2**, complete **Fig. 2** to show the shape of load on the river at site 3.

Award [1] each for correctly labelling each segment with correct key.
Award [1] correct division of line at 70%. [2]

(ii) Describe how the load has changed in size and explain how it has been transported downstream.

Do not credit methods of erosion in this question.

For Level 3 there should be both good description of how the load changes with figures and a clear explanation of at least three methods of transportation (traction/saltation/suspension/solution). For the full 6 marks some understanding that traction/saltation more likely to occur in the upper river and/or suspension/solution will happen in the lower river.

Award [0] for a response not worthy of credit.

Level 1 ([1]–[2])
Brief statements which focus on only description and/or list the method of transportation,
e.g. The stones become smaller. They are moved downstream by traction. [2]
e.g. The stones become smaller. At site 1 the average load size is 18.7 cm however by site 4 average load size is 4.9 cm. [2]
e.g. Saltation and traction are transportational processes. [2]

AVAILABLE MARKS

Level 2 ([3]–[4])
Statements of description with some use of the figures and explains one method of transportation. [3] One method only stated for [3]. Two methods only stated for [4].

The load decreases in size from 18.7 cm to 4.9 cm between sites 1 and 4. The load may have been transported by traction. [3] This is when the bedload is rolled along the river bed. [4]

Level 3 ([5]–[6])
Good description with figures and at least two methods of transportation explained for [6]. One method explained with one named process. [5]

The bed load decreases in size from 18.7 cm to 4.9 cm between sites 1 and 4. This is an overall decrease of 13.8 cm. The load may have been transported by traction. This is when the load is rolled along the river bed. It may have also been moved by suspension. [5] This occurs when the load is so small it is carried in the flow of the water. [6] [6]

(f) **(i)** Using **Fig. 3** state the day when the flood risk was at its highest.

Wednesday. [1]

(ii) Using **Fig. 3**, state **two** impacts these floods had on the environment.

Award [0] if the candidate states human impacts or refers to impacts not on **Fig. 3**.

- 100 trees blown down.
- In Northern England 5000 hectares of farmland were under water.
- Underground reservoirs filled up.

(2 × [1]) [2]

(g) Explain fully **one** physical cause of flooding on a river in the British Isles which you have studied.

Award [0] for a response not worthy of credit or a human cause of flooding.

No named river [1].

Award [1] for a brief accurate physical cause of flooding,
e.g. Heavy rainfall causes the river to flood.

Award [2] for an accurate physical cause of flooding on a named river (with explanation),
e.g. The River Derwent experienced heavy rainfall. The land became waterlogged, so all the water went to the river. This caused the river to burst its banks.

Award [3] for an accurate physical cause explained and elaborated with a relevant fact/figure/place related to the named river,
e.g. The River Derwent experienced 250 mm of rainfall over a 2 week period. This caused the land to become waterlogged. This decreased infiltration and increased surface runoff which ultimately led to flooding. [3]

(h) For a named river outside the British Isles which you have studied, evaluate the engineering strategies used to manage its floods.

AVAILABLE MARKS

Award [0] for a response not worthy of credit or e.g. a coastal strategy.

Note: no mark for name of river.
Maximum Level 1 if British Isles river used/only one strategy.
Level 1 for no named river.

Level 1 ([1]–[2])
Candidates provide a limited factual account of strategies or only one strategy used on a named river outside the British Isles, e.g. levees were built along stretches of the Mississippi and meanders were straightened. Alternatively the candidate may simply provide a factual account of strategies with no reference to his or her chosen case study.

Level 2 ([3]–[5])
One fact/figure needed for top Level 2. Candidates provide an account of strategies used on a named river outside the British Isles with limited evaluation of the strategies, e.g. they have tried to control the Mississippi by building or strengthening levees for 3000 km and they have also straightened the meanders to help the water move quickly downstream. The levees have allowed the floodplain to be developed but they are expensive to build and they must be maintained on a regular basis. Major flooding on the Mississippi shows this strategy has not worked. [5]

Level 3 ([6]–[7])
Need at least 2 facts/figures/places named for full Level 3. Candidates provide detailed information about river management strategies used on a river outside the British Isles.

e.g. The Mississippi River in the USA has been managed for over 100 years to improve navigation and prevent flooding. The levees were raised to 15 metres along 3000 km of the river and meanders were straightened over a 1750 km stretch but these strategies are very expensive and require regular maintenance, however they do offer good protection to the people who have settled on the floodplain. Recently the US Conservation Service has spent $25 million buying farmland prone to flooding and converting it to natural conditions which do not require any maintenance and have no obvious negative environmental impacts. [6] Some element of judgement needed for top Level 3. [7] [7]

Assessment of spelling, punctuation and the accurate use of grammar

If the answer does not address the question then no SPaG marks are available. If the candidate has attempted to answer the question but produced nothing of credit, SPaG marks may still be awarded.

