GCSE

Geography B Geography for Enquiring Minds

J384/01: Our natural world

General Certificate of Secondary Education

Mark Scheme for June 2023

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, Cambridge Nationals, Cambridge Technicals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support, which keep pace with the changing needs of today's society.

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

MARKING INSTRUCTIONS

PREPARATION FOR MARKING

1. Make sure that you have accessed and completed the relevant training packages for on-screen marking: *RM assessor Online Training; OCR Essential Guide to Marking.*

2. Make sure that you have read and understood the mark scheme and the question paper for this component. These are posted on the RM Cambridge Assessment Support Portal http://www.rm.com/support/ca

3. Log-in to RM assessor and mark the **required number** of practice responses ("scripts") and the **required number** of standardisation responses.

YOU MUST MARK 5 PRACTICE AND 10 STANDARDISATION RESPONSES BEFORE YOU CAN BE APPROVED TO MARK LIVE SCRIPTS.

MARKING

1. Mark strictly to the mark scheme.

2. Marks awarded must relate directly to the marking criteria.

3. The schedule of dates is very important. It is essential that you meet the RM assessor 50% and 100% deadlines. If you experience problems, you must contact your Team Leader without delay.

4. If you are in any doubt about applying the mark scheme, consult your Team Leader by telephone or the RM assessor messaging system, or by email.

5. **Crossed Out Responses**
Where a candidate has crossed out a response and provided a clear alternative then the crossed out response is not marked. Where no alternative response has been provided, examiners may give candidates the benefit of the doubt and mark the crossed out response where legible.

Rubric Error Responses – Optional Questions
Where candidates have a choice of question across a whole paper or a whole section and have provided more answers than required, then all responses are marked and the highest mark allowable within the rubric is given. Enter a mark for each question answered into RM assessor, which will select the highest mark from those awarded. *(The underlying assumption is that the candidate has penalised themselves by attempting more questions than necessary in the time allowed.)*

Multiple Choice Question Responses

When a multiple choice question has only a single, correct response and a candidate provides two responses (even if one of these responses is correct), then no mark should be awarded (as it is not possible to determine which was the first response selected by the candidate).

Contradictory Responses
When a candidate provides contradictory responses, then no mark should be awarded, even if one of the answers is correct.

Short Answer Questions (requiring only a list by way of a response, usually worth only **one mark per response**)
Where candidates are required to provide a set number of short answer responses then only the set number of responses should be marked. The response space should be marked from left to right on each line and then line by line until the required number of responses have been considered. The remaining responses should not then be marked. Examiners will have to apply judgement as to whether a 'second response' on a line is a development of the 'first response', rather than a separate, discrete response. *(The underlying assumption is that the candidate is attempting to hedge their bets and therefore getting undue benefit rather than engaging with the question and giving the most relevant/correct responses.)*

Short Answer Questions (requiring a more developed response, worth **two or more marks**)
If the candidates are required to provide a description of, say, three items or factors and four items or factors are provided, then mark on a similar basis – that is downwards (as it is unlikely in this situation that a candidate will provide more than one response in each section of the response space.)

Longer Answer Questions (requiring a developed response)
Where candidates have provided two (or more) responses to a medium or high tariff question which only required a single (developed) response and not crossed out the first response, then only the first response should be marked. Examiners will need to apply professional judgement as to whether the second (or a subsequent) response is a 'new start' or simply a poorly expressed continuation of the first response.

6. Always check the pages (and additional objects if present) at the end of the response in case any answers have been continued there. If the candidate has continued an answer there then add a tick to confirm that the work has been seen.

7. Award No Response (NR) if:
   - there is nothing written in the answer space

   Award Zero '0' if:
   - anything is written in the answer space and is not worthy of credit (this includes text and symbols).

   Team Leaders must confirm the correct use of the NR button with their markers before live marking commences and should check this when reviewing scripts.

8. The RM assessor **comments box** is used by your team leader to explain the marking of the practice responses. Please refer to these comments when checking your practice responses. **Do not use the comments box for any other reason.**
   If you have any questions or comments for your team leader, use the phone, the RM assessor messaging system, or e-mail.

9. Assistant Examiners will send a brief report on the performance of candidates to their Team Leader via email by the end of the marking period. The report should contain notes on particular strengths displayed as well as common errors or weaknesses. Constructive criticism of the question paper/mark scheme is also appreciated.

