AQA GCSE Biology | 8461

SPECIFICATION POINT 4.6.3.6

Extinction

Mark schemes and examiner comments

Tier	**Foundation**
Question groups	**37**
Available paper years	**2007–2025**

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.

4.6.3.6 Extinction

Answer 01 · Mark scheme January 2007 | BLY1F | Original Q1 | Legacy

Question 1

	answers	extra information	mark
(a)	any **two** from: • streamlined / shape reduces friction / long and thin / smooth surface OWTTE • fins / flippers / tail / paddle • structures that push against water	do **not** accept 'arms' or 'legs'	2
(b)(i)	any **two** from: fossil has hind limb / legs / feet fossil has more ribs / bones fossil has teeth fossil has curved spine	it = minke accept any valid comparison	2
(b)(ii)	billion give evidence for		1 1
total			6

4.6.3.6 Extinction

Answer 02 · Mark scheme January 2007 | BLY1F | Original Q7 | Legacy

Question 7

	answers	extra information	mark
(a)	any **two** from: • burning • activity of microbes / microbial respiration • less photosynthesis **or** trees take in CO_2 **or** less CO_2 locked up in wood • CO_2 given off by clearing machinery	ignore CO_2 release unqualified do **not** accept CO_2 taken in for respiration	2
(b)(i)	range of different species	accept idea of variety of organisms or plants or animals	1
(ii)	any **one** from: • organisms may produce substances useful to humans • duty to preserve for future generations • effect on other organisms e.g. food chain effects • loss of environmental indicators	do **not** accept if food is only example ignore effect on human food supply	1
total			4

4.6.3.6 Extinction

Answer 03 · Mark scheme June 2007 | BLY1B | Original Q8 | Legacy

Eight	**2**	**2**	**4**	**4**

Answer 04 · Mark scheme November 2007 | BLY1B | Original Q6 | Legacy

Six	**A**	a recent photograph of an ivory-billed woodpecker	**3**
	B	people claiming to have seen the ivory-billed woodpecker	**4**
	C	the distinct bird calls	**1**
	D	the knocking on the trunk of a tree	**2**

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

Answer 05 · Mark scheme November 2007 | BLY1B | Original Q8 | Legacy

Eight	**4**	**2**	**3**	**2**

4.6.3.6 Extinction

Answer 06 · Mark scheme

Question 2

	answers	extra information	mark
(a)	long hind legs / muscular hind legs / bent hind legs	accept powerful hind legs accept back legs act as spring	1
(b)	colour / markings warns predators not to eat it	allow animals learn not to eat them ignore camouflage	1
(c)(i)	any **two** from: • loss of habitat • climate / environment change • pollution	allow <u>new</u> disease allow <u>new</u> predators ignore lack of food **or** eaten	2
(c)(ii)	eg may have chemicals useful to humans	accept duty to keep for future generations allow food chain (effects)	1
total			5

4.6.3.6 Extinction

Answer 06 · Mark scheme

January 2008 | BLY1F | Original Q2 | Legacy

BLY1F

Answer 07 · Mark scheme

June 2008 | BLY1BP | Original Q4 | Legacy

Four	**A**	Homo sapiens	**3**
	B	Australopithecus robustus	**4**
	C	Australopithecus afarensis	**1**
	D	Homo habilis	**2**

Answer 08 · Mark scheme

June 2008 | BLY1BP | Original Q5 | Legacy

Five	**A**	extinction	**4**
	B	natural selection	**1**
	C	mutation	**3**
	D	variation	**2**

4.6.3.6 Extinction

Answer 09 · Mark scheme

June 2008 | BLY1F | Original Q4 | Legacy

question	answers	extra information	mark
4(a)(i)	40 – 42		1
4(a)(ii)	Palaeocene		1
4(a)(iii)	bush babies		1
4(b)	any **two** from: • religious objections • insufficient evidence • mechanism of heredity not known	allow 'could not prove' ignore 'no evidence'	2
Total			**5**

4.6.3.6 Extinction

Answer 09 · Mark scheme

June 2008 | BLY1F | Original Q4 | Legacy

COMPONENT NUMBER: BLY1F

COMPONENT NAME: Science B / Biology

STATUS: Final

DATE: June 2008

4.6.3.6 Extinction

Answer 10 · Mark scheme

January 2009 | BLY1F | Original Q2 | Legacy

question	answers	extra information	mark
2(a)	fuel / houses / paper	allow any object made from wood	1
	farming / agriculture / replanting	allow roads / homes / factories	1
	carbon dioxide / greenhouse gas / pollution **or** relative named pollutant		1
	warming / temperature increase		1
2(b)(i)	none of species left / died out		1
2(b)(ii)	may have products useful to humans / examples	allow preserve for future generations **or** 'still there to look at' allow affect food chains / cycles **or** extinction of other species allow non human reasons eg loss of habitat ignore environmental effects	1
Total			**6**