Threshold performance ([1])
Candidates spell, punctuate and use the rules of grammar with reasonable accuracy in the context of the demands of the question. Any errors do not hinder meaning in the response. Where required, they use a limited range of specialist terms appropriately.

Intermediate performance ([2]–[3])
Candidates spell, punctuate and use the rules of grammar with considerable accuracy and general control of meaning in the context of the demands of the question. Where required, they use a good range of specialist terms with facility.

High performance ([4])
Candidates spell, punctuate and use the rules of grammar with considerable accuracy and general control of meaning in the context of the demands of the question. Where required, they use a wide range of specialist terms adeptly and with precision. [4]

AVAILABLE MARKS

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AVAILABLE MARKS

2 **(a)** Study **Fig. 4** which shows an instrument used to measure the weather and answer the questions which follow.

(i) Name the weather instrument shown in **Fig. 4**.

Rain gauge (correct full name of instrument required). [1]

(ii) State and explain **one** factor that should be considered when choosing a site for this weather instrument.

Award [0] for answer not worthy of credit.

Accept answers referring to stability of instrument being sunk into the ground.

Award [1] for a correct statement,
e.g. In an open space/not in a sheltered place/on grass, not tarmac/ away from trees or buildings.

Award [2] for a statement with some correct explanation,
e.g. In an open area so that nothing can stop the rain entering the opening.

Award [3] for a statement with a full explanation,
e.g. In an open area so that trees or buildings do not shelter the rain gauge and also cause wind eddies which blow raindrops past the gauge. [3]

(b) Study **Fig. 5** which shows a cross section of a depression. Answer the questions which follow.

(i) Name the air mass at **A**.

Tropical Maritime (full name of air mass required). [1]

(ii) Explain why there is cloud and heavy rain occurring at **B**.

Award [0] for answer not worthy of credit.

Award [1] for a simple, accurate statement,
e.g. This is the cold front/air is rising.

Award [2] for a valid explanation,
e.g. B is at the cold front where warm air is being pushed up by cold air [or warm air rises] and the air cools so forming clouds and rain,
e.g. warm air rises and cools and water vapour condenses.

Award [3] for a detailed explanation relating to how cloud and rain are caused,
e.g. B is at the cold front where warm air is being pushed up by cold air; as the warm air rises, it cools so the water vapour condenses to give rain and cloud. [3]

AVAILABLE MARKS

(iii) Describe **one** positive and **one** negative effect of a depression on the economy.

Note: credit must only be given to one negative and one positive effect.

Award [0] for answer not worthy of credit or answers not linked to the economy.

Award [1] for a simple, accurate statement,
e.g. Rain can ruin crops/strong winds can delay ships/depressions bring rain/roads can be flooded.

Award [2] for a developed answer which includes a positive and negative effect with a consequence/elaboration
e.g. Heavy rain can cause floods and destroy harvests so farmers lose income,
e.g. Strong winds can delay ships so the trade of goods is disrupted,
e.g. Depressions can bring rainfall so farmers do not need to spend money on irrigating crops,
e.g. Depressions can bring rainfall after a heatwave in summer, so the government does not have to pay to deliver water to homes.
(2 × [2]) [4]

