OCR GCSE GATEWAY BIOLOGY A · J247

BIOLOGY



MARK SCHEME

B6.1 MONITORING AND MAINTAINING THE ENVIRONMENT

SCORE	PERCENTAGE
/149	%

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Question			Answer/Indicative content	Marks	Guidance
1			A	1	
			Total	**1**	
2		i	set out a grid / sample area (1)	1	
		i	use random sampling within that area (1)	1	
		ii	* Please refer to the marking instruction point 10 for guidance on how to mark this question. **Level 3** **(5–6 marks)** **Explains improved animal sampling techniques.** *There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.* **Level 2** **(3–4 marks)** **Explains advantages of plants being sedentary along with the limitations of animal sampling using a quadrat.** *There is a line of reasoning presented with some structure. The information presented is relevant and supported by some evidence.* **Level 1** **(1–2 marks)** **Provides a basic description of why sampling has to be used and use of or the limitations of the quadrat.** *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 or no response worthy of credit.*	6	**AO3.3b: Analyse the information to develop the techniques to improve the sampling techniques** • use of capture / recapture • use of pitfall traps • use of pooters • plants are sedentary so will not move and as such are easy to count • animals can move away / frightened away • risk of counting animal more than once • missing some animals e.g. burrowing **and** • further limitations of these methods **AO1.2: Demonstrate knowledge of sampling techniques and why sampling is carried out** • a basic description of use of capture / recapture pitfall traps and pooters • gives a basic description as to why sampling techniques are used • the habitat is often too large to count everything • saves time / would take too long otherwise
			Total	**8**	
3	a		larger surface area (to take up pollutants) (1)	1	**allow** sticks out more from bark

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Question			Answer/Indicative content	Marks	Guidance
	b	i	use of random numbers (1)	1	
		ii	40.4 (2)	2	**allow** correct mean ie 9.0 (1)
		iii	moderate pollution (1)	1	**allow** ECF from (d) (ii)
		iii	only just above low / closer to low than high (1)	1	
		iv	identify the species of lichens present in their sample (1)	1	**allow** reference to bushy / crusty
		iv	find out how sensitive to pollution these lichens are (1)	1	
		iv	if the lichens are mostly pollution sensitive species = low pollution levels (1)	1	**allow** ora
			Total	9	
4			C	1	
			Total	1	
5			C	1	
			Total	1	
6		i	use of random numbers (1)	1	
		ii	40.4 (2)	2	**allow** correct mean i.e. 9.0
		iii	moderate diversity (1)	1	**allow** ECF from (d) (ii)
		iii	only just above low / closer to low than high (1)	1	
		iv	identify the species of lichens present in their sample (1)	1	**allow** reference to bushy / crusty
		iv	find out how sensitive to pollution these lichens are (1)	1	
		iv	if the lichens are mostly polution sensitive species = low pollution levels (1)	1	**allow** ora
			Total	8	

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Question			Answer/Indicative content	Marks	Guidance
7			[Level 3] Answer includes a correct description of the greenhouse effect and is able to link this to the decrease in population of hares. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) [Level 2] Answer includes a correct description of the greenhouse effect or explains why warmer weather results in less hares surviving. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) [Level 1] Answer includes reference to the greenhouse effect or global warming or identifies that the predictions are for less hares to survive (1 – 2 marks) [Level 0] Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)	6	This question is targeted up to grade C Indicative scientific points about the warmer weather may include: • The greenhouse effect • Carbon dioxide being a greenhouse gas • Trapping more heat in the Earth's atmosphere • Less radiated out to space Indicative scientific points about the prediction of the hares include: • Warmer weather means less snow • Hares will be less well camouflaged • More eaten by lynx • Increased risk of disease due to warmer conditions • Flooding of habitats due to sea level rising • Lack of food due to inability to grow in the new climate Use the L1, L2, L3 annotations in Scoris; do not use ticks.
			Total	6	