4.6.3.6 Extinction

Answer 10 · Mark scheme

January 2009 | BLY1F | Original Q2 | Legacy

Biology BLY1F - AQA GCSE Mark Scheme 2009 January Series

COMPONENT NUMBER: BLY1F

COMPONENT NAME: Science B / Biology

STATUS: Final

DATE: January 2009

Answer 11 · Mark scheme

June 2009 | BLY1BP | Original Q4 | Legacy

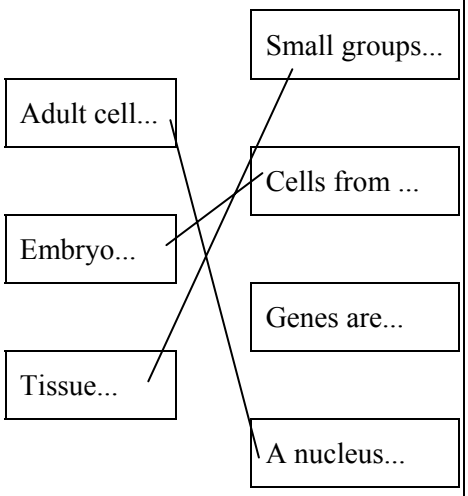
Four	**A** when trilobites first appeared on the Earth	**4**
	B when trilobites had finally become extinct	**1**
	C when there were most groups of trilobites	**3**
	D the beginning of the largest scale extinction of trilobite groups	**2**

4.6.3.6 Extinction

Answer 12 · Mark scheme

June 2009 | BLY1F | Original Q4 | Legacy

Question 4

question	answers	extra information	mark
4(a)	killed by poachers / killed for tusks less trees / leaves to eat land available disappearing	 ignore feed on lots of leaves 	1 1 1
4(b)		all three correct = **3** marks two correct = **2** marks one correct = **1** mark extra line from a statement cancels the mark	max 3
Total			**6**

4.6.3.6 Extinction

Answer 12 · Mark scheme June 2009 | BLY1F | Original Q4 | Legacy

BLY1F

Answer 13 · Mark scheme November 2009 | BLY1BP | Original Q4 | Legacy

Four	**A**	evolution	**1**
	B	extinction	**3**
	C	natural selection	**4**
	D	reproduction	**2**

Answer 14 · Mark scheme November 2009 | BLY1BP | Original Q8 | Legacy

Eight	**4**	**4**	**2**	**3**

4.6.3.6 Extinction

Answer 15 · Mark scheme

Question 4

question	answers	extra information	mark
4(a)	sexual		1
4(b)	chromosome		1
4(c)(i)	any **two** from: • genetic-engineering can produce fast-growing food animals • genetic engineering can be used to clone animals in danger of extinction • using GM animals can reduce the number of animals used in medical research	ignore answers that do not relate to list	2
4(c)(ii)	GM animals might escape and breed with wild animals animals have the right to be free from genetic modification	ignore answers that do not relate to list	1 1
Total			**6**

4.6.3.6 Extinction

Answer 15 · Mark scheme January 2010 | BLY1F | Original Q4 | Legacy

BLY1F

Question5

Answer 16 · Mark scheme March 2010 | BLY1BP | Original Q5 | Legacy

Five	**A** sexual reproduction	**2**	
	B tissue culture	**3**	
	C embryo transplants	**1**	
	D adult cell cloning	**4**	
	A	**B**	**C**	**D**

Answer 17 · Mark scheme June 2010 | BLY1BP | Original Q6 | Legacy

No matching mark scheme was available in the supplied archive for this question.

Answer 18 · Mark scheme November 2010 | BLY1BP | Original Q3 | Legacy

Three	**A** extinction	**4**
	B mutation	**1**
	C natural selection	**3**
	D variation	**2**

Answer 19 · Mark scheme November 2010 | BLY1BP | Original Q6 | Legacy

Six	**4**	**4**	**3**	**2**

Answer 20 · Mark scheme June 2011 | BLY1BP | Original Q5 | Legacy

Five	**A** extinction	4	
	B mutation	2	
	C reproduction	3	
	D variation	1	
	A	**B**	**C**	**D**