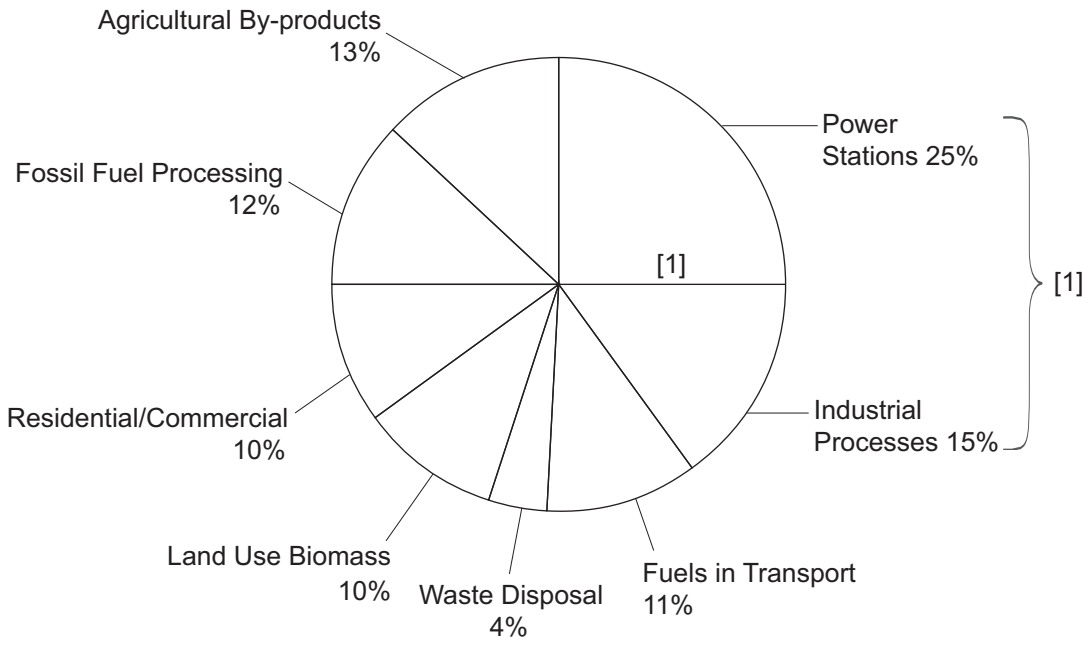
(c) Study **Fig. 6**, which shows some sources of greenhouse gases. Answer the questions which follow.

(i) Complete **Fig. 6** using the information in Table 3.

Award [1] for the accurate dividing of the space into 25% for Power Stations and 15% for Industrial Processes.

Award [2] for the accurate dividing of the space into 25% and 15% and both Power Stations [25%] and Industrial Processes [15%] named accurately. [2]

Sources of Gases which lead to the Greenhouse Effect



Source: Principal Examiner

Fig. 6

AVAILABLE MARKS

(ii) Explain how the greenhouse effect helps to cause climate change.

Award [0] for response not worthy of credit.

Award [1] for a basic accurate statement,
e.g. The atmosphere lets in solar radiation but pollution traps heat.

Award [2] for a valid explanation which links heat coming in and going out of the atmosphere but being trapped by pollution or gases,
e.g. The atmosphere lets in solar radiation and the earth re-radiates the heat but it cannot escape because of the pollution in the atmosphere so earth heats up.

Award [3] for a detailed explanation linking the greenhouse effect to climate change,
e.g. The atmosphere lets in solar radiation [short wave radiation] and the earth re-radiates the heat [as long wave radiation] but it cannot escape because of the layer of gases such as CO_2 or nitrogen in the atmosphere so the temperature increases. [3]

(d) Study **Photograph 2** which shows multi-storey parking for bicycles in Amsterdam. Answer the questions which follow.

(i) Outline how the use of the means of transport shown in **Photograph 2** would help to reduce climate change.

Award [1] for a simple statement about bicycles,
e.g. using bicycles means fewer cars are used/less pollution is produced. [1]

Award [2] for a response that makes a clear link between the use of bicycles and a reduction of pollution and less heating,
e.g. Having a Bike Park encourages people to cycle to work, which will reduce pollution from cars or buses and so less heat will be trapped. [2]

(ii) Name **two** different strategies to deal with climate change [**not** in **Photograph 2** or in Amsterdam] and explain how they are helping to reduce climate change. Refer to places in your answer.

Award [0] for response not worthy of credit.

Two facts/figures and at least one place [not Amsterdam] required for top Level 3.

Level 1 ([1]–[2])
Statement of two strategies or one strategy with some basic explanation,
e.g. Park and ride schemes have been set up in Belfast and the congestion charge used in London,
OR
The congestion charge in London has cut the percentage of cars in the Inner City.

Level 2 ([3]–[4])
Two strategies accurately explained and reference is made to at least one named place, with one fact/figure. [4]
e.g. The congestion charge in London has cut the percentage of cars in the Inner Zone by 15% so less pollution is produced and park and ride schemes have been set up to improve public transport.

AVAILABLE MARKS

Level 3 ([5]–[6])
Two strategies accurately explained with two facts/figures/places included and reference is made to at least one named place and to how climate change is reduced,
e.g. The congestion charge in London has cut the percentage of cars in the Inner Zone by 15% so less pollution is produced. Park and ride schemes have been set up in Belfast so more people leave their car e.g. at Sprucefield/Carryduff Park and Ride and take the bus into Belfast city centre; the bus can use the bus lane on the M1/Saintfield Road and so journey times are shorter and so there is less pollution produced. Both of these strategies mean that there is less greenhouse gas to trap heat so warming has been reduced. [6]

Accept other valid strategies such as renewable energy, Kyoto or Paris Agreements or reducing deforestation.