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Question			Answer/Indicative content	Marks	Guidance
8			Sam (1) (mean is 16 but this means that) there could be some ladybirds with 7 spots (and some with 15 or more) (1)	2	answer must include figure
			Total	2	

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Question			Answer/Indicative content	Marks	Guidance
9			[Level 3] idea of how carbon dioxide contributes to the greenhouse effect AND effect on snowshoe hares and their habitat AND linked to a reason for numbers dropping / extinction Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) [Level 2] idea of how carbon dioxide contributes to the greenhouse effect AND effect on snowshoe hares and their habitat OR linked to a reason for numbers dropping / extinction Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) [Level 1] idea of how carbon dioxide contributes to the greenhouse effect OR effect on snowshoe hares and their habitat OR a reason for numbers dropping / extinction OR reference to the prediction by the scientists (1 – 2 marks) [Level 0] Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)	6	This question is targeted up to grade C Indicative scientific points about carbon dioxide in the environment include: • the greenhouse effect • carbon dioxide being a greenhouse gas • trapping more heat in the Earth's atmosphere / less radiated out to space • global warming Indicative scientific points about the hares habitat include: • loss of habitat • not having as much camouflage • numbers may fall below critical level -reduced population Indicative scientific points about the hares extinction include: • this may result in -higher predation -lack of genetic variation -inability to find mates / lower reproduction rate Indicative scientific points about prediction by the scientists at Level 1 • predictions show that less hares will survive Use the L1, L2, L3 annotations in Scoris; do not use ticks.
			Total	6	

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Question			Answer/Indicative content	Marks	Guidance
10			Sam is correct because: **any two from:** 7 spotted would decrease the mean (1) an even spread would decrease the mean (1) harlequins would increase the mean (1)	2	**no mark for Sam** **Tom or Harry correct no marks**
			Total	**2**	
11	a		net (1)	1	**allow** answer ringed, underlined or ticked more than one answer = 0
	b	i	all three points correctly plotted (1) (3,36) (4,26) (5,16)	1	
		ii	answer matching line drawn on graph (1)	1	no line = no mark **allow** + or – 1
		iii	numbers are falling (1) (so concerned) there will be none left / become extinct (1)	2	
			Total	**5**	

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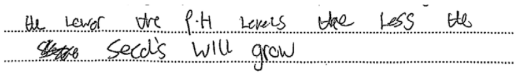
Question			Answer/Indicative content	Marks	Guidance
12	a		37 (2) **But if incorrect** $\frac{17 \times 11}{5}$ or $\frac{187}{5}$ (1)	2	**allow** 37.4 (1)
	b	i	**Any two from** (overall) decrease in population (1) numbers remained steady for first 4 years / at start (1) population is **starting** to fall in year 5 or at end / idea that **largest** decrease is in year 5 or at end (1)	2	
		ii	**Any one from:** limited set of results (1) idea that there is only one set of data from each year (1) need to sample at different times of the year / population may vary over (a single) year (1) need monitor for more years to see if trend continues (1) idea that populations may change due to migration / immigration / less birth / more death / effects of marking (1)	1	**allow** small sample size(1)
			Total	5	
13			idea that it will increase monitoring of sewage / pollution idea that sewage / pollution can kill the animals and plants in the water / can spread disease (1)	2	**allow** to stop pollution / reduces pollution **accept** high level answer that sewage may cause eutrophication (1)
			Total	2	

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Question			Answer/Indicative content	Marks	Guidance
14			A ✓	1 (AO2.2)	Examiner's Comments This question was the most accessible question in the multiple choice section A, with most candidates correctly answering A by correctly applying the equation.
			Total	1	
15			C ✓	1 (AO1.2)	
			Total	1	