Answer 21 · Mark scheme November 2011 | BLY1BP | Original Q7 | Legacy

Seven	**3**	**4**	**2**	**3**

4.6.3.6 Extinction

Answer 22 · Mark scheme

June 2012 | BL1FP | Original Q4 | Legacy

Question 4

question	answers	extra information	mark
4 (a)	too cold / very cold **or** oxygen / microbes cannot reach it	allow not enough energy / heat / warmth ignore frozen	1
	for microorganisms / microbes / bacteria / fungi / enzyme / reaction (to work)	ignore other consumers	1
4 (b)	no longer exist **or** no more left **or** died out / all died	ignore died unqualified	1
4 (c)(i)	egg cell		1
4 (c)(ii)	nucleus		1
4 (c)(iii)	given an electric shock		1
4 (c)(iv)	womb		1
4 (d)	has mammoth genes / chromosomes	accept genetic information / DNA / alleles / nucleus accept converse	1
Total			**8**

4.6.3.6 Extinction

Answer 22 · Mark scheme

June 2012 | BL1FP | Original Q4 | Legacy

BL1FP

4.6.3.6 Extinction

Answer 23 · Mark scheme

June 2012 | BL2FP | Original Q3 | Legacy

Question 3

question	answers	extra information	mark
3(a)	remains of an organism **or** bone / shell / hard part of an organism / impression further detail – eg in rock / from a long time ago	 if numbers, greater or equal to hundreds of years allow made of minerals ignore over time ignore fossil are rocks	1 1
3(b)(i)	D		1
3(b)(ii)	B		1
3(b)(iii)	predation / disease / lack of food / competition / loss of habitat / climate change / catastrophic event – or volcanic eruption / flood / drought / temperature change / weather change / ice age / change in atmosphere	ignore human effects ignore pollution effects / acid rain ignore human effects allow natural disaster	1
3(c)	C = 'widest' thickest / wider thicker column **or** more fossils (of type C found)	allow biggest / er	1
3(d)	members of the groups have similar physical structures	extra box ticked – cancel	1
Total			**7**

4.6.3.6 Extinction

Answer 23 · Mark scheme

June 2012 | BL2FP | Original Q3 | Legacy

BL2FP

4.6.3.6 Extinction

Answer 24 · Mark scheme

January 2013 | BL2FP | Original Q3 | Legacy

Question 3

question	answers	extra information	mark
3(a)(i)	animal walking on soft material **or** suitably named material **or** further detail – eg dries out / buried / hardens / turns to rock	 do **not** allow general descriptions of how fossils are formed **or** reference to bones not decaying	1
3(a)(ii)	any **one** from: • (from) bones / shells / hard parts **or** from parts that do not decay / rot or are preserved • animal trapped in resin / amber / ice / peat • infiltration with minerals / named	 ignore imprint / impression allow frozen	1
3(b)	any **two** from: examples of physical factors such as flooding, volcanic activity (allow volcanoes) asteroid collision, drought, ice age / temperature change examples of biological factors such as predators (allow hunters), disease / named pathogen, competition lack of food / mates, cyclical nature of speciation / isolation / lack of habitat or habitat change	 accept 2 physical factors or 2 biological factors or one of each for full marks ignore pollution If no other answers given allow natural disaster / climate change / weather change / catastrophic event / environmental change for **1** mark	2

Question 3 continues on the next page . . .

4.6.3.6 Extinction

Question 3 continued . . .

question	answers	extra information	mark
3(c)	older fossils simpler **or** change (with time)	to gain the mark there must be implication of change ignore evolve ignore extinction	1
3(d)	insufficient / no evidence / no remains **or** fossils survive	ignore no people were there allow no proof	1
Total			**6**

4.6.3.6 Extinction

Answer 24 · Mark scheme January 2013 | BL2FP | Original Q3 | Legacy

BL2FP

4.6.3.6 Extinction

Answer 25 · Mark scheme

June 2013 | BL2FP | Original Q2 | Legacy

Question 2

question	answers	extra information	mark
2(a)(i)	(remains of) an organism / a bone / a shell / hard part of an organism / part of organism that does not decay / impression of an organism / footprint / burrow / rootlet trace further detail – eg in rock / ice/ amber / mineralisation **or** from a long time ago / many years ago	 if number, > 1000 years ignore hundreds	1 1
2(a)(ii)	older fossils are simple(r) **or** fossils show change / adaptation with time	must make ref to change and time allow deeper fossils are simple(r)	1
2(b)(i)	18 to 30	allow 30 to 18 allow 12 ignore units	1
2(b)(ii)	small sample	allow only 49 shells / not representative / not enough evidence allow not all fossils found	1
2(c)	example of a physical factor such as flooding, volcanic activity (allow volcanoes) asteroid collisions, drought, ice age / temperature change **or** example of a biological factor such as predators / disease / competition / lack of food or mates / cyclical nature of speciation / isolation / lack of habitat or habitat change	allow natural disaster / climate change / weather change / catastrophic event / environmental change ignore human factors eg hunting / pollution	1
Total			**6**