Assessment of spelling, punctuation and the accurate use of grammar

If the answer does not address the question then no SPaG marks are available. If the candidate has attempted to answer the question but produced nothing of credit, SPaG marks may still be awarded.

Threshold performance ([1])
Candidates spell, punctuate and use the rules of grammar with reasonable accuracy in the context of the demands of the question. Any errors do not hinder meaning in the response. Where required, they use a limited range of specialist terms appropriately.

Intermediate performance ([2]–[3])
Candidates spell, punctuate and use the rules of grammar with considerable accuracy and general control of meaning in the context of the demands of the question. Where required, they use a good range of specialist terms with facility.

High performance ([4])
Candidates spell, punctuate and use the rules of grammar with consistent accuracy and effective control of meaning in the context of the demands of the question. Where required, they use a wide range of specialist terms adeptly and with precision. SPaG [4] 29

AVAILABLE MARKS

3 (a) Study **Fig. 7** which shows the world's distribution of crustal plates and volcanoes. Answer the questions which follow.

(i) Describe the world distribution of volcanoes shown on **Fig. 7** referring to named places in your answer.

Award [0] for a response not worthy of credit.

Level 1 ([1])
A simple, general statement or one named place,
e.g. Volcanoes are along plate boundaries or along the west side of the Pacific Ocean or list of places with no mention of plate boundaries, e.g. Japan/Iceland.

Level 2 ([2]–[3])
A statement with two accurate named places [2] and reference to plate boundaries for full Level 2 [3],
e.g. Volcanoes are along plate boundaries, e.g. around the Pacific Ocean/Ring of Fire and down the west side of North America (Cascade Range).

Level 3 ([4])
A statement with two accurate named places and reference to plate boundaries and to one exception such as volcanoes in the centre of the Pacific Ocean for full Level 3,
e.g. Volcanoes are along plate boundaries such as around the Pacific Ocean called the Ring of Fire and down the west side of North America (Cascade Range). There is an East/West belt through the Mediterranean Sea and a North/South belt down the middle of the Atlantic Ocean. There are also volcanoes in the middle of the Pacific Ocean which are not on a plate boundary. [4]

(ii) Explain how a mid-ocean ridge forms.

Award [0] for a response not worthy of credit.

Level 1 ([1])
A simple statement about convection currents or plate boundaries,
e.g. A mid-ocean ridge forms where plates pull apart.

Level 2 ([2]–[3])
An answer which elaborates on the process,
e.g. A mid-ocean ridge forms at a constructive boundary. [2]. Magma then erupts through a line of volcanoes to build up the ridge. [3]

Level 3 ([4])
An answer which acknowledges that it is formed at constructive/divergent plate boundary and discusses the idea of a spreading seafloor caused by convection currents in the mantle,
e.g. A mid-ocean ridge is an underwater volcanic feature formed by plate tectonics where the plates pull up at constructive/divergent plate boundary. The uplifting of the ocean floor occurs due to the action of convection currents which rise in the mantle beneath the oceanic crust bringing magma to the surface where the currents spread sideways. As the plates pull apart magma wells up to fill the gap through cracks and a line of volcanoes. As the rising magma cools it forms new crust which becomes part of the ridge. [4]

AVAILABLE MARKS

(b) Study **Photograph 3** which shows basalt columns at the Giant's Causeway in Co. Antrim. Answer the question which follows.

Explain how basalt columns such as those shown in **Photograph 3** are formed.

Award [0] for an answer not worthy of credit.

Award [1] for a simple explanation that links the formation of basaltic columns to (extrusive) volcanic activity,
e.g. Basaltic Columns are formed when lava erupts and cools on the surface.

Award [2] for an explanation with some development,
e.g. Lava erupts and cools on the surface and splits into shapes that look like columns.

Award [3] for a full explanation which refers to fissures and cooling,
e.g. lava erupts and flowed out of cracks and into hollows and cooled very slowly into basalt. On cooling it contracted into regular hexagonal and pentangular columns. [3]

(c) Metamorphic rocks are one of three main rock types.
Name **one** metamorphic rock and explain how it formed.

1. Award [1] for marble, slate or other correct response; [1]

2. How it formed.

Award [0] for an answer not worthy of credit.