Question			Answer/Indicative content	Marks	Guidance
16	a		type of seeds / temperature ✓	1 (AO3.3b)	ALLOW light / volume/amount of solution / size of cotton wool / type of cotton wool / time soaked in solution IGNORE reference to time/ days DO NOT ALLOW pH Examiner's Comments This question differentiated well, the majority of higher ability candidates correctly gained marks here and lower ability candidates did not. Most correct answers referred to the amount of solution, and most incorrect answers referred to the number of seeds and days left.
	b		(acid rain) will lower the number of seeds growing ✓ only affects seeds if the pH is less than 6.0 ✓	2 (AO 2 × 3.2b)	IGNORE references to pH for this marking point IGNORE references to alkalinity IGNORE decrease pH decreases number of seeds growing Examiner's Comments This question challenged many of the candidates and the majority did not apply the experimental results to the effects of acid rain. Many referred to the effect of pH on seed growth. For the second marking point candidates didn't recognise it was only below pH 6 that affected seed growth, and only stated the general trend. An example of an answer that didn't receive any marks is seen in Exemplar 1. Exemplar 1 

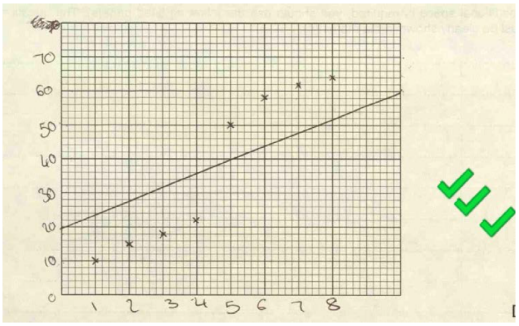
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Question			Answer/Indicative content	Marks	Guidance
	c	i	If answer = 10 award 2 marks $\frac{5 \times 16}{8}$ ✓ = 10 ✓	2 (AO 2 × 2.2)	<u>Examiner's Comments</u> This question differentiated well between higher and lower ability candidates. Most common error in the calculation was replacing the number of seeds that are growing with the total number of seeds used. This gave an incorrect answer of 12.5 instead of 10.
		ii	idea that it takes into account the mean root length / growth rate ✓	1 (AO 3.2b)	IGNORE grows well IGNORE more accurate result <u>Examiner's Comments</u> Most candidates gave general answers referring to accurate results and difficulty in counting / miscounting of the seeds. This is seen in Exemplar 2 which did not gain marks. Exemplar 2 this is because the counter can miss some seed growing and it will not be aguate [1]
			Total	6	

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Question			Answer/Indicative content	Marks	Guidance
17			correctly chosen axes, labelled with units ✓ suitable scale on both axes ✓ all points correctly plotted ✓✓ line of best fit through most points ✓	5 (AO 5 × 2.2)	**place ticks on right hand side of grid** minimum 50% of grid used scale must be in ascending order **ALLOW** +/- half a square 0 to 5 correct points plotted = 0 mark 6 or 7 correct points plotted = 1 mark All 8 correct points plotted = 2 marks **DO NOT ALLOW** dot to dot line **ALLOW** line of best fit for their plotting **IGNORE** any extrapolation of line <u>Examiner's Comments</u> The majority of candidates scored 3 or 4 marks for the graph. Most common errors were choosing the wrong axis labelled with units. A number of candidates didn't give a suitable scale on both axes. Points plotted correctly on the graph were where candidates scored most marks. The construction of a line of best fit going through most points seemed very challenging or not attempted. Others just joined the points. Exemplar 11 shows a graph with no axes labelled with units; suitable scale on both axes; all points correctly plotted but no acceptable line of best fit. This graph achieved 3 marks out of a possible5 marks. Exemplar 11 
			Total	5	

