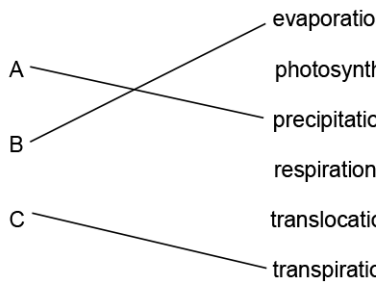
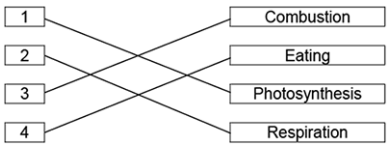
Mark scheme - Ecosystems

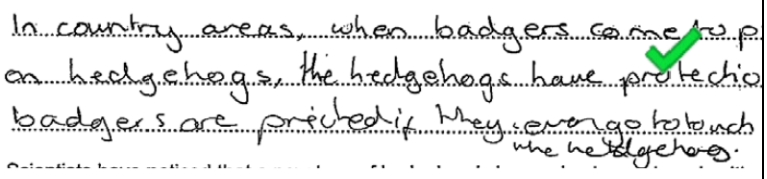
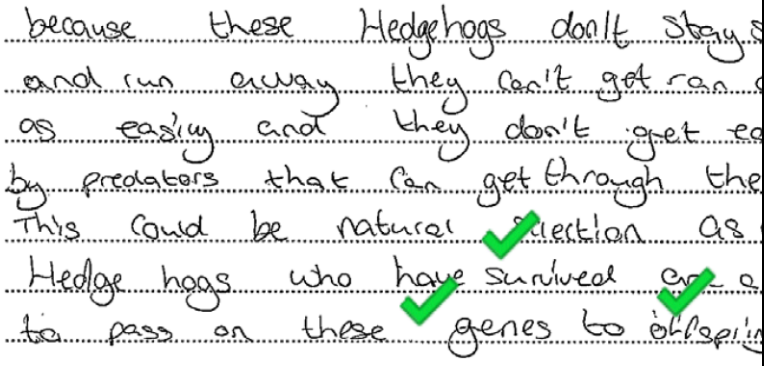
Question			Answer/Indicative content	Marks	Guidance
1			A ✓	1 (AO1.2)	
			Total	**1**	
2			A ✓	1 (AO1.1)	
			Total	**1**	
3			D ✓	1 (AO1.1)	
			Total	**1**	
4			C	1 (AO 1.1)	
			Total	**1**	
5			B	1 (AO 2.1)	
			Total	**1**	
6			B	1 (AO 1.1)	**Examiner's Comments** This question assessed knowledge and understanding of abiotic factors. Just over half of candidates did not achieve this mark and responded incorrectly with a named biotic factor.
			Total	**1**	
7			A	1 (AO 1.1)	**Examiner's Comments** This question was the most accessible question in the multiple-choice section A, with most candidates correctly answering A which represents evaporation.
			Total	**1**	
8			C ✓	**1 (AO1.1)**	
			Total	**1**	
9			A ✓	**1 (AO1.2)**	
			Total	**1**	

10	a			3 (AO3 x 1.1)	**Each correct line = 1 mark** **DO NOT ALLOW** more than 1 line from each letter
	b		prevents lake drying out / replenishes lake water / washes minerals into the lake ✓	1 (AO1.1)	**ALLOW** idea of lack of water in lake causing harm to organisms that live in the water / will provide organisms with sufficient/enough water to live in **ALLOW** idea of providing organisms with dissolved oxygen **IGNORE** will provide organisms with more water **IGNORE** nutrients
			Total	**4**	
11	a	i	Three/3 ✓	1 (AO2.2)	
		ii	(sun)light / the sun ✓	1 (AO1.1)	
		iii	Award one mark for: (an organism) that lives on/in on a (host) organism ✓ Idea parasite benefits at the expense to its <u>host</u> ✓ Award two marks for: An organism that feeds on a living organism / An organism that causes harm to a living organism ✓✓	2 (AO2 x 1.1)	**IGNORE** an organism that feeds on another organism unless qualified
	b		**Any three from:** biological control ✓ nematodes will eat cutworms ✓ less cutworms ✓ less stevia eaten ✓ increase the yield ✓	3 (AO3 x 2.1)	**ALLOW** predators of the cutworms added **ALLOW** more crop
			Total	**7**	
12	a		to let air / oxygen in ✓ for (aerobic) respiration ✓	2 (AO1 x 2.1) (AO1 x 1.1)	**DO NOT ALLOW** carbon dioxide **DO NOT ALLOW** anaerobic respiration