10. For answers marked by levels of response:
    a. **To determine the level** – start at the highest level and work down until you reach the level that matches the answer
    b. **To determine the mark within the level**, consider the following:

Descriptor	**Award mark**
On the borderline of this level and the one below	At bottom of level
Just enough achievement on balance for this level	Above bottom and either below middle or at middle of level (depending on number of marks available)
Meets the criteria but with some slight inconsistency	Above middle and either below top of level or at middle of level (depending on number of marks available)
Consistently meets the criteria for this level	At top of level

11. **Annotations**

Annotation	Meaning
BP	Blank page – the annotation must be used on all blank pages within an answer booklet (structured or unstructured) and on each page of an additional object where there is no candidate response
	Correct response
	Incorrect response
	Unclear
^	Information omitted
L1	Level 1
L2	Level 2
L3	Level 3
DEV	Development
PLC	Relevant place detail
BOD	Benefit of doubt
IRRL	Significant amount of material which doesn't answer the question
	Extendable vertical wavy line
C	Communicate findings
SEEN	Noted but no credit given

12. Subject Specific Marking Instructions

INTRODUCTION

Your first task as an Examiner is to become thoroughly familiar with the material on which the examination depends. This material includes:

- the specification, especially the assessment objectives
- the question paper and its rubrics
- the mark scheme.

You should ensure that you have copies of these materials.

You should ensure also that you are familiar with the administrative procedures related to the marking process. These are set out in the OCR booklet **Instructions for Examiners**. If you are examining for the first time, please read carefully **Appendix 5 Introduction to Script Marking: Notes for New Examiners**.

Please ask for help or guidance whenever you need it. Your first point of contact is your Team Leader.

USING THE MARK SCHEME

Please study this Mark Scheme carefully. The Mark Scheme is an integral part of the process that begins with the setting of the question paper and ends with the awarding of grades. Question papers and Mark Schemes are developed in association with each other so that issues of differentiation and positive achievement can be addressed from the very start.

This Mark Scheme is a working document; it is not exhaustive; it does not provide 'correct' answers. The Mark Scheme can only provide 'best guesses' about how the question will work out, and it is subject to revision after we have looked at a wide range of scripts.

Please read carefully all the scripts in your allocation and make every effort to look positively for achievement throughout the ability range. Always be prepared to use the full range of marks.

LEVELS OF RESPONSE QUESTIONS:

The indicative content indicates the expected parameters for candidates' answers but be prepared to recognise and credit unexpected approaches where they show relevance.

Using 'best-fit', decide first which set of level descriptors best describes the overall quality of the answer. Once the level is located, adjust the mark concentrating on features of the answer which make it stronger or weaker following the guidelines for refinement.

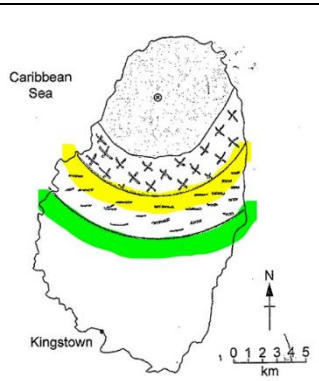
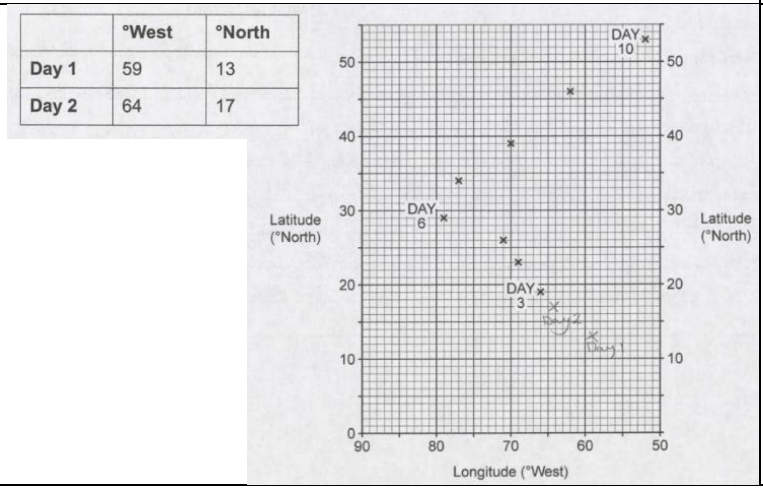
Highest mark: If clear evidence of all the qualities in the level descriptors is shown, the HIGHEST Mark should be awarded.

