GCSE
BIOLOGY
8461/2H

Paper 2 Higher Tier

Mark scheme

June 2020

Version: 1.0 Final Mark Scheme

jun208461/2H/MS

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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Level of response marking instructions

Level of response mark schemes are broken down into levels, each of which has a descriptor. The descriptor for the level shows the average performance for the level. There are marks in each level.

Before you apply the mark scheme to a student's answer read through the answer and annotate it (as instructed) to show the qualities that are being looked for. You can then apply the mark scheme.

Step 1 Determine a level

Start at the lowest level of the mark scheme and use it as a ladder to see whether the answer meets the descriptor for that level. The descriptor for the level indicates the different qualities that might be seen in the student's answer for that level. If it meets the lowest level then go to the next one and decide if it meets this level, and so on, until you have a match between the level descriptor and the answer. With practice and familiarity you will find that for better answers you will be able to quickly skip through the lower levels of the mark scheme.

When assigning a level you should look at the overall quality of the answer and not look to pick holes in small and specific parts of the answer where the student has not performed quite as well as the rest. If the answer covers different aspects of different levels of the mark scheme you should use a best fit approach for defining the level and then use the variability of the response to help decide the mark within the level, ie if the response is predominantly level 3 with a small amount of level 4 material it would be placed in level 3 but be awarded a mark near the top of the level because of the level 4 content.

Step 2 Determine a mark

Once you have assigned a level you need to decide on the mark. The descriptors on how to allocate marks can help with this. The exemplar materials used during standardisation will help. There will be an answer in the standardising materials which will correspond with each level of the mark scheme. This answer will have been awarded a mark by the Lead Examiner. You can compare the student's answer with the example to determine if it is the same standard, better or worse than the example. You can then use this to allocate a mark for the answer based on the Lead Examiner's mark on the example.

You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do not have to cover all of the points mentioned in the Indicative content to reach the highest level of the mark scheme.

An answer which contains nothing of relevance to the question must be awarded no marks.

Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement
- the Assessment Objectives, level of demand and specification content that each question is intended to cover.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.

In general the right-hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening and underlining

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following bullet points is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**. Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.

2.4 Any wording that is underlined is essential for the marking point to be awarded.

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which students have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error/contradiction negates each correct response. So, if the number of error/contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

Example 1: What is the pH of an acidic solution?

[1 mark]

Student	Response	Marks awarded
1	green, 5	0
2	red*, 5	1
3	red*, 8	0

Example 2: Name two planets in the solar system.

[2 marks]

Student	Response	Marks awarded
1	Neptune, Mars, Moon	1
2	Neptune, Sun, Mars, Moon	0

3.2 Use of chemical symbols/formulae

If a student writes a chemical symbol/formula instead of a required chemical name, full credit can be given if the symbol/formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Marks should be awarded for each stage of the calculation completed correctly, as students are instructed to show their working. Full marks can, however, be given for a correct numerical answer, without any working shown.

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward is kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation ecf in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(…..) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

3.8 Allow

In the mark scheme additional information, 'allow' is used to indicate creditworthy alternative answers.

3.9 Ignore

Ignore is used when the information given is irrelevant to the question or not enough to gain the marking point. Any further correct amplification could gain the marking point.

3.10 Do <u>not</u> accept

Do **not** accept means that this is a wrong answer which, even if the correct answer is given as well, will still mean that the mark is not awarded.

4. Level of response marking instructions

Extended response questions are marked on level of response mark schemes.

- Level of response mark schemes are broken down into levels, each of which has a descriptor.
- The descriptor for the level shows the average performance for the level.
- There are two marks in each level.

Before you apply the mark scheme to a student's answer, read through the answer and annotate it (as instructed) to show the qualities that are being looked for. You can then apply the mark scheme.

Step 1: Determine a level

Start at the lowest level of the mark scheme and use it as a ladder to see whether the answer meets the descriptor for that level. The descriptor for the level indicates the different qualities that might be seen in the student's answer for that level. If it meets the lowest level then go to the next one and decide if it meets this level, and so on, until you have a match between the level descriptor and the answer.

When assigning a level you should look at the overall quality of the answer. Do **not** look to penalise small and specific parts of the answer where the student has not performed quite as well as the rest. If the answer covers different aspects of different levels of the mark scheme you should use a best fit approach for defining the level.

Use the variability of the response to help decide the mark within the level, ie if the response is predominantly level 2 with a small amount of level 3 material it would be placed in level 2 but be awarded a mark near the top of the level because of the level 3 content.