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Question			Answer/Indicative content	Marks	Guidance
18			C ✓	1 (AO2.2)	
			Total	1	
19			C ✓	1 (AO1.2)	
			Total	1	
20			correctly chosen axes, labelled with units ✓ suitable scale on both axes ✓ all points correctly plotted ✓ ✓ line of best fit through most points ✓	5 (AO 5 × 2.2)	**place ticks on right hand side of grid** minimum 50% of grid used scale must be in ascending order **ALLOW** +/- half a square 0 to 5 correct points plotted = 0 mark 6 or 7 correct points plotted = 1 mark All 8 correct points plotted = 2 marks **DO NOT ALLOW** dot to dot line **ALLOW** line of best fit for their plotting **IGNORE** any extrapolation of line <u>Examiner's Comments</u> This question assessed candidates' ability to apply knowledge and understanding of scientific enquiry, techniques and procedures in graphing skills. Many candidates scored 4 marks and missed out on the mark for the line of best fit as they drew straight lines that did not go through or near any of the points. The mark scheme looked for the line through most of the points and this was best achieved by a curved line. There were a significant number of candidates who plotted the variables on the wrong axes. This did lose them a mark, but they were able to score the other marking points if all points were plotted accurately, to a suitable scale and a suitable line of best fit was drawn.
			Total	5	

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Question			Answer/Indicative content	Marks	Guidance
21	a		number of seeds that germinated ✓	1 (AO 3.1a)	IGNORE the number of seeds
	b		to keep the total volume constant / to dilute the acid by different amounts ✓	1 (AO 3.1a)	ALLOW so volume adds up to $20cm^3$ ALLOW change/investigate the concentration of acid ALLOW make it more/less acidic / vary acidity Examiner's Comments In this AO3 question many candidates found difficulty in communicating that the same volume overall was needed, or to change the concentration of acid. Where candidates did gain marks, it was often for stating 'so volume adds up to $20cm^3$'.
	c		idea that germination is affected by temperature✓	1 (AO 3.1a)	ALLOW higher level answers such as references to rate of diffusion or enzyme action correctly linked to temperature change IGNORE to make it a fair test Examiner's Comments This AO3 interpretation question provided challenge for most candidates. Often responses were seen referencing prevention of evaporation, which did not gain marks. Few candidates correctly linked the temperature to its effect on germination rate. Some higher ability candidates did give correct references to enzyme action.

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Question			Answer/Indicative content	Marks	Guidance
	d		**Any two from:** acid rain will reduce the number of seeds that germinate ✓ reference to addition of small volumes of acid having little effect / rapid drop in germination between third and fourth flask ✓ germination at the highest volume of acid is still possible / acid concentration would have to be higher to stop germination ✓	2 (AO 2 × 3.1b)	**ALLOW** ORA **ALLOW** indication of correct flasks from table data Examiner's Comments This question assessed AO3 evaluation. Most candidates correctly identified the effect of acid on germination, but none commented on the pattern in the data. On the very rare occasion that a second mark was obtained, it was for identifying that germination still did happen with highest concentration stating that 'the higher acid concentration reduces germination rate, but it doesn't stop it altogether' which got maximum marks.
	e	i	**First check answer on answer line** **If answer = 100 award 2 marks** correct calculation of 10% ✓ VI = 100 ✓	2 (AO 2 × 2.2)	Examiner's Comments This AO2 question assessed mathematical skills in a practical context. Many candidates did well and scored both marks. Some had an incorrect answer but scored the working out mark for getting 10%. Again, this emphasises the advantage of candidates ensuring that they show their working out in the space provided for them to put their response.

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Question			Answer/Indicative content	Marks	Guidance
		ii	takes into account how well the seeds are growing ✓ also better to use percentage germination than number germinated ✓	2 (AO3.3b)	ALLOW shows seeds growing roots/shoots / shows seeds growing above/below soil Examiner's Comments This AO3 question linked to improving experimental procedures was looking for the idea that VI, by measuring length of roots/shoots, looked at growth not just germination. However, candidates simply repeated the question (just referencing about the length of shoot/roots) and used terms such as accurate, precise and reliable to try and cover the improvement aspect of the question. Very few were able to identify that percentage germinated was a better value to use than number of seeds germinated.
			Total	9	
22			B	1 (AO 1.2)	
			Total	1	