	b		to allow a valid comparison of the results✓	1 (AO3.1 b)	
	c	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 (AO3.1 a)	**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
	d	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 (AO3.1 b)	**ALLOW** less contribution to global warming / greenhouse effect / climate change
	e		minerals ✓	1 (AO1.1)	more than one answer ringed = no mark
			Total	**17**	
13		i	correctly chosen axes, labelled with units ✓ suitable scale for the number of bird boxes ✓ bars correctly drawn ✓	4 (AO 2.2)	height (m) must be on x-axis **DO NOT ALLOW** scale that use less than half the grid **ALLOW** +/- half a square **IGNORE** ?touching adjacent bars

			suitable key ✓		**Examiner's Comments** This was a good question which differentiated between the higher and lower ability candidates whereby they had to generate a bar chart from the information provided. Lower ability candidates struggled to choose the correct axis for the independent and dependant variable. A suitable scale and key were the highest marking points. Over a quarter of candidates were given full marks. **AfL** Candidates should be encouraged to use the headings in a table to identify the independent and dependent variables. Convention is that the first column is most likely to be the independent variable. This should support them in choosing the correct axis, as the convention is that the independent variable goes on the x axis.
		ii	**Any three from:** great tits (nest) higher (in the trees) / ORA ✓ this protects them from weasels who live mainly on the ground / ORA ✓ idea flycatchers (nest) at all heights ✓ as pine martens can move up and down/climb the tree ✓	3 (AO 3.2b)	**ALLOW** weasels can't reach them/great tits **ALLOW** fewer great tits lower down as weasels eat them = 2 **ALLOW** flycatchers can get killed anywhere in tree by pine marten **IGNORE** pine martens eat flycatchers and live in the trees **Examiner's Comments** Lower ability candidates could not analyse the information and draw conclusions. A number of candidates did not interpret the data correctly. Some compared the great tits with the flycatchers instead of identifying the predator prey relationship they had with the weasels or pine martins to explain the number of nests at different heights. A lot of candidates just stated that pine martins live in a tree, which is in the stem of the question.
			Total	**7**	
14			 ✓✓	2 (AO 1.1)	**ALLOW** numbers matched to correct boxes All 4 lines correct = 2 marks 2 or 3 lines correct = 1 mark 1 or 0 lines correct = 0 mark **Examiner's Comments** This question differentiated well, and many candidates were able to demonstrate their knowledge and understanding of the carbon cycle.
			Total	**2**	
15		i	feeds on seeds it is a primary (consumer) ✓	2 (AO 2.1)	**ALLOW** eats seeds which are the producer/first trophic level **ALLOW** eats insects which are the primary consumer

			feeds on insects, then it is a secondary (consumer) ✓		**ALLOW** it feeds on seeds and insects if no other marks scored. **IGNORE** references to herbivores/carnivores/predators **Examiner's Comments** This question was on application of knowledge and understanding of interdependence in food webs. Over half of all candidates were given at least one mark.
		ii	predator because it eats/kills pine martens ✓ competitor (with pine martens) because they eat flycatchers/same prey ✓	2 (AO 2.1)	**ALLOW** pine martens are foxes prey **ALLOW** foxes hunt pine martens **ALLOW** competitor because pine martens also eat flycatchers **Examiner's Comments** This question differentiated well on application of knowledge and understanding on interdependence. The main reason why the lower ability candidates did not score was due to them not identifying and stating the predator relationship and the competitor relationship.
		iii	insect(s) / Great tits	1 (AO 1.1)	**Examiner's Comments** This question was well answered by the candidates correctly identifying an organism in the second trophic level using their knowledge and understanding.
			Total	**5**	
16	a		four / 4 ✓	**1 (AO 1.2)**	**Examiner's Comments** Over half of candidates achieved this mark and correctly identified the number of secondary consumers.
	b		badger number have increased ✓ more competition for food / less slugs to eat ✓	**2 (AO 3.1b)** **(AO 3.2b)**	**IGNORE** reference to hedgehog numbers dropping **ALLOW** badgers eat more slugs so less for hedgehogs **ALLOW** less food to eat **IGNORE** badgers are predators of hedgehogs **IGNORE** they both eat slugs **Examiner's Comments** The majority of candidates could identify there was a lack of slugs to eat for the hedgehogs. The higher ability candidates could link the increase in numbers, as the reason for the lack of food. Candidates that didn't score here just stated that the hedgehogs decrease which wasn't credit worthy, as the question asked for an explanation.
	c	i	in country/advantage/where badgers live, if it rolls up in a ball then will provide more protection / less attacks from badgers/predators ✓ in cities/disadvantage/many roads, it will be run over by cars ✓	**2 (AO 2 × 2.1)**	**ALLOW** in country/advantage/where badgers live hedgehogs have defence against predators/badgers **ALLOW** hedgehogs have a reduced risk of being eaten **Examiner's Comments**