Step 2: Determine a mark

Once you have assigned a level you need to decide on the mark. The descriptors on how to allocate marks can help with this.

The exemplar materials used during standardisation will help. There will be an answer in the standardising materials which will correspond with each level of the mark scheme. This answer will have been awarded a mark by the Lead Examiner. You can compare the student's answer with the example to determine if it is the same standard, better or worse than the example. You can then use this to allocate a mark for the answer based on the Lead Examiner's mark on the example.

You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do **not** have to cover all of the points mentioned in the indicative content to reach the highest level of the mark scheme.

You should ignore any irrelevant points made. However, full marks can be awarded only if there are no incorrect statements that contradict a correct response.

An answer which contains nothing of relevance to the question must be awarded no marks.

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1	bacteria fungi	allow singular allow mould ignore microbes / germs / decomposers do **not** accept viruses	1 1	AO1 4.7.2.2 4.7.2.3
01.2	fatty acid(s)		1	AO2 4.7.2.3 4.2.2.1 RPA10
01.3	any **one** from: • universal indicator (paper / solution) • pH meter	allow UI (paper / solution) ignore pH paper unqualified allow pH probe ignore datalogger unqualified ignore Cresol red ignore phenolphthalein / litmus	1	AO1 4.7.2.3 RPA10
01.4	any **two** from: • volume of milk • exposure to air / oxygen • sterilise test tubes • treatment of milk before investigation • freshness / age of milk (at start) • time of day pH was measured	allow amount of milk allow bungs on test tubes allow example such as pasteurised or not allow starting pH of milk	2	AO1 4.7.2.3 RPA10
01.5	almond (milk)		1	AO3 4.7.2.3 RPA10

01.6	as temperature increases up to 15 °C the time taken (to reach pH 5) decreases above 15 °C the time taken (to reach pH 5) stays the same	allow converse if no other mark awarded allow **1** mark for as temperature increases the time taken (to reach 5 °C) decreases and then stays the same	1 1	AO2 4.7.2.3 RPA10
01.7	any **one** from: • bacteria / microbes / microorganisms / fungi dividing faster (when warmer) • reactions (in the bacteria) are happening faster (to decay milk) • (because there is) more (kinetic) energy • enzyme activity is higher (at 10 °C than at 5 °C)	allow converse if clearly describing 5 °C allow number of bacteria / microbes / microorganisms / fungi increasing (when warmer) allow more bacteria microbes / microorganisms / fungi allow particles move faster allow more collisions between particles allow enzymes work faster ignore enzymes work better	1	AO2 4.7.2.3 4.1.1.6 RPA10
01.8	any **two** from: • different concentration / type of fat / lipid • different concentration / type of proteins / carbohydrate / sugar • different (amount / type of) bacteria present • may have been pasteurised by a different process • different starting pH	allow different amounts of fat / lipid allow different amounts of proteins / carbohydrate / sugar allow may have been treated in different ways (before the investigation) ignore different oxygen concentration	2	AO3 4.7.2.3 RPA10

01.9	determine the types of bacteria present in the milk		1	AO3 4.7.2.3 RPA10
Total			**13**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.1	$\frac{6.0}{1.6}$ 3.75	allow a range of 5.9 to 6.1 for 6.0 do **not** accept if a unit is given if no other marks awarded, allow a correct answer using a value of 5.8 or 6.2 for **1** mark	1 1	AO2 4.7.3.2
02.2	$\frac{2.5 — 1.6}{50}$ 0.018 (billion per year)	allow $\frac{0.9}{50}$	1 1	AO2 4.7.3.2
02.3 view with Figure 2	suitable extrapolation line on Figure **2** reading taken at 2050 from student's line	allow straight extrapolation allow a tolerance of ± ½ small square allow **1** mark for 10 billion if no extrapolation drawn	1 1	AO2 4.7.3.2
02.4	fewer fish caught **or** limit the number of fish caught (remaining fish) can reproduce	allow a method of doing this, eg increase mesh size **or** do not catch young fish allow more fish (survive to) reproduce	1 1	AO1 4.7.5.1 4.7.5.3