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Question			Answer/Indicative content	Marks	Guidance
23	a		quadrat ✓	1 (AO 1.2)	Examiner's Comments The majority of higher ability candidates gained this mark. Those candidates that didn't score couldn't recall the piece of equipment as a quadrat. Common errors included square frame and Punnett square.
	b	i	FIRST CHECK ANSWER ON THE ANSWER LINE If answer = 0.1 (%) award 3 marks 10x0.25 or 2.5 (m^2)✓ 2.5 ?00 / 0.001 ✓ = 0.1 (%) ✓	3 (AO 2 x 2.2)(AO 1.2)	ALLOW correct conversion of the fraction of the area sampled into a percentage Examiner's Comments Just over half of candidates did not achieve any marks for this mathematical application question and lower ability candidates found having to work out the fraction of the field sampled then convert it into a percentage challenging. The candidates benefited if they showed their working out as there was an error carried forward mark for the correct percentage from an incorrect fraction.
		ii	(student A): has taken more samples/quadrats than B ✓ has sampled all over/spread out/ random over the marsh ORA ✓ samples more likely to be representative / not bias / valid ✓	3 (AO 3.1a x2) (AO 3.2a)	If student B chosen = No marks IGNORE A = 10 and B = 8 samples IGNORE plants more spread out Examiner's Comments The majority of higher ability candidates achieved at least one mark here, with the most common credited mark that student A's sample was random. Very few candidates appreciated the sample would be more valid/representative, using the accepted language of measurement.

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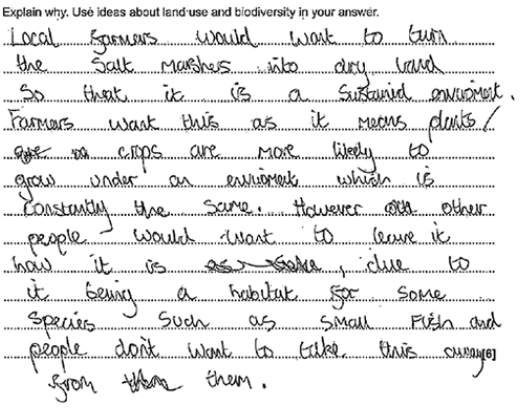
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Question			Answer/Indicative content	Marks	Guidance
		iii	**Any two from:** wash hands (after sampling) ✓ not to eat / do not put hands to mouth (whilst sampling) ✓ protective clothing (whilst sampling) ✓ Cover cuts with plasters ✓	2 (AO 3.3b)	**ALLOW** sterilise equipment after use Examiner's Comments Half of candidates achieved one mark on this question. The most common credited response was protective clothing, which was given by candidates analysing the information and making suggestions to improve experimental procedures.
	c		Please refer to the marking instructions on page 4 of this mark scheme for guidance on how to mark this question. **Level 3 (5–6 marks)** Provides a detailed explanation for the uses for the land. **AND** Provides a detailed explanation how preserving the salt marsh will maintain biodiversity. *There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.* **Level 2 (3–4 marks)** Provides a detailed explanation for the uses for the land. **OR** Provides a detailed explanation how preserving the salt marsh will maintain biodiversity. **OR** Provides a basic explanation for the use for the land. **AND** Provides a basic explanation how preserving the salt marsh will maintain biodiversity. *There is a line of reasoning presented with some structure. The information presented is relevant and supported by some evidence.* **Level 1 (1–2 marks)**	6 (AO 1.1 x2) (AO 2.1 x4)	**AO1.1 Demonstrates knowledge and understanding of land use and the need to maintain biodiversity** • land may be used for growing crops/biofuels/ grazing animals/renewable energy • protecting the salt marsh will maintain biodiversity/ecosystem/number of species/habitats/food chains ORA **AO2.2a Applies knowledge and understanding of land use and the need to maintain biodiversity** • increases in population mean that land is needed to supply more food / biofuel/renewable energy • farmers will gain more money from more food production • increased demand for renewable energy resources to reduce climate change • the salt marshes are rare habitats/species • avoid species becoming extinct/endangered ORA • maintaining biodiversity can provide medicines ORA • pollinators are crucial in maintaining biodiversity ORA Examiner's Comments This is the Level of Response question on this paper which required the candidates to

