AQA GCSE Biology | 8461

SPECIFICATION POINT 4.7.1.1

Communities

Mark schemes and examiner comments

Tier	**Higher**
Question groups	**10**
Available paper years	**2008–2025**

Using this booklet

1. Booklet answer numbers match the question booklet.
2. Use the original question number within marking tables.
3. Examiner comments are included where available.

Name: _____ **Date:** _____

Where a precise marking extract is unavailable, the full source document is included in an appendix. Any missing mark scheme is explicitly identified.

4.7.1.1 Communities

Answer 01 · Mark scheme

March 2008 | BLY1BP | Original Q2 | Legacy

Two	**A**	competition	**3**
	B	environmental change	**1**
	C	survival	**4**
	D	extinction	**2**

	A	B	C	D

4.7.1.1 Communities

Answer 02 · Mark scheme

June 2008 | BLY1H | Original Q5 | Legacy

question	answers	extra information	mark
5	any **four** from: • mutation produced a bird whose bill was crossed • birds compete for <u>food</u> / <u>seeds</u> • mutant crossbill able to obtain food faster / easier / more successfully • selected for **or** more likely to survive • reproduce / mate / breed / produce offspring	max **two** marks for a Lamarck explanation do **not** allow birds decide to mutate	4
Total			**4**

4.7.1.1 Communities

Answer 02 · Mark scheme June 2008 | BLY1H | Original Q5 | Legacy

COMPONENT NUMBER: BLY1H

COMPONENT NAME: Science B / Biology

STATUS: Final

DATE: June 2008

Answer 03 · Mark scheme June 2009 | BLY1BP | Original Q2 | Legacy

Two	**A** Creationism **4** **B** Intelligent Design **3** **C** Lamarckism **1** **D** Darwinism **2**			
	A	**B**	**C**	**D**

4.7.1.1 Communities

Answer 04 · Mark scheme

June 2009 | BLY1H | Original Q1 | Legacy

Question 1

question	answers	extra information	mark
1(a)	streamlined / aerodynamic / swept-back / arrow-shaped / dart-shaped wings / tail **or** large / long wings	allow pointed / curved wings ignore pointed tail / beak ignore large tail	1
1(b)	no / fewer insects / food (in winter)	allow **too** cold ignore not adapted to cold ignore day length	1
1(c)(i)	any **two** from • feed / hunt at different heights **or** swifts feed higher up • feed / hunt at different times **or** swifts feed at night • arrive / depart at different times		2
1(c)(ii)	nesting sites / territory / habitat	allow homes / space ignore food unqualified allow well qualified food answers eg insects / food near the ground **or** insects / food when it's light **or** insects / food between early May and early August	1
Total			**5**

4.7.1.1 Communities

Answer 04 · Mark scheme June 2009 | BLY1H | Original Q1 | Legacy

BLY1H

Answer 05 · Mark scheme March 2010 | BLY1BP | Original Q2 | Legacy

Two	**A**	The trees' leaves live for about 30 years.	**4**
	B	The trees can grow new bark.	**1**
	C	The trees have needle-shaped leaves.	**3**
	D	The trees grow far apart.	**2**

	A	**B**	**C**	**D**

Answer 06 · Mark scheme March 2010 | BLY1BP | Original Q9 | Legacy

Nine	**4**	**2**	**1**	**3**

Answer 07 · Mark scheme June 2014 | BL1HP | Original Q2 | Legacy

The full source mark scheme begins on page 15. Follow original question 2 in that document.

4.7.1.1 Communities

Answer 08 · Mark scheme

June 2023 | 8461/1H | Original Q4

Question 4

Question	Answers	Extra information	Mark	AO / Spec Ref.
04.1	any **two** from: • *(effect)* muscle fatigue **or** oxygen debt occurs (1) *(reason)* caused by (build-up of) lactic acid (1) • *(effect)* (continued) heavy / deep / fast breathing (1) *(reason)* to provide the oxygen needed to break down (built-up) lactic acid (1) • *(effect)* (continued) increased heart rate (1) (*reason)* to provide the oxygen needed to break down (built-up) lactic acid (1) • *(effect)* fewer / weaker muscle contractions (1) *(reason)* (because) less energy is released / available (1)	mark as pairs allow muscle cramp ignore fatigue / cramp unqualified allow to repay the oxygen debt allow to repay the oxygen debt do **not** accept energy being produced / made / created	4	AO1 4.4.2.1 4.4.2.2