Question	Answers	Mark	AO / Spec. Ref.
02.5	**Level 2:** Scientifically relevant facts, events or processes are identified and given in detail to form an accurate account.	4-6	AO1 4.7.3.1 4.7.3.2 4.7.3.3 4.7.3.4 4.7.3.6 4.7.3.5 4.7.5.1 4.7.5.2
	Level 1: Facts, events or processes are identified and simply stated but their relevance is not clear.	1–3	
	No relevant content	0	
	Indicative content **human land use** • increasing population requires more food • crops / livestock for food • farming crops for biofuels • peat use as compost • peat use as fuel • increased use of pesticide / insecticide / herbicide / fertilisers • use of free-range / organic methods increases land use (for same yield) **link to biodiversity** • deforestation • monocultures • loss of hedgerows (to make fields larger) • loss of habitat • consequence of loss of habitat eg (change in) migration • fertiliser run off polluting water • use of pesticide / insecticide / herbicide reduces insects / plants which damages food chains • more soil erosion **link to atmospheric pollution** • more carbon dioxide (from farm animals / machinery) • more methane (from cows) • climate change **or** global warming • example of impact on biodiversity • acid rain • desertification Answers referring to only land use or only biodiversity are level 1		

02.6	golden rice has improved nutritional value		1	AO1 4.7.5.4
02.7	any **one** from: • gene may contaminate / enter other breeds / species • reduction / extinction of population of wild / traditional rice • reduction / extinction of population of flowers / insects • high cost of seeds • may have too much vitamin A (in diet)	ignore references to religious beliefs allow decrease in biodiversity allow decrease in gene pool allow may harm (human) health allow may cause side effects (on humans) ignore may harm humans unqualified	1	AO3 4.6.2.4
Total			**16**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.1	to increase fruit size to promote flower production		1 1	AO1 4.5.4.2
03.2	any **two** from: • keep temperature the same (for all dishes) • use equal numbers of seedlings (in each dish) • use seedlings of the same (initial) height • use more seedlings in each dish • give all dishes the same volume of water • use seed(ling)s of the same species • measure light intensity	allow move equal distance **or** away from radiator **or** turn off radiator **or** use heat shield between lamp and seedlings allow use seedlings of the same (initial) size allow give all dishes the same amount of water allow use seed(ling)s of the same type allow measure distance from lamp allow put lamp above each dish and use different light intensity **or** power for each allow same concentration of mineral ions **or** named example ignore nutrients / food do **not** accept keep the same light intensity	2	AO3 4.5.4.1 RPA8
03.3	any **one** from: • use a piece(s) of thread / string **and** measure length of thread (with ruler) • straighten seedling / shoot **and** measure (with ruler) • measure with a flexible ruler **or** a tape measure	allow use a piece of thread **and** (put the thread against) a ruler allow straighten seedling against a ruler allow use a flexible ruler **or** a tape measure	1	AO2 4.5.4.1 RPA8

03.4		reference to side only needed once		4.5.4.1 RPA8
	(side nearest the lamp) receives more light (on side P)	allow side Q receives less light allow side Q is in the shade ignore side P is in the light	1	AO2
	(therefore) unequal distribution of <u>auxin</u>	allow more <u>auxin</u> on side Q allow (so) more <u>auxin</u> present on side away from the lamp do **not** accept more auxin on light side **or** side P	1	AO1
	(auxin causes) more growth on side away from the lamp	allow more growth on side Q allow (auxin causes) cell elongation on side away from the light ignore mechanism of auxin action	1	AO2
03.5	ethene is released from bananas	allow ethylene is released from bananas allow the hormone is ethene / ethylene	1	AO2 4.5.4.1 4.5.4.2
Total			**9**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	many (joined) nucleotides **or** monomers	allow (long) molecule / chain made of repeating units	1	AO1 4.6.1.4 4.6.1.5
04.2	phosphate	ignore phosphorus	1	AO1 4.6.1.5
	(phosphate attached to a) sugar	allow deoxyribose / pentose	1	
	(which has 1 of 4) base(s) (attached to sugar)	allow **2** marks if position of sugar / phosphate / base is incorrect	1	
	(bases) are A, C, G **and** T	allow bases are adenine, cytosine, guanine **and** thymine do **not** accept thiamine / adenosine allow description of a pair of nucleotides	1	
04.3		an incorrect answer for one step does not prevent allocation of marks for subsequent steps		AO2 4.6.1.4 4.6.1.5
	$0.34 \times 12\,000\,000\,000$		1	
	$4\,080\,000\,000$		1	
	$\frac{4\,080\,000\,000}{1\,000\,000\,000}$	allow conversion from nm to m at any point in the calculation	1	
	4.08 (m)		1	
	2.04 (m) (divided by 2 due to base pairs)	allow division by 2 at any point in the calculation	1	
04.4	(non-coding parts) can switch genes on / off		1	AO1 4.6.1.5
Total			**11**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	any **three** from: • mitosis produces two (daughter) cells but meiosis produces four (daughter) cells • one cell division in mitosis but two cell divisions in meiosis • mitosis produces cells with two of each chromosome, but meiosis produces cells with one of each chromosome • mitosis produces genetically identical cells, but meiosis produced genetically different cells	answers must be comparative allow mitosis produces diploid cells but meiosis produces haploid cells allow mitosis maintains the number of chromosomes **or** mass of DNA **or** mass of genetic material but meiosis halves the number / mass allow mitosis produces cells with 23 pairs **or** 46 chromosomes but meiosis produces cells with 23 chromosomes allow other correct differences between the processes of mitosis and meiosis	3	AO1 4.6.1.1 4.6.1.2 4.1.2.2