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Question			Answer/Indicative content	Marks	Guidance
			Provides a basic explanation for the use for the land. **OR** Provides a basic explanation how preserving the salt marsh will maintain biodiversity. *There is an attempt at a logical structure with a line of reasoning. The information is in the most part relevant.* **0 marks** No response or no response worthy of credit.		demonstrate and apply their knowledge and understanding of land use and biodiversity to salt marshes. This differentiated well between lower and higher ability candidates, whereby there was a spread of marks across the levels given. The majority of higher ability candidate achieved a Level 2. Exemplar 2 shows a Level 2 response, which does not provide a detailed explanation for land use or preserving the salt marsh. **Exemplar 2**  Explain why. Use ideas about land use and biodiversity in your answer. Local farmers would want to turn the salt marshes into dry land so that it is a sustained environment. Farmers want this as it means plants / get on crops are more likely to grow under an environment which is constantly the same. However other people would want to leave it how it is as ~~same~~, due to it being a habitat for some species such as small fish and people don't want to take this away[6] from them.
			Total	**15**	
24			C	1 (AO 1.1)	
			Total	**1**	

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Question			Answer/Indicative content	Marks	Guidance
25			shows that over the years the birds are laying eggs earlier (in May) ✓ this could be because temperatures are increasing (year on year) ✓ however, the data shows a lot of variation ✓ there could be other factors involved ✓	4 (AO 3.1a) (AO 3.2b) (AO 3.1a) (AO 3.2b)	**ALLOW** shows downward trend **ALLOW** because Earth is getting warmer **ALLOW** examples of variation in data from the graph **ALLOW** data shows lots of fluctuations / erratic data / spikes in the data **ALLOW** examples of factors such as predator/prey relationship may be different Examiner's Comments In this AO3 question, most higher ability candidates scored well. Most candidates were able to appreciate and describe the fluctuations. Some lower ability candidates wrote about climate change without mentioning an increase in temperature, for example, 'due to climate change eggs were laid earlier'. Some referred to the number of eggs laid rather than the timing, and many that didn't lost track that eggs were laid earlier. Some candidates thought climate change might not be the cause but then didn't suggest that another factor could be involved.
			Total	**4**	
26			D ✓	1 (AO1.2)	
			Total	**1**	

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Question			Answer/Indicative content	Marks	Guidance
27	a		pooter ✓ Any two from: place tube A next to/over moth/insect ✓ student sucks ✓ on tube B ✓	3 (AO3 x 1.2)	 ALLOW student sucks the moth/insect into tube A = 2 marks ALLOW tube with end covered by fine mesh
	b	i	FIRST CHECK THE ANSWER ON ANSWER LINE If answer = 250 award 2 marks 25 x 30 / 3 OR 750 / 3 ✓ = 250 ✓	2 (AO2 x 2.2)	
		ii	Idea of less visible ORA ✓ otherwise they are more likely to be eaten ORA ✓	2 (AO2 x 2.2)	ALLOW spot not visible to predators = 2 marks ALLOW small spot is less likely to be toxic / poisonous If no other mark scored, credit less likely to be washed off
	c	i	(further from the factory) there is less sulfur dioxide and so thicker cuticle/leaves ORA✓ insects find it harder to feed on the thicker leaves/cuticle ORA✓ the numbers are lower with thicker leaves/cuticle ORA✓	2 (AO2 x 3.1b)	IGNORE any reference to section A If no other mark scored, credit thicker leaves/cuticle further from the factory ORA
		ii	very high concentrations of sulfur dioxide kill the insects✓	1 (AO3.2b)	
			Total	10	