4.7.1.1 Communities

Answer 08 · Mark scheme

Question	Answers	Mark	AO / Spec Ref.
04.2	**Level 3:** The method would lead to the production of a valid outcome. The key steps are identified and logically sequenced.	5-6	AO3 4.4.2.2
	Level 2: The method would not necessarily lead to a valid outcome. Most steps are identified, but the method is not fully logically sequenced.	3-4	
	Level 1: The method would not lead to a valid outcome. Some relevant steps are identified, but links are not made clear.	1-2	
	No relevant content.	0	
	Indicative content • test a group of athletes • use at least two different types / intensities of exercise • get each athlete to do all exercises **or** have a large (≥30) group doing each exercise • record heart rate for each athlete before and after exercise **or** calculate increase in heart rate for each athlete after exercise • calculate the mean increase in heart rates for each type / intensity of exercise • compare mean increase in heart rates for each type / intensity of exercise • control variables: o same (biological) sex **or** mix of sexes o same level of activity / exercise o same age o same caffeine / drug / medicine intake o same length of time for exercise o no health issues / illnesses o return to resting heart rate before each exercise		

Question	Answers	Extra information	Mark	AO / Spec Ref.
04.3	(athlete is) faster / stronger	allow description of improved performance allow reference to increased stamina / endurance	1	AO2 4.4.2.1 4.4.2.2
	(because more muscle mass so) more / stronger muscle contractions		1	

Answer 08 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec Ref.
04.4	hybridoma		1	AO1 4.3.2.1

Question	Answers	Extra information	Mark	AO / Spec Ref.
04.5	any **three** from: • (cell) is cloned • many (identical) cells are produced • all the cells make the same antibody • the antibody is (collected and) purified	 ignore name of cell allow many clones are produced	3	AO1 4.3.2.1

Question	Answers	Extra information	Mark	AO / Spec Ref.
04.6	a monoclonal antibody only binds to the anabolic steroid		1	AO2 4.3.2.1

Question	Answers	Extra information	Mark	AO / Spec Ref.
04.7	to show that the test is working	allow to prevent a false negative (result) ignore to show there are free / remaining monoclonal antibodies	1	AO3 4.3.2.1 4.3.2.2

4.7.1.1 Communities

Answer 08 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec Ref.
04.8	*evidence* no blue / visible dye (in control area) *reason* (because) no (free) monoclonal antibodies bound to control area **or** (because) there were no (free) monoclonal antibodies on the end of the (test) strip	allow no line(s) (in control area) allow no colour change (in control area) allow the (free) monoclonal antibodies did not move up the test strip allow urine did not move up the test strip	1 1	AO3 4.3.2.1 4.3.2.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
04.9	D		1	AO3 4.3.2.1 4.3.2.2

Total Question 4	**21**

4.7.1.1 Communities

Answer 09 · Mark scheme

June 2024 | 8461/2H | Original Q2

Question 2

Question	Answers	Extra information	Mark	AO / Spec Ref.
02.1	lack of oxygen for (aerobic) respiration	do **not** accept ref to respiration in dead plants	1	AO3
	(so) less / no energy (released)	do **not** accept energy produced / made / created	1	AO2
	(for) microorganisms / bacteria / fungi / microbes / decomposers **OR** low pH denatures enzymes (1)	allow low pH / acidity reduces enzyme activity	1	AO2 4.2.2.1 4.4.2.1 4.7.1.2 4.7.2.3
	(so) less / no (chemical) reactions / metabolism / respiration **or** less **/** no energy released (1) in microorganisms / bacteria / fungi / microbes / decomposers (1)	do **not** accept energy produced / made / created		

Question	Answers	Extra information	Mark	AO / Spec Ref.
02.2	34 g/m^2/year		1	AO2 4.7.4.3

Question	Answers	Extra information	Mark	AO / Spec Ref.
02.3	DNA		1	AO1 4.6.1.5 4.7.1.2 4.7.1.4