Lowest mark: If the answer shows the candidate to be borderline (i.e. they have achieved all the qualities of the levels below and show limited evidence of meeting the criteria of the level in question) the LOWEST mark should be awarded.

Middle mark: This mark should be used for candidates who are secure in the level. They are not 'borderline' but they have only achieved some of the qualities in the level descriptors.

Be prepared to use the full range of marks. Do not reserve (e.g.) highest level marks 'in case' something turns up of a quality you have not yet seen. If an answer gives clear evidence of the qualities described in the level descriptors, reward appropriately.

	AO1	AO2	AO3
Comprehensive	A range of detailed and accurate knowledge that is fully relevant to the question.	A range of detailed and accurate understanding that is fully relevant to the question.	Detailed and accurate interpretation through the application of relevant knowledge and understanding. Detailed and accurate analysis through the application of relevant knowledge and understanding. Detailed and substantiated evaluation through the application of relevant knowledge and understanding. Detailed and substantiated judgement through the application of relevant knowledge and understanding.
Thorough	A range of accurate knowledge that is relevant to the question.	A range of accurate understanding that is relevant to the question.	Accurate interpretation through the application of relevant knowledge and understanding. Accurate analysis through the application of relevant knowledge and understanding. Supported evaluation through the application of relevant knowledge and understanding. Supported judgement through the application of relevant knowledge and understanding.
Reasonable	Some knowledge that is relevant to the question.	Some understanding that is relevant to the question.	Some accuracy in interpretation through the application of some relevant knowledge and understanding. Some accuracy in analysis through the application of some relevant knowledge and understanding. Partially supported evaluation through the application of some relevant knowledge and understanding. Partially supported judgement through the application of some relevant knowledge and understanding.
Basic	Limited knowledge that is relevant to the topic or question.	Limited understanding that is relevant to the topic or question.	Limited accuracy in interpretation through lack of application of relevant knowledge and understanding. Limited accuracy in analysis through lack of application of relevant knowledge and understanding. Un-supported evaluation through lack of application of knowledge and understanding. Un-supported judgement through lack of application of knowledge and understanding.

Question			.	Mark	Guidance
1	(a)	(i)	**D:** plates move towards each other (✓).	1	(✓)
1	(a)	(ii)		3	1 x 1 (✓) 7km boundary correctly shown (zone shown) 1 x 1 (✓) 10km boundary correctly shown (zone shown) 1 x 1 (✓) Zones 2 and 3 correctly shaded The boundaries must be a curve. There does not need to be a line.
1	(b)	(i)		2	1 x1 (✓) Day 1 accurately plotted. 1 x1 (✓) Day 2 accurately plotted. No requirement to join points or label points.

1	**(b)**	**(ii)**	Plot on a map/ overlay with countries (✓). Add north arrow (✓). Join the points together (✓). Other days labelled / add a key showing the days (✓). Label the 5-degree lines / smaller intervals (✓). Add hurricane strength (✓).	1	1 x 1 (✓) for appropriate way that the diagram could be adapted. Do not credit: Line of best fit Title Larger Different type of graph Change the direction of the axes/ extend the axes to the S/E. Add/ collect extra data on other hurricanes.