05.2	any **one** from: • DNA doubles / copies / replicates (once) • increase in the number of mitochondria / ribosomes / sub-cellular structures	 allow chromosomes **or** genetic material **or** genetic information double / replicate / are copied ignore mitochondria / ribosomes are copied / duplicated allow chromosomes / chromatids pulled to side (of cell) allow other correct similarities between the processes of mitosis and meiosis	1	AO1 4.6.1.1 4.6.1.2 4.1.2.2
05.3	Dd / dD has **D** because has Dupuytren's **and** has **d** because child / person 6 is homozygous recessive **or** does not have Dupuytren's **or** is **dd**	allow heterozygous allow has **D** because has Dupuytren's **and** person 1 and person 2 both passed **d** to child / person 6 allow has **D** because has Dupuytren's **and** cannot be homozygous / **DD** or all the children would have Dupuytren's	1 1	AO3 4.6.1.6 4.6.1.7
05.4	male / person 7 gametes correct: **D** and **d** female / person 8 gametes correct: **d** and **d** correct derivation of offspring genotypes: **Dd Dd dd dd** offspring with Dupuytren's identified probability correct from the correct identification given	allow **1** mark for both sets of gametes correct if parents not identified allow correct derivation of offspring genotypes from incorrect gametes allow correct for genotypes stated in mp3 allow probability correct from offspring genotypes if identification not given	1 1 1 1 1	4.6.1.6 4.6.1.7 AO2 AO2 AO2 AO2 AO3

05.5	female(s) / person(s) 3 / 11 / 12 have Dupuytren's	allow some females have Dupuytren's	1	AO3 4.6.1.6 4.6.1.7 4.6.1.8
	females don't have Y chromosome **or** Dupuytren's is passed from fathers / 1 / 7 to daughters / 3 / 12, (so is not on the Y chromosome)	allow only males have Y chromosomes allow females are XX allow Dupuytren's is passed from mothers / 11 to children / 15, (so is not on the Y chromosome)	1	
Total			**13**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1	A		1	AO1 4.5.2.2
06.2	cerebral cortex	allow cerebrum allow cerebral hemisphere(s) ignore D	1	AO1 4.5.2.2
06.3	any **three** from: • can ask people to do different tasks (while taking scan) • to see which part of brain is active / inactive • to compare with a person without brain damage • to see (exactly) where the damage is • (traditional) MRI scanner cannot be used if people can't stay still	 allow can ask person to do a (specific) task allow to see which part of the brain is working allow examples such as children **or** patients with Parkinson's disease allow may be better for people who are claustrophobic	3	AO3 4.5.2.2
06.4	(cells in) retina sensitive to light impulse passes along (sensory) neurone (along) optic nerve	allow retina detects light allow rods / cones detect light allow electrical signal **or** electrical message passes along (sensory) neurone allow chemical transmission across synapse	1 1 1	AO1 4.5.2.1 4.5.2.3

Question	Answers	Mark	AO / Spec.
06.5	**Level 3:** Relevant points (reasons/causes) are identified, given in detail and logically linked to form a clear account.	5–6	AO2
	Level 2: Relevant points (reasons/causes) are identified, and there are attempts at logical linking. The resulting account is not fully clear.	3–4	AO2
	Level 1: Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.	1–2	AO1
	No relevant content	0	4.5.2.3 4.6.2.1 4.6.2.2 4.6.3.1 4.6.3.4 4.7.1.3 4.7.1.4
	Indicative content • mutation (in gene / DNA) • randomly **or** due to chance • causes new / different protein / (visual) pigment to be made • in the retina of bird • (so more) variation in the wavelengths of light birds retinas could detect • birds with the mutation **or** birds able to detect UV are more likely to see fruits (that reflect UV) • birds with the mutation **or** birds able to detect UV are more likely to see where small mammals are or have been • therefore get more food (small mammals or fruit) • avoid being eaten (by small mammals) • out competing those birds without the mutation **or** birds not able to detect UV • so more likely to survive **and** reproduce **or** have offspring • by natural selection • passing on allele / gene / mutation to offspring • repeated over many generations For Level 3 a link to UV vision is required		
Total			**14**