Question	Answers	Extra information	Mark	AO / Spec Ref.
02.4	protein		1	AO1 4.4.1.1 4.4.2.1 4.4.2.3 4.7.1.2 4.7.1.4

4.7.1.1 Communities

Answer 09 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec Ref.
02.5	increase in temperature	allow global warming allow heat (energy) is trapped ignore reference to greenhouse gases	1	AO3
	(because) carbon dioxide is released (from the peat bog)		1	AO2
	(because) carbon dioxide is produced by burning / decay of peat	ignore methane is released from burning / decay of peat allow fewer plants to take in carbon dioxide (for photosynthesis)	1	AO2
	(because) methane is released (from the peat bog)		1	AO2
				4.4.2.1 4.7.2.3 4.7.3.3 4.7.3.5

Total Question 2	10

4.7.1.1 Communities

Answer 10 · Mark scheme

June 2025 | 8461/2H | Original Q1

Question 1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1	any **two** from: • (ichthyosaur died and) is buried in sediment / sand / mud / silt • (only) soft parts decayed / eaten **or** bones were not decayed / eaten • bone(s) / remains replaced by minerals	allow skeleton **or** hard parts for bones throughout ignore compression ignore reference to oxygen do **not** accept (icthyosaur died and) is buried in rock(s) allow mineralisation of bones allow bone(s) left imprint in mud / sand / sediment (that then hardened to rock) ignore bones turned to stone / rock	2	AO2 4.6.3.5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.2	120 × 17 2040 (mm) 2.04 (metres)	allow conversion to metres at any stage allow correct conversion of incorrectly calculated length	1 1 1	AO2 4.6.3.5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.3	phylum family	in this order only	1 1	AO1 4.6.3.5 4.6.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.4	any **two** from: • ice age • global warming • volcanic activity • asteroid collision • new predators • (new) disease / pathogen • competition for mates • lack of habitat **or** habitat change	 } if neither of these, allow climate change for **1** mark ignore weather } if neither of these, allow catastrophic event **or** natural disaster for **1** mark allow named example allow hunters allow named example allow lack of mates ignore competition unqualified ignore environment change allow competition between **ichthyosaurs** for food ignore isolation ignore pollution ignore lack of food	2	AO1 4.6.3.6

Total Question 1	9

4.7.1.1 Communities

AQA Qualifications

GCSE
SCIENCE A / BIOLOGY

BL1HP
Mark scheme

4405 / 4401
June 2014

Version: 1.0 Final

4.7.1.1 Communities

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 Assessment Writer.

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.

Further copies of this Mark Scheme are available from aqa.org.uk

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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 and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded
- the Assessment Objectives 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

Full marks can be given for a correct numerical answer, without any working shown.

However, if the answer is incorrect, mark(s) can be gained by correct substitution / working and this is shown in the 'extra information' column or by each stage of a longer calculation.

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 e.c.f. 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 Ignore / Insufficient / Do <u>not</u> allow

Ignore or insufficient are 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.

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

Quality of Written Communication and levels marking

In Question 2 students are required to produce extended written material in English, and will be assessed on the quality of their written communication as well as the standard of the scientific response.

Students will be required to:

- use good English
- organise information clearly
- use specialist vocabulary where appropriate.

The following general criteria should be used to assign marks to a level:

Level 1: basic

- Knowledge of basic information
- Simple understanding
- The answer is poorly organised, with almost no specialist terms and their use demonstrating a general lack of understanding of their meaning, little or no detail
- The spelling, punctuation and grammar are very weak.

Level 2: clear

- Knowledge of accurate information
- Clear understanding
- The answer has some structure and organisation, use of specialist terms has been attempted but not always accurately, some detail is given
- There is reasonable accuracy in spelling, punctuation and grammar, although there may still be some errors.

Level 3: detailed

- Knowledge of accurate information appropriately contextualised
- Detailed understanding, supported by relevant evidence and examples
- Answer is coherent and in an organised, logical sequence, containing a wide range of appropriate or relevant specialist terms used accurately.
- The answer shows almost faultless spelling, punctuation and grammar.