1	(c)		**Case study – natural weather hazard event** **Level 3 (5-6 marks)** An answer at this level demonstrates **thorough** knowledge of the chosen weather hazard (AO1) and a **thorough** understanding of the consequences of the chosen weather hazard (AO2). This will be shown by including **well-developed** ideas about a range of consequences. The answer must also include place-specific details for the named natural weather hazard event. Amount of relevant place-specific detail determines credit within level. **Level 2 (3-4 marks)** An answer at this level demonstrates **reasonable** knowledge of the chosen weather hazard (AO1) and a **reasonable** understanding of the consequences of the chosen weather hazard (AO2). This will be shown by including **developed** ideas about some of the consequences. Developed ideas but no place-specific details credited up to **bottom** of level. **Level 1 (1-2 marks)** An answer at this level demonstrates **basic** knowledge of the chosen weather hazard (AO1) and a **basic** understanding of the consequences of the chosen weather hazard (AO2). This will be shown by including **simple** ideas about the consequences (s) of the hazard. Simple ideas or appropriate named example only credited at **bottom** of level. **0 marks** No response worthy of credit.	6	**Indicative content** The hazard could include flash flooding/ tropical storm/ heat wave/ drought and can be from anywhere in the World. Consequences could include, - deaths - damage to homes and infrastructure - aid provided by other countries/ NGOs - rebuilding - migration Credit responses that use multiple case studies. Example of a **well-developed** idea One of the consequences of the Boscastle Flood was the destruction of buildings. 58 properties were flooded including the Riverside Hotel. The early end to the tourism season is estimated to have cost £25million as 90% of the local economy was based on tourism and insurance premiums have tripled despite £10million being spent on flood prevention. Example of a **developed** idea One consequence of the Boscastle Flood were the 58 buildings that were flooded including shops and hotels. This meant that the businesses lost money as 90% of the local economy was based on tourism. Example of a **simple** idea Buildings were destroyed. Tourists stop visiting. Businesses lost money. Max 3 marks for thorough understanding of the consequences of a tectonic hazard, or a non-21st century weather hazard. PLC needs to be more than just the name of the country.

Question			Answer	Mark	Guidance
2	(a)		Increased air temperature leads to an increase in sea temperature (✓). Increased temperature leads to more melting (✓). More melting leads to an increase in mean sea level (✓). Increased temperature leads to sea level to rise (✓). Increased temperatures would lead to thermal expansion (✓). Thermal expansion leads to mean sea level to rise. (✓).	2	2 x (✓) for a correct link between the different concepts. Do not credit: - increased rainfall
2	(b)	(i)	A: frozen ocean water (✓).	1	(✓)
2	(b)	(ii)	= 271.27 km^3/year (✓) 32,235 – 24,097 (DEV) 2328 + 2754 + 3056 (DEV) 8138 (DEV) ÷ 30 (DEV)	2	1 x 1 (DEV) for correct workings 1 x 1 (✓) for correct answer Allow 271 km^3/year 271.3 km^3/year 271.27 km^3/year 271.267 km^3/year The answer on the line takes precedence over other answers. DEV mark can be awarded even if the answer is wrong.

2	(c)		**Level 3 (6-8 marks)** An answer at this level demonstrates **thorough** understanding of causes of climate change (AO2), a **reasonable** analysis of the importance of these causes (AO3) and a **thorough** judgement about the extent to which climate change is a natural process is made (AO3). This will be shown by including **well-developed** ideas about a range of causes of climate change and their relative significance. The response is clear and logically structured. The information presented is relevant and substantiated. **Level 2 (3-5 marks)** An answer at this level demonstrates **reasonable** understanding of causes of climate change (AO2), a **basic** analysis of the importance of these causes (AO3) and a **reasonable** judgement about the extent to which climate change is a natural process is made (AO3). This will be shown by including **developed** ideas about some of the causes of climate change and their relative significance. The information presented is in the most-part relevant and supported by some evidence. **Level 1 (1-2 marks)** An answer at this level demonstrates a **basic** understanding of causes of climate change (AO2), a **basic** analysis of the importance of these causes (AO3) and a **basic** judgement about the extent to which climate change is a natural process is made (AO3).	8	**Indicative content** Causes could include: Sunspots, Volcanic eruptions, Milankovitch cycles, Deforestation, Cattle farming, Rice fields, Landfill, Natural vs. enhanced greenhouse effect Example of a **well-developed** idea There is evidence that natural causes are responsible for the climate changing. Milankovitch Cycles are a natural cause of climate change in the amount of sunlight and therefore energy the Earth receives from the Sun. They are long cycles (10s to 100s of 1000s of years) and have shown little change over the last 150 years whilst the Earth's climate has shown significant warming over this period. However, the increased levels of carbon dioxide produced by human activities such as the burning of fossil fuels has contributed to a much faster rate of change with each decade increasing 0.18 degrees centigrade since 1981. Example of a **developed** idea Natural processes are responsible for the changing climate. Milankovitch Cycles, such as tilt, vary the amount of solar insolation meaning there are warmer and colder periods. Human processes are also partially responsible as carbon dioxide from burning fossil fuels are having a big impact since the Industrial Revolution.