Award [1] for a simple statement which refers to the rock having changed or what it has changed from,
e.g. A metamorphic rock is one which has been changed or altered.
e.g. Marble was formed from limestone/a sedimentary rock.
e.g. Slate is formed from shale/mudstone/formed from a sedimentary rock.

Award [2] for an answer which refers to the altered state of the named rock due to heat and pressure,
e.g. Marble is a metamorphic rock formed due to the impact of heat and pressure on sedimentary rock.
e.g. Limestone is changed into marble from heat of volcanic rocks. [2]

Award [3] for an answer which explains what rock the metamorphic rock originated as and refers to the role of both heat and pressure in altering the original rock,
e.g. Marble is a metamorphic rock changed from limestone due to the impact of heat and pressure. [3]

(d) Earthquakes have both short and long term impacts.

AVAILABLE MARKS

(i) Describe one short and one long term impact of an earthquake on the environment of an LEDC you have studied.

Name of Earthquake, e.g. Indian Ocean earthquake 26th December 2004. [not credited – used to validate response]

Reference to built environment not credited.

If no LEDC named or if candidate uses a MEDC earthquake then maximum Level 1.
Accept all valid alternatives.

Level 1 ([1]–[2])
A simple statement referring to short and/or long term impact on the environment,
e.g. A large wave travelled across the ocean. [1]
e.g. A large wave travelled across the ocean and flooded many coastal areas. [2]

Candidates present some relevant information in a form and using a style of writing which suits its purpose. The text is reasonably legible. Spelling, punctuation and the rules of grammar are used with some accuracy so that meaning is reasonably clear. A limited range of specialist terms is used appropriately.

Level 2 ([3]–[4])
A more detailed answer referring to both short term and long term impacts on the environment. One may be covered in more detail than the other, e.g. The earthquake triggered a large tidal wave that circled the Indian Ocean. The seabed rose up causing sea levels to rise. Many coastal ecosystems were flooded and took months to recover. [3] The Earth vibrated due to the energy released by this movement and the release of energy shortened the Earth's day. [4]

Candidates present relevant information in a form and using a style of writing which suits its purpose. The text is legible. Spelling, punctuation and the rules of grammar are used with considerable accuracy so that meaning is clear. A good range of specialist terms is used appropriately.

Level 3 ([5]–[6])
A very detailed answer referring to both short term and long term impacts on the environment. One fact/figure needed for [5]. Two facts/figures needed to access [6].
Answers relating to the shortening of the length of the day and energy released are also valid.
e.g. In the short term the 9.0 earthquake triggered a large tidal wave which reached 30m in some places. It circled the Indian Ocean affecting all the countries with a coastline there. Many coastal ecosystems around the Indian Ocean, such as mangroves and forests, were flooded, and coral reefs destroyed. These will take months or possibly years to recover.

Candidates present, and organise effectively, relevant information in a form and style of writing which suits its purpose. The text is fluent and legible. Spelling, punctuation and the rules of grammar are used with almost faultless accuracy so that meaning is clear. A wide range of specialist terms is used skillfully and with precision. [6]

		AVAILABLE MARKS
(ii)	Earthquakes often have a more devastating effect and cause more deaths in LEDCs than MEDCs. Giving two reasons suggest why this may be so. Award [0] for a response not worthy of credit. **Level 1 ([1])** A simple statement which focuses on LEDCs or MEDCs, or list of statements e.g. Many LEDCs have poorly built buildings. [1] e.g. LEDCs have poor emergency services. [1] **Level 2 ([2]–[3])** Two valid comparisons [2], one with elaboration. [3] e.g. In LEDCs construction standards tend to be poor. Homes and other buildings may suffer serious damage and collapse when an earthquake strikes, resulting in high death tolls. In contrast, MEDCs buildings are often built to be quake proof and use fire-resistant materials resulting in less damage and fewer deaths, [2] e.g. LEDCs have poorer communications. [3] **Level 3 ([4])** An answer which compares the response of MEDCs and LEDCs. At least two comparisons should be included, e.g. In LEDCs construction standards tend to be poor. Homes and other buildings may suffer serious damage and collapse when an earthquake strikes, resulting in high death tolls. In contrast, MEDCs buildings are often built to be quake proof and use fire-resistant materials. In LEDCs evacuation and other emergency plans can be difficult to put into action due to limited funds and poor communications. However in MEDCs emergency plans are well rehearsed, e.g. practice drill days. [4]	25
	Total	**108**