Question	Answers	Extra information	Mark	AO / spec ref.
1(a)	3-layered triangular pyramid	as blocks or layered triangle, ignore (small) gaps between layers	1	AO2 1.5.1b
	(pyramid) labelled in food chain order	all three labels are required for **2** marks the pyramid must be fully correct	1	
1(b)(i)	C		1	AO3 1.5.1c
1(b)(ii)	shortest **or** fewest stages / transfers / (trophic) levels	allow only if (b)(i) is C or blank	1	AO1 / AO2 1.5.1c
	less losses in waste / faeces / urine / CO_2 / excretion	allow smaller amount uneaten	1	
	less loss in respiration / heat / movement	allow less lost keeping warm do **not** allow energy for respiration do **not** allow respiration makes energy	1	
		allow less loss (of biomass / energy) **or** less transfer (of biomass / energy) to surroundings if neither 2nd nor 3rd point given, for **1** mark		
Total			**6**	

<table>
<tr><th>Question</th><th>Answers</th><th>Extra information</th><th>Mark</th><th>AO / spec ref.</th></tr>
<tr><td>2</td><td colspan="2">Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 5 and apply a ‘best-fit’ approach to the marking.</td><td>6</td><td>AO1
1.4.1d,f</td></tr>
<tr><td>0 marks</td><td>Level 1 (1-2 marks)</td><td>Level 2 (3-4 marks)</td><td>Level 3 (5-6 marks)</td><td></td></tr>
<tr><td>No relevant content.</td><td>At least one way in which animals and / or plants are adapted to survive.</td><td>A description of ways in which animals and / or plants are adapted and an attempt to link at least one adaptation to how it increases the chance of survival.</td><td>A description of ways in which animals and plants are adapted and a description of how at least one adaptation increases the chance of survival.</td><td></td></tr>
<tr><td colspan="2">examples of biology points made in the response:
(animals)
• (A) change / decrease in surface area / example
○ (decrease in surface area which) reduces area from which sweat / water may be lost
• (A) hump with fat / fat stores
○ (fat in hump) to convert to water (via respiration)
• (A) long eyelashes
○ (long eyelashes) to keep (wind-blown) dust out of eyes
• (A) nocturnal / ‘keep out of the sun’
○ reduce sweat loss (in heat of the day)

(plants)
• (A) decrease in surface area
• (A) leaves are spikes
○ (reduced area / leaves are spikes) reduces water loss / transpiration / evaporation
• (A) long / wide spread / extensive roots
○ (long / wide spread /extensive roots) to absorb (more) water
• (A) fleshy / thick stem
○ (fleshy / thick stem) to store water</td><td colspan="2">extra information
allow adaptations of specific animals to living in specified dry conditions, eg a desert
• (A) change / increase in surface area / example
○ (increase in surface area which) increases area heat may be lost from (by radiation)
• (A) changes to thickness of insulating coat
○ (thicker coat on upper surface) increases insulation from sun’s heat
• (A) thin (layer) / reduced amount of body fat
○ (reduced amount of body fat which) reduces insulating layer
• (A) wide feet
○ (wide feet) to reduce pressure / spread weight / prevent sinking

allow adaptations of specific plants to living in specified dry conditions, eg a desert
• (A) thick wax
○ (thick wax) to reduce evaporation / water loss / transpiration
• (A) few(er) stomata
○ (few stomata) to reduce evaporation / water loss / transpiration</td><td></td></tr>
<tr><td>Total</td><td></td><td></td><td>6</td><td></td></tr>
</table>