			This will be shown by including **simple** ideas about the cause(s) of climate change and may include a simple analysis of their relative importance. The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear. **0 marks** No response worthy of credit.		Example of a **simple** idea Natural cycles can make the climate change, making it hotter. Human activities like burning fossil fuels can also make the climate hotter.

Question			Answer	Mark	Guidance
3	(a)		A: everything that can be seen that is natural or man-made (✓)	1	(✓)
3	(b)	(i)	Similarity: Both upland areas and glaciated areas are in the North of the UK/ not commonly found in the South of the UK (✓). Upland areas and glaciated areas are mostly in the same place (✓). Difference: There are some upland areas in the S/SW that are not glaciated (✓). Upland areas are found inland/ central, but the glaciated area extends all the way to the coast (✓).	2	1 x 1 (✓) for similarity between location of upland and glaciated areas in the UK. 1 x 1 (✓) for difference between location of upland and glaciated areas in the UK. This must include comparative language. No double credit Do not credit direct contradictions in the same part of the answer. No credit for above/ below/ left/ right/ top/ bottom.
3	(b)	(ii)	Higher latitude/ further north has colder temperatures/ too warm for ice sheets to form further south (✓). Solar insolation is spread over a wider area (✓). Higher altitude/ upland areas have lower temperatures (✓). The lowland/ Southern areas are too warm for ice sheets to form (✓).	1	1 x (✓)

3	**(c)**		During a flood the river has high energy to carry sediment (✓). The river overtops the banks (✓). The water slows down (✓). The river has less energy/ force (✓). Sediment is deposited (✓). (Deposition) occurs on the side of the river/ floodplain/ bank (✓). Larger rocks. sediment are deposited first (✓). Material is left when the river recedes (✓). Repeated floods build up levées (✓).	**3**	3 x 1 (✓) for appropriate points made explaining the formation of a river levee. Do not credit statements about deposition linked to meanders or oxbow lakes. Reward development with further (✓)

3	(d)		**Case study – coastal landscape in the UK** **Level 3 (5-6 marks)** An answer at this level demonstrates **thorough knowledge** of the formation of the chosen landform (AO1) and a **thorough** understanding of the geomorphic processes that created it (AO2). This will be shown by including **well-developed** ideas about erosional/ depositional processes. The answer must also include place-specific details for the named UK coastal landscape. Amount of relevant place-specific detail determines credit within level. **Level 2 (3-4 marks)** An answer at this level demonstrates **reasonable** knowledge of the formation of the chosen landform (AO1) and a **reasonable** understanding of the geomorphic process(es) that created it (AO2). This will be shown by including **developed** ideas about erosional/ depositional process(es). Developed ideas but no place-specific details credited up to **bottom** of level. **Level 1 (1-2 marks)** An answer at this level demonstrates **basic** knowledge of the formation of the chosen landform (AO1) and a **basic** understanding of a geomorphic process that created it (AO2). This will be shown by including **simple** ideas about an erosional/ depositional process. Simple ideas or appropriate named example only credited at **bottom** of level. **0 marks** No response worthy of credit.	6	**Indicative content** Place specific examples could be the rock type a landform is made from, the direction of wind/ waves creating a depositional landform, a named feature and its location, a specific geological feature (e.g., concordant). Example of a **well-developed** idea Old Harry is found on a chalk headland. Erosion (by hydraulic action and corrasion) erodes the more resistant rock slower forming headlands. Headlands are more vulnerable to high energy waves that widen any cracks in the headland into caves. Erosion continues to erode the backwall of the cave until an arch is formed. Chemical weathering (slightly acidic rainwater) and biological weathering weaken the top of the arch until gravity causes it to collapse under its own weight creating Old Harry. Old Harry's wife is formed when erosion weakens the base of the stack, and it falls over leaving a stump. Example of a **developed** idea Old Harry formed when waves attack cracks in a chalk headland and make them larger turning it into a cave. Hydraulic action makes the caves erode all the way through the headland making an arch. The arch will then collapse to make a stack which will be eroded at the base, so it falls over and makes a stump. Example of a **simple** idea There is a stack on the Dorset coast. Waves have turned cracks into caves. Max 3 marks for thorough understanding of the geomorphic processes that created a river landform. Credit each step in the formation of one landform – headland, crack, arch, stack, stump.