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.1	triangular pyramid with 3 levels		1	AO1 4.7.4.1 4.7.4.2
	correct labels: (waste) vegetables / plants; insect(s); dog(s)	do **not** accept additional incorrect labels	1	AO2 4.7.4.2
07.2	any **two** from: • carbon dioxide from respiration (from dog) • urea from excretion (from dog) • not all parts (of insects) are absorbed / digested (by dog)	allow carbon dioxide breathed out (by dog) allow urea in urine (from dog) allow faeces from egestion (from dog) ignore references to loss of energy if no other mark awarded allow **two** factors without descriptions for **1** mark	2	AO1 4.7.4.3
07.3	less land required		1	AO2 4.7.5.1 4.7.3.5
	(so) more space for crops (for humans)	allow more meat (from cows etc) for humans	1	
	less methane (from animals) therefore less global warming	allow less methane from rotting vegetables in landfill	1	
	(therefore) less harmful effects of global warming on (human) food production	allow example such as less flooding of farmland allow may lead to the development of more foods for humans made from insects	1	
Total			**8**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.1	38 500 000 – 36 000 000	allow 500 000 × 5	1	AO2 4.6.3.6
	2 500 000 (years) **or** 2.5 million (years)	if no other mark awarded, allow 38.5 – 36 = 2.5 **or** 0.5 × 5 = 2.5 for **1** mark	1	

08.2	(extinction of Andrewsarchus) led to population increase / evolution of another predator because Andrewsarchus no longer competing for food / resources other predator (population) hunted more Brontotherium **or** (extinction of Andrewsarchus) led to population increase / evolution of another herbivore (previously eaten by Andrewsarchus) (1) because Andrewsarchus no longer predating (other) herbivore (1) more competition with other herbivores (1) **or** (extinction of Andrewsarchus so) Brontotherium are not eaten so therefore the population increases (1) so much that the food source decreases (1) Brontotherium compete with each other so much that they all die (1)	allow idea of a new predator allow because Andrewsarchus no longer eating another predator max **2** marks if reference to hunted by humans **or** still killed by Andrewsarchus **or** reference to climate change or factors relating to climate change	1 1 1	AO2 4.6.3.6 4.7.1.1 4.7.1.3 4.7.4.1

08.3	any **three** from: • fossils buried deep(er) so hard(er) to find • fossils smaller so harder to find • more likely to be destroyed by geological activity / earthquakes / erosion • oldest organisms were soft-bodied so most of the tissue decayed • dating older fossils is hard • older eras less researched by scientists because less to find • (usually) unclear when one species evolves into another species (because not enough fossils found)	allow oldest organisms were soft-bodied so there were very few fossils	3	AO2 4.6.3.5

Question	Answers	Mark	AO / Spec. Ref.
08.4	**Level 3:** A judgement, strongly linked and logically supported by a sufficient range of correct reasons, is given.	5–6	AO3 4.6.3.6 4.7.1.2 4.7.1.3
	Level 2: Some logically linked reasons are given. There may also be a simple judgement.	3–4	
	Level 1: Relevant points are made. They are not logically linked.	1–2	
	No relevant content	0	
	Indicative content **Supporting the statement** • decrease (in large mammals) is large(r) in some areas • decrease (in large mammals) occurs when humans enter areas • decrease occurs at different times in the areas, so not suggestive of worldwide climate change or meteor impact or volcanic activity • decrease is not (always) immediate, suggesting human population grew, then had impact **or** decrease accelerates as human population grows **Not supporting the statement** • only shows large mammals **or** does not show other species • correlation does not mean causation • there were always some left so it wasn't a 'mass extinction' • decrease could have been due to other factors / named • no information about climate change / abiotic factors • no information about predators / pathogens / food sources / other biotic factors • decrease (in mammal population) in Africa (after humans present) is small • decrease (in mammal population) in Madagascar (after humans present) was gradual / slow • only shows data for four areas of the world **or** no data shown for other areas of the world Answers in level **3** must refer to evidence supporting **and** not supporting the statement		

08.5	(disadvantage) any **one** from: • loss of potential, future biodiversity • reduction in range of alleles (advantage) allows evolution of new species / varieties	 allow loss of biodiversity allow reduction in gene pool allow opportunity for speciation	1 1	AO3 4.6.3.6
Total			**16**	