4.7.1.1 Communities

MARK SCHEME – GCSE Science A / Biology – BL1HP – JUNE 2014

Question	Answers	Extra information	Mark	AO / spec ref.
3(a)	microorganisms	allow microbes / bacteria / fungi / decomposers	1	AO1 / AO2 1.6.1b
	(microorganisms) respire	do **not** allow dead plants respire	1	
	(respiration / decay / microorganisms) releases (thermal) energy / 'heat'	ignore produce 'heat' do **not** allow produce energy do **not** allow dead plants release 'heat'	1	
3(b)(i)	any **three** from: • (opening) allows oxygen in		3	AO1 / AO2 / AO3
	• microorganisms / eggs need oxygen	allow air for oxygen		1.6.1b, c, 1.6.2
	• oxygen needed for respiration			
	• (opening) allows release of carbon dioxide (from microorganisms / respiration / eggs)	allow gaseous exchange (1 mark) of / for microorganisms / eggs (1 mark) if none of first four points given		
	• (opening) allows energy / 'heat' to escape • (closing) retains energy / 'heat' if too cool / at night	if no mark awarded for either of these points allow 1 mark for vents open in the day to prevent overheating **and** close at night to prevent it getting too cold		
	• (closing) retains moisture	allow (opening) releases moisture		
3(b)(ii)	any **one** from: • maintains sex balance	e.g. equal / best / correct numbers of male and female	1	AO3 1.6.1
	• (survival of species depends on there being) males and females in population	allow so the offspring are not all the same sex		
Total			**7**	

4.7.1.1 Communities

MARK SCHEME – GCSE Science A / Biology – BL1HP – JUNE 2014

Question	Answers	Extra information	Mark	AO / spec ref.
4(a)	mumps rubella / German measles	in either order both needed for the mark ignore measles unqualified	1	AO1 1.1.2l
4(b)(i)	80(.0)	allow **1** mark for $\frac{504}{630}$ **or** 0.8	2	AO2 1.1.2
4(b)(ii)	less chance of epidemic / pandemic **or** less chance of spread of disease / measles / mumps / rubella	allow idea of herd immunity (increased protection for those who are not vaccinated) ignore less chance of getting the disease **or** to eradicate the disease	1	AO2 1.1.2e,l
4(c)(i)	dead / inactive pathogens / viruses / bacteria	allow antigens / proteins from pathogens / viruses / bacteria ignore microorganisms	1	AO1 1.1.2l
4(c)(ii)	white blood cells produce <u>antibodies</u> antibodies produced rapidly (on re-infection) **or** response rapid (on re-infection) these antibodies kill pathogens / viruses / bacteria	 allow ecf if antibodies incorrectly identified in first marking point do **not** accept idea that original antibodies remain in blood and kill pathogens	1 1 1	AO1 1.1.2c, d,e,l
4(d)(i)	antibiotics don't kill viruses (because measles) virus / pathogen lives inside cells	allow antibiotics only kill bacteria allow antibiotics do not work inside cells **or** killing virus / pathogen would kill / damage cell	1 1	AO1 / AO2 1.1.2h
4(d)(ii)	(bacteria / pathogens) develop resistance (to antibiotic)	ignore reference to immunity ignore viruses develop resistance	1	AO1 1.1.2i,j
Total			**11**	

Question	Answers	Extra information	Mark	AO / spec ref.
5(a)	motor	allow efferent / postsynaptic allow **another** relay (neurone)	1	AO1 1.2.1d, e
5(b)	release of chemical (from relay neurone)	allow ecf for 'motor' neurone from (a) allow release of neurotransmitter / named example	1	AO1 / AO2 1.2.1e
	chemical crosses gap / junction / synapse	allow diffuses across allow chemical moves to X	1	
	chemical attaches to X / motor / next neurone (causing impulse)		1	
5(c)	(curare) decrease / no contraction	accept (muscle) relaxes	1	AO2 / AO3 1.2.1e
	(strychnine) increase / more contraction	if no other mark awarded allow 1 mark for (curare) decrease / no response **and** (strychnine) increase / more response	1	
Total			**6**	

4.7.1.1 Communities

MARK SCHEME – GCSE Science A / Biology – BL1HP – JUNE 2014

Question	Answers	Extra information	Mark	AO / spec ref.
6(a)(i)	idea of poor sleeping	allow as a sleeping pill	1	AO1 1.3.1d
6(a)(ii)	(for) morning sickness (in pregnant women)	ignore sickness unqualified ignore leprosy	1	AO1 1.3.1d
6(a)(iii)	limb abnormalities / defects	accept description e.g. short / no arms / legs ignore disabled / deformed	1	AO1 1.3.1d
6(a)(iv)	drug not tested / trialled on pregnant animals / women	allow not tested for treatment of morning sickness	1	AO3 1.3.1b,d
6(b)(i)	changes to chemical processes	ignore addiction	1	AO1 1.3.1h
6(b)(ii)	dependency on (some) legal drugs is more than / equal to on (some) illegal drugs example of a named legal drug for which dependency is equal to **or** greater than a named illegal drug	allow idea of no / little consistency between dependency and classification allow two pairs of named examples for 2 marks	1 1	AO3 1.3.1e
6(b)(iii)	any **one** from: • the harm it does / harmfulness • effect on health • side effects	ignore cost / addiction / dependency accept (severity of) withdrawal symptoms accept named health effects e.g. mental illness **or** effect on heart / circulatory system	1	AO3 1.3.1f,g
Total			**8**	