Question			Answer	Mark	Guidance
4	(a)	(i)	June (✓)	1	(✓)
		(ii)	2115 (✓)	1	June (24 x 30) + July (23 x 31) + Aug (22 x 31)
		(iii)	A: line graph (✓)	1	(✓)
4	(b)		Slow growing (✓) due to a lack of nutrients/ to conserve energy (DEV). Low growing/ compact/ rounded (✓) as protection against the wind (DEV). Shallow roots (✓) to avoid the permafrost/ thin soils/ rocky ground (DEV). Wide/ large root network (✓) to maximise nutrient/ water uptake (DEV). Small/waxy/ hairy leaves/ thick cuticles (✓) to limit transpiration (DEV). Do not require much moisture (✓) lack of available water/ water is frozen/ low precipitation (DEV). Can survive in low light conditions (✓) due to little light in polar winters (DEV). Ability to stop growing (✓) as plants can be covered in snow (DEV). Small surface area to volume ratio/ thick stems/ antifreeze (✓) to reduce the impact of being frozen. (DEV). Rapid reproduction (✓) to set seed in the short growing season (DEV). Heliotropic (✓) to aid pollination/ maximise photosynthesis (DEV). Evergreen (✓) to maximise the growing season (DEV).	4	2 x 1 (✓) for identified feature of flora that allows them to survive in polar environments. 2 x 1 (DEV) for explanation of how feature of flora allows them to survive in polar environments. Do not credit: Deep roots Large roots Long roots Lots of leaves Thorns Do not credit the same development of 2 different points.

	(c)		**Case study – small-scale example of sustainable management in either Antarctic or the Arctic** **Level 3 (5-6 marks)** An answer at this level demonstrates **thorough** knowledge (AO1) of a small-scale sustainable management solution and a **thorough** evaluation of its usefulness in providing a sustainable solution (AO3). This will be shown by including **well-developed** ideas about the named small-scale management and how useful it is in providing a sustainable solution for the chosen polar environment. The answer must also include place-specific details for the named example of sustainable management. Amount of relevant place-specific detail determines credit within level. **Level 2 (3-4 marks)** An answer at this level demonstrates **reasonable** knowledge (AO1) of a small-scale sustainable management solution and a **reasonable** evaluation of its usefulness in providing a sustainable solution (AO3). This will be shown by including **developed** ideas about the named small-scale management and how useful it is in providing a sustainable solution for the chosen polar environment. Developed ideas but no place-specific details credited up to **bottom** of level. **Level 1 (1-2 marks)** An answer at this level demonstrates **basic** knowledge (AO1) of a small-scale sustainable management solution and/ or a **basic** evaluation of its usefulness in providing a sustainable solution (AO3). This will be shown by including **simple** ideas about the named small-scale management and/ or how useful it is in providing a sustainable solution for the chosen polar environment. Simple idea or appropriate named example only credited at **bottom** of level.	**6**	Indicative content Could include – sustainable tourism, conservation, controlling whaling. Example of a **well-developed** idea One sustainable solution to aid conservation was the creation of the Marine Wildlife Area on the Clyde River, Canada in 2008. It is a useful solution as it acts as a sanctuary for the 2000 bowhead whales that stop to rest and feed there every year. This was needed to prevent further decline of the whale population which had been destroyed by commercial whaling. However, its usefulness is limited as the whales migrate, so they are not protected all year. Example of a **developed** idea The Clyde River whale sanctuary was set up to aid the conservation of the bowhead whale. It is a useful solution as 2000 bowhead whales stop, rest and feed there every year. However, its usefulness is limited as the whales migrate. Example of a **simple** idea A whale sanctuary was set up to protect whales and give them somewhere to stop, rest and feed. Max 3 marks for thorough evaluation of the usefulness of a large-scale example of sustainable management such as the Antarctic Treaty, Arctic Council, IAATO or International Whaling Commission.

			0 marks No response worthy of credit.		