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Question			Answer/Indicative content	Marks	Guidance
28	a		to allow a valid comparison of the results✓	1 (AO3.1b)	
	b	i	correct plots ✓✓ smooth curved line between points ✓	3 (AO3 x 2.2)	**ALLOW** +/- half a square All correct = 2 marks 3 or 4 plots correct = 1 mark **DO NOT ALLOW** sketchy line / line thicker than half a square
		ii	increases up to 10 days/70°C ✓ then decreases ✓	2 (AO3.1a)	**ALLOW** increases up to 9-11 days **ALLOW** increases by 44°C
		iii	**FIRST CHECK THE ANSWER ON ANSWER LINE** **If answer = 39 (°C) award 2 marks** 70-31 ✓ = 39 (°C)✓	2 (AO2.2) (AO1.2)	
		iv	normal compost is made by aerobic respiration✓ aerobic respiration releases more energy than anaerobic respiration✓	2 (AO2 x 2.1)	2 correct ticks = 2 marks 1 correct ticks = 1 mark 3 ticks two correct = 1 mark 3 ticks one correct = 0 marks 4 or more ticks = 0 marks
	c	i	**FIRST CHECK THE ANSWER ON ANSWER LINE** **If answer = 8 (kg) award 3 marks** 1500-1200 **OR** 300 ✓ 300/40 **OR** 7.5 ✓ = 8 (kg) ✓	3 (AO3 x 2.2)	**ALLOW** one mark for clear evidence of rounding incorrect answer correctly to the nearest whole number
		ii	less carbon dioxide is produced ✓	1 (AO3.1b)	**ALLOW** less contribution to global warming / greenhouse effect / climate change
			Total	**14**	
29			D ✓	1 (AO2.2)	
			Total	**1**	

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Question			Answer/Indicative content	Marks	Guidance
30	a		normal bin has holes to allow in air / oxygen ✓ (making normal compost) so aerobic respiration occurs ✓	2 (AO2.1) (AO1.1)	ALLOW converse arguments for bokashi bin ALLOW aerobic bacteria carry out respiration IGNORE bacteria work aerobically
	b		used the same pile of dead plant material for both composters / used same plant type / used equal mass in both composters ✓	1 (AO2.2)	ALLOW used the same time interval for both composters ALLOW used the same water/moisture content for both composters ALLOW idea of same external conditions e.g. put both in same place / external temperature kept the same / kept in the same environment IGNORE references to fair testing
	c	i	Axes – both correctly labelled, including units✓ Axes - even scales occupying more than half of the grid ✓ Plotting - all points correctly plotted ✓ Line - lines labelled or a key ✓ Line - points with curve of best-fit lines ✓	5 (AO5 x 2.2)	Must have time on x-axis and temperature on y-axis ALLOW +/- half a square at least 8 points correctly plotted IGNORE extrapolated lines
		ii	temperature increased as compost decomposed / bacteria released heat by respiration ✓ temperature starts to drop as decomposition slows down/complete / bacterial respiration slows ✓	2 (AO2 x 2.1)	ALLOW rise in temperature due to energy released by respiration ✓ ALLOW bacterial activity slows (if respiration already mentioned) ALLOW temperature starts to drop as enzymes in respiration denature at high temperatures
		iii	idea that decomposition in bokashi (method) bin much slower ✓ anaerobic respiration releases less heat/energy than aerobic respiration ✓	2 (AO2 x 2.1)	Enter text here.

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Question			Answer/Indicative content	Marks	Guidance
	d	i	FIRST CHECK THE ANSWER ON ANSWER LINE If answer = 27 (%) award 3 marks 400 / 1500 x 100 ✓ 26.6 (%) ✓ = 27 (%) ✓	3 (AO2.2) (AO2.2) (AO1.2)	If answer = 26.6 (%) award 2 marks ALLOW ECF for correct rounding
		ii	 idea that the gas given off is carbon dioxide ✓ less greenhouse gas produced / less likely to result in global warming / less contribution to greenhouse effect ✓	2 (AO2.2) (AO3.1b)	ALLOW for 2 marks less carbon dioxide produced which is a greenhouse gas ALLOW correct formula ALLOW explanations of the greenhouse effect IGNORE references to environmental damage/not environmentally friendly/pollution/not good for the environment
			Total	17	

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