4.7.1.1 Communities

MARK SCHEME – GCSE Science A / Biology – BL1HP – JUNE 2014

Question	Answers	Extra information	Mark	AO / spec ref.
7(a)(i)	variation (in population) / mutation		1	AO1 / AO2
	longer nosed individuals get more food / leaves	allow longer nosed individuals more likely to survive	1	1.8.1a,d, e,f
	(these) survivors breed (more)		1	
	pass on genes / alleles / DNA (for long nose)	allow pass on mutation	1	
7(a)(ii)	Phiomia / ancestor stretched its nose (during its lifetime) to reach food / leaves		1	AO1 / AO2
	passed on (stretched nose) to offspring	allow offspring inherit (stretched nose) do **not** allow ref to genes	1	1.8.1c
7(b)(i)		ignore other theories, eg religion		AO1
	insufficient evidence / no proof	do **not** allow no evidence	1	1.8.1b
	mechanism of inheritance not known	allow genes / DNA not discovered	1	
7(b)(ii)	God made all living things / them	allow creationism ignore religion	1	AO1 1.8.1b
Total			9	

Question	Answers	Extra information	Mark	AO / spec ref.
8(a)	any **three** from: • (gene) cut out • (gene / cut out) from (bacterial) chromosome / DNA • ref to enzymes (at any point) • (gene spliced) into maize chromosome / DNA • (gene added) at an early stage of development	accept (gene / cut out) from (bacterial) plasmid	3	AO1 1.7.2d, e
8(b)	any **four** from: • justification based on comparison of the relative merits of at least one advantage and one disadvantage Advantages: • less effort for farmer **or** less likely to harm farmer • (pesticide) always there **or** doesn't wash away • less insects to eat crop / maize **or** carry disease • so greater crop production / yield Disadvantages: • (toxin) kills other insects • so (some) crops don't get pollinated / (sexually) reproduce • possible harm when eaten by humans / animals • damage to food chains • gene may spread to other species	max **3** marks if only advantages or disadvantages given ignore ref to cost allow examples eg no need to spray allow pesticide doesn't contaminate water courses ignore ref to cost allow maize not pollinated allow may have unpleasant taste allow reduced biodiversity	4	AO3 1.7.2e, f
Total			**7**	

4.7.1.1 Communities

Answer 08 · Examiner comments

June 2023 | 8461/1H | Original Q4

Question 4 (Standard, standard/high and high demand)

04.1 Students were asked to explain two effects of anaerobic respiration on the body. Over 87% of students scored some marks on this question but only around 12% managed to score full marks. Many students mentioned lactic acid and were able to put this in the context of oxygen debt or muscle fatigue, though some answers were vague and referred to pain, aches or stitch which were not deemed sufficient to gain credit at this level. Lots of students gave increased breathing and heart rate as effects but less were able to relate this to the reason of needing the oxygen to break down lactic acid. Oxygen debt was frequently referred to but only gained credit as an explanation if reference was made to it being repaid in this context. While a significant number of students referred to 'less energy' being available, very few students correctly linked this idea to 'weaker muscle contractions'.

04.2 This levelled response question required students to design an investigation to show the effects of different exercise on heart rate. Most students attempted an answer, seemingly familiar with such an investigation. Over 16% of students were successful at entering level 3, with around 32% reaching level 2. The main barrier to students achieving higher marks seemed to be using just one athlete for the investigation which then limited the maximum mark achievable, as this would not lead to a valid outcome. Most understood the importance of measuring heart rate before and after exercise, although some students forgot about measuring the initial heart rate first, which again would not lead to a valid outcome. There were many references to technology such as heart rate monitors or watches to measure heart rate, which was creditworthy as long as heart rate was recorded before and after exercise. Students were generally very competent at describing control variables for their investigation.