					More than half of candidates achieved at least one mark here. This question differentiated well between all abilities. Those candidates that didn't score did not link the hedgehogs to each conclusion properly. E.g. advantage/in country/where badges live to correct conclusion. Exemplar 9 was credited 1 mark for the advantage conclusion. **Exemplar 9** 
		ii	hedgehogs that run away are more likely to survive / less likely to get run over ✓ they will reproduce ✓ pass on the allele/gene for running away ✓ over time/many generations (running away will become more common) ✓	**4 (AO 4 × 2.1)**	**ALLOW** ORA for each marking point **ALLOW** reference to how change occurred e.g. mutation for running away **ALLOW** offspring produced / breed together **ALLOW** pass on advantageous gene **IGNORE** trait is pass on / genes are passed on **Examiner's Comments** A number of candidates achieved at least 1 mark, mainly that hedgehogs which run away are more likely to survive. A small number of candidates confused natural selection with genetic engineering. Exemplar 10 shows an answer credited 3 out of 4 marks. **Exemplar 10** 
			Total	**9**	
17			idea of **less** plants/percentage of plants/% cover in shade/closer to the tree ✓ **less** light (in shade/closer to the tree)✓	**4** **(AO 1.2)** **(AO 2.1)** **(AO**	**ORA** for all marking points **ALLOW** shows negative correlation **IGNORE** less sun **IGNORE** in shade **no** photosynthesis / **no** light **ALLOW less** light for photosynthesis (closer to the tree) 2 marks **ALLOW** photosynthesis **less** effective (closer to the tree)

			less photosynthesis (in shade/closer to the tree)✓ **less** food/raw materials produced **for growth** (in shade/closer to the tree)✓	**3.1b)** **(AO 3.2b)**	**Examiner's Comments** A number of candidates achieved 1 mark on this question for the idea of less plants/% cover closer to the tree/shade or the reverse argument. Most candidates didn't link this to less light for photosynthesis. Less food for growth was the least credited marking point.
			Total	**4**	
18		i	21800 (kg) ✓	**1 (AO 2.2)**	**Examiner's Comments** Over half of the candidates could correctly calculate the amount of biomass lost between plants and humans. The most common incorrect answer was 19800kg.
		ii	egestion/excretion/respiration ✓	**1 (AO 1.1)**	**ALLOW** named excretory product /faeces/urine/ uneaten parts/heat **IGNORE** movement/waste **DO NOT ALLOW** growth **Examiner's Comments** This again was a good differentiator, with most common credited answer being respiration. A lot of candidates referred incorrectly to the cattle eating them as a cause of biomass loss.
			Total	**2**	
19	a		type of plant material ✓ will affect the rate of microbes decomposing ✓ OR Size/SA of plant material ✓ will affect the rate of microbes decomposing ✓ OR mass of plant material ✓ will affect the rate of microbes decomposing ✓ OR oxygen ✓ will affect the (aerobic) respiration of microbes ✓	**2 (AO 3.1a)**	**Second marking point is dependent on a correct factor being stated** **ALLOW** decay/breakdown/rot throughout **ALLOW** decomposers/saprophytes/bacteria/fungi throughout **ALLOW** amount of plant material **IGNORE** amount of compost / composter size **Examiner's Comments**

					This question was challenging for the candidates. The majority couldn't identify a correct control variable and explain the effect on microbe action. The most common answer was to keep the water the same, which was the independent variable. Exemplar 5 demonstrates an answer which did not gain credit. **Exemplar 5** She should keep the water constant.
	b	i	**any two from:** **A** reaches the highest temperature ✓ **A** has a higher temperature for longer/at the start ✓ temperature increases quicker in **A** ✓ temperature falls quicker in **A** ✓ towards the end the temperature in **A** is lower ✓	**2 (AO 2 × 2.2)**	**ALLOW** ORA **IGNORE** A has a higher temperature **IGNORE** references to decay **IGNORE** comparisons to section B **Examiner's Comments** In this question the most common correct scoring point was that A reaches the highest temperature and increases quicker. Some candidates didn't make it a comparative answer with C, so did not gain credit. A small number of candidates referred to rate of decay instead of temperature or compared section A with section B.
		ii	Decay/breakdown/decompose/rot is fastest (in **A**) ✓	**1 (AO 3.2a)**	**Examiner's Comments** The majority of lower ability candidates did not score this question and linked watering more often to faster decay. Answer included seeing the effects of water on growth, also references to increases temperature on the plant material.
	c		(oxygen) is needed for **microbes** (that cause decay) ✓ for (aerobic) respiration ✓	**2 (AO 1.2)**	**AW** decomposers/saprophytes/ bacteria/fungi **IGNORE** references to enzymes **Examiner's Comments** In this question candidates linked oxygen and decay correctly but did not gain credit as couldn't demonstrate their knowledge and understanding of microbes requiring oxygen for respiration.
			Total	**7**	