Question			Answer	Mark	Guidance
5	(a)		Answers could include, I used a bar chart as it made my results clearer/ more visual (✓) so I could compare them to each other (✓). I drew a bar graph as it was discrete/ discontinuous data (✓). I created a scattergraph as it is easy to spot anomalies (✓) and you can create a line of best fit. (✓). I drew a line graph as it allows me to see trends/ patterns/ changes over time (✓). I drew a line graph as it shows the cross profile of a river (✓). I drew a bar graph to show sediment levels on each side of the groyne (✓). This shows which way longshore drift is happening (✓). I drew a bar graph as it was easier to draw (than a pie chart) (✓). I drew a pictogram as it was more visually interesting/ informative/ memorable (✓) and useful for representing a large amount of /discrete data (✓).	2	2 x 1 (✓) for valid points justifying chosen presentation technique. Credit data tables. Do not credit responses that do not specify which type of graph/ chart is being justified. No credit for stating the technique, describing the technique, or describing the data presented. Credit why the technique was chosen. Expect a wide range of data presentation techniques.
5	(b)	(i)	A =0.4 (✓) B =0.3 (✓)	2	2 x 1 (✓) for correct calculations of velocity Units are not needed
5		(ii)	34.3 (✓)	1	(✓) Units are not needed

5		**(iii)**	The water flows fastest on the outside of the river bend/ place A (✓). The water flows slowest in the inside of the bend/ place B/C (✓). Place B and place C have the same mean speed/ all 3 locations have a similar mean speed (✓). Looking at the mean is useful as it reduces the impact of anomalies (✓). Attempt 1 at site C/ Attempt 3 at site A is an anomaly (✓). Place A /C have the largest data range (✓).	**2**	2 x 1 (✓) for appropriate observations about the data collected. Carry any error forward from 5bi/ 5bii.

5		(iv)	**Level 3 (6–8 marks)** The answer must include a **thorough** analysis of the methods used (AO3) with a **thorough** judgement as to how the investigation could be improved (AO3). This will be shown by including **well-developed** idea about the data collection methods and how they could be improved. There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated. **Level 2 (3–5 marks)** The answer must include **reasonable** analysis of the methods used (AO3) with a **reasonable** judgement as to how the investigation could be improved (AO3). This will be shown by including **developed** ideas about the data collection methods and how they could be improved. There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence. **Level 1 (1–2 marks)** The answer will include **basic** analysis of the methods used (AO3) with a **basic** judgement as to how the investigation could be improved (AO3). This will be shown by including **simple** ideas about the data collection methods and how they could be improved. The information is basic and communicated in an unstructured way. The information is supported by	8	**Example of well-developed ideas** The results may not be accurate as the orange may not have stayed in the same position on its journey around the meander. This means the orange does not stay in its 'lane' making the data collection imprecise. A better method would be to use a flowmeter as this would increase the accuracy by measuring in a precise location. They could have also repeated the investigation in high and low flow conditions to compare the results as this would have an impact on the speed of the water. This would help show the range of data that could be measured and show how representative the data was. **Example of developed ideas** The orange may not stay in the correct place, so it doesn't go the right distance. This would have made the measurement less accurate. They could repeat the investigation at different times of year to see if they get the same results each time and increase the overall accuracy. **Example of simple ideas** They could have used a flowmeter. The students could have done the experiment more than 3 times. They could visit other meanders to compare with the one that was measured.

			limited evidence and the relationship to the evidence may not be clear. **0 marks** No response worthy of credit.		
			Spelling, punctuation and grammar and the use of specialist terminology (SPaG) are assessed using the separate marking grid in Appendix 1.	**3**	

Appendix 1

Spelling, punctuation and grammar and the use of specialist terminology (SPaG) assessment grid

High performance 3 marks
• Learners spell and punctuate with consistent accuracy • Learners use rules of grammar with effective control of meaning overall • Learners use a wide range of specialist terms as appropriate
Intermediate performance 2 marks
• Learners spell and punctuate with considerable accuracy • Learners use rules of grammar with general control of meaning overall • Learners use a good range of specialist terms as appropriate
Threshold performance 1 mark
• Learners spell and punctuate with reasonable accuracy • Learners use rules of grammar with some control of meaning and any errors do not significantly hinder overall • Learners use a limited range of specialist terms as appropriate
0 marks
• The learner's response does not relate to the question • The learner's achievement in SPaG does not reach the threshold performance level, for example errors in spelling, punctuation and grammar severely hinder meaning

- Where a candidate has not attempted the question and receives NR, they should also receive NR for the SPAG mark.

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