4.7.1.1 Communities

Answer 08 · Examiner comments

04.3 Nearly 58% of students managed to gain the first marking point about anabolic steroids making athletes faster or stronger, or gave specific descriptions of improved performance or enhanced stamina. Only 6% of students also gained the second marking point, and were able to develop this and explain that the increased muscle mass caused more or stronger muscle contractions. Students must take care not to repeat information in the question stem without adding value to this; thus, an answer stating that anabolic steroids improve performance was insufficient.

04.4 Over 92% of students correctly identified 'hybridoma' as the type of cell created when a mouse lymphocyte and tumour cell combine.

04.5 The process of creating monoclonal antibodies is clearly well known by some students, though others have varied misconceptions including that the lymphocyte or monoclonal antibodies are cloned, rather than the hybridoma. Just under 3% of students were able to get the full 3 marks as a result.
Many students spent a lot of their answer describing that a hybridoma is formed when a mouse lymphocyte and tumour cell combine, but this gained no credit as it had been assessed in the previous question, and so wasted time and answer space. Very few described that the hybridoma is cloned (simply dividing by mitosis was frequently stated but gained no credit). Additionally, very few were able to describe that all the cells produced made the same antibody. The most common point made that gained credit was that monoclonal antibodies need to be purified after collection. This question was set at high demand and required correct use of terminology, which very few students were able to do; consequently, almost 59% of students scored zero marks.

04.6 Almost 90% of students were able to correctly identify that a monoclonal antibody only binds to the anabolic steroid.

04.7 Around 47% of students were able to correctly suggest the purpose of the control area in a test strip, and suggested that it was to show that the test had worked. Some were distracted into giving other irrelevant details of the test process here and discussed the complementary nature of monoclonal antibodies, rather than focus on the question posed.

04.8 Many students were able to give correct evidence with 58% gaining 1 mark. Sadly, less were able to suggest a possible reason for the evidence they had selected and consequently, only around 26% of students successfully gained both available marks. Some students referred to other processes involved in the test when discussing the reason, rather than focussing on the idea of monoclonal antibodies not binding to, or reaching, the control area. Lots of students described the test not being used properly, or the urine not having any steroids in it as their reason, neither of which gained credit.

04.9 Just over 75% of students correctly identified athlete D as testing positive for anabolic steroids.

4.7.1.1 Communities

Answer 09 · Examiner comments

Question 2 (standard demand)

02.1 Some students appeared to be confused as to how decay happens, believing that the dead plant matter would decay itself. However, the majority of students did indicate that some sort of microorganism is involved in the decay process, gaining the third mark in the mark scheme. 40% of students gained at least 2 or more marks overall.

Some students spent time unnecessarily describing the factors needed for decay and often needed to extend their answers onto the additional pages.

There were two routes students could use to gain marks. Many students' answers included elements of both routes, so examiners awarded a mark for the described route which gave the higher mark. In most cases this was the first route given in the mark scheme.

The information in the question told students that layer B contains 'very little oxygen' and 'has a low pH'; thus, simply repeating either of these was insufficient to gain credit. To gain the first mark, students needed to link one of these pieces of information to their own knowledge, either in terms of respiration or in terms of enzymes being denatured or reducing in activity. Many students also gained this first marking point, although some who took the second route demonstrated confusion about what a 'low pH' constitutes, describing it as 'low acidity' or 'being 'alkaline'.

Achieving marking point 2 proved to be more problematic for many students, most simply by omitting any reference to energy or metabolism. Students should be advised that when referring to respiration in their answers (as many did), they should then go on to describe the role of respiration: 'releasing energy'. For those who did refer to energy, it was noted that very few described energy being 'produced', which is never acceptable as this would contradict the principle of conservation of energy.

02.2 Just under 70% of students identified the correct answer regarding the approximate biomass of moss that becomes biomass in primary consumers.

02.3 Half of students identified DNA as a substance that can be made using phosphates.

02.4 Around 65% of students could identify protein as the substance that can be made using nitrogen.

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4.7.1.1 Communities

Answer 09 · Examiner comments June 2024 | 8461/2H | Original Q2

02.5 This was a well answered question, with almost all students gaining at least one mark, and 65% of those gaining three or more marks. A number of students described a rise in temperature of the Earth's atmosphere, gaining marking point 1.

It should be noted that the 'greenhouse effect' and 'climate change' are not equivalent to 'global warming'. A significant number of students attempted to describe the mechanism of global warming. This was often confused, including references to the 'ozone layer' and incorrect descriptions of long and short-wave radiation. However, such descriptions are beyond the requirements of the specification, so were ignored.

Students who merely repeated the information that the peat bog 'contains' carbon dioxide and methane could not be awarded marking points 2 or 4. Instead further added value was required, in that these gases would be 'released' from the peat when the bog was destroyed. A significant number of students omitted any reference to methane, so were unable to gain marking point 4.

Again, students should be advised that repeating the information in the question will not gain credit, such as those that described 'the use of peat as a fuel' releasing carbon dioxide. To gain credit here, students needed to indicate that the peat would have to be 'burned' to produce carbon dioxide. In this case, examiners ignored the idea that burning would also release (trapped) methane, as this would inevitably also be burned, releasing more carbon dioxide.

Answer 10 · Examiner comments June 2025 | 8461/2H | Original Q1

Question 1 (Standard demand)

01.1
This question required students to apply their knowledge of fossil formation to the specific example of an ichthyosaur fossil.

4.7.1.1 Communities

Answer 10 · Examiner comments

Only two steps in the fossilisation process were required to score full marks, so misunderstanding or omission of one step, was not critical. Almost a third of students achieved both marks.

Many students showed good knowledge of the first step in fossil formation, often referring to sediment, or an appropriate synonym; however, some also referred to the dead animal being buried in 'rock' or in 'rocks' which disqualified this idea. Whether this burying occurred before or after decay was not important in the award of the mark.

Although many students were aware that the dead ichthyosaur had decayed, they were often imprecise in terms of what had decayed. Many described the whole 'body' or the 'tissues' decaying, which implied that both soft and hard material decays. Some were able to recover this point with statements such as 'the body decays, leaving the bones behind'. Very few students referred to the soft tissues being eaten (by detritivores).
Students were commonly well versed in the idea of mineralisation of bones.
There were some excellent answers showing that students had revised this topic well, often giving all three points on the mark scheme in clear and concise detail.

01.2
Students were provided with the length of the fossil image and the relevant magnification factor and were required to calculate the real length of the fossil.
The majority of students completed this calculation well with a pleasing 80% gaining all 3 available marks. The most common error was in converting millimetres to metres, where a conversion factor of 100 was not uncommon. Some students completed the conversion in two steps, first converting to centimetres, then to millimetres, perhaps showing a lack of confidence in their maths, at the start of the paper.
A not uncommon error was for students to use the magnification equation, with the two values as numerator and denominator. It was rare then, for students to attempt to convert their answer to metres.

01.3
Students were required to recall the classification hierarchy, completing a partial classification using given terms.
This was very well attempted with nearly 90% of students gaining both marks. It was clear that many students had remembered the sequence by using a mnemonic, often written alongside the question. However, less successful students occasionally confused population for phylum, presumably due to the same initial letter.

01.4
Students were required to suggest causes for the extinction of ichthyosaurs, and over 80% of students gained at least one of the available marks.
Although this should not be an unfamiliar question to students who have practised from previous examination papers, the context of the information provided meant that some general answers were insufficient. The information in the question was that ichthyosaurs lived in the sea, consequently 'drought' was not credited. Similarly, the information provided stated that ichthyosaurs were in competition with other predators for food, thus a 'lack of food' was ignored, as was the presence of 'predators'. For this last idea, a mark could only be awarded if any predators were described as being 'new'.

4.7.1.1 Communities

Answer 10 · Examiner comments June 2025 | 8461/2H | Original Q1

The question was well answered, common correct responses included reference to ‘disease’, ‘natural disasters’ and ‘habitat loss’, although all of the possible answers were seen frequently.