4.6.3.6 Extinction

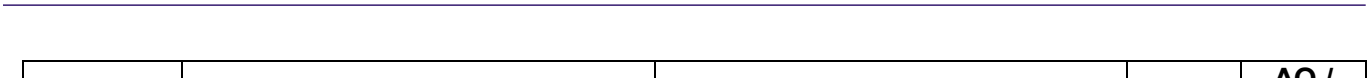
Answer 26 · Mark scheme June 2014 | BL1FP | Original Q6 | Legacy

Question	Answers	Extra information	Mark	AO / spec ref.
6(a)(i)	(volume) increases (with time)	ignore numbers	1	AO2 1.8.1
6(a)(ii)	there is more evidence / specimens / results (for Homo sapiens)	allow examples of this, eg more / better fossils allow converse if clearly referring to Australopithecus ignore reference to being 'more recent'	1	AO3 1.8.1
6(b)	2.5 – 3.15 (million years ago)	accept any number in range	1	AO3 1.8.1
6(c)(i)	Darwin		1	AO1 1.8.1a
6(c)(ii)	any **one** from: • they believed in other theories • insufficient evidence • no proof • genes / mechanism of inheritance not known / discovered	 allow they believe that God made all life ignore 'no evidence' allow not enough proof	1	AO1 1.8.1b
Total			**5**	

4.6.3.6 Extinction

Answer 26 · Mark scheme

June 2014 | BL1FP | Original Q6 | Legacy



4.6.3.6 Extinction

Answer 27 · Mark scheme June 2014 | BL2FP | Original Q4 | Legacy

4(a)	fossils show change over time.		1	AO1 2.8
4(b)	covered in sediment / mud or sinks into the mud soft parts decay / are eaten **or** bones / hard parts / shell do not decay minerals enter bones / parts are replaced by minerals / mineralisation	 accept turns to rock allow 'is an impression' / 'imprint' / 'cast'	1 1 1	AO1 / AO2 2.8.1a, b
4(c)	skin is soft / skin not preserved / not fossilised / skin decays	accept not enough / no evidence / no-one has seen one allow 'this fossil is only bones'	1	AO3 2.8, 2.8.1c
4(d)	any **two** examples of: physical factors such as volcanic activity (allow volcanoes) / earthquakes / asteroid (collision) / ice age / temperature change **and / or** biological factors such as predators / disease / named pathogen / competition/ lack of food / mates / cyclical nature of speciation / isolation / lack of habitat or habitat change	accept 2 physical factors or 2 biological factors or one of each for full marks ignore pollution if no other answers given allow natural disaster / climate change / weather change / catastrophic event / environmental change for 1 mark	2	AO1 2.8.1e
Total			**7**	

4.6.3.6 Extinction

Answer 27 · Mark scheme

June 2014 | BL2FP | Original Q4 | Legacy

Question	Answers	Extra information	Mark	AO / spec ref.

4.6.3.6 Extinction

Answer 28 · Mark scheme June 2015 | BL2FP | Original Q6 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
6(a)(i)	any **two** from: • trapped / held (since sticky) • engulfed / covered by resin • prevented decay	allow engulfed / covered by amber	2	AO2 / AO3 2.8.1b
6(a)(ii)	any **two** from: • animal / plant (dies and) body covered in sediment / mud • bones / shells / hard parts do not decay • minerals enter bones / parts are replaced by other materials / mineralisation • preserved traces / footprints / burrows / rootlet traces / impressions / casts	ignore ref to rock allow covered in tar / ice	2	AO1 2.8.1b
6(b)(i)	New technology provides more valid evidence.		1	AO3 2.8

4.6.3.6 Extinction

Answer 28 · Mark scheme

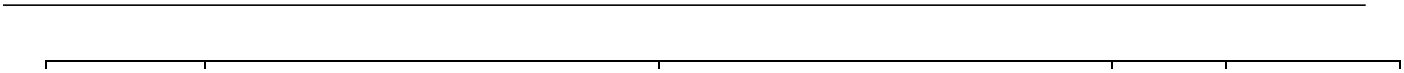
June 2015 | BL2FP | Original Q6 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
6(b)(ii)	any **three** from: examples of physical factors, eg • flooding • drought • ice age / temperature change examples of biological factors, eg • (new) predators (allow hunters) • (new) disease / named pathogen • competition for food • competition for mates • cyclical nature of speciation • isolation • lack of habitat or habitat change	accept 3 physical factors or 3 biological factors or some of each for full marks ignore pollution competition must be qualified **if no other answers given allow** natural disaster / weather change / catastrophic event / environmental change / climate change for **1** mark	3	AO1 2.8.1e
Total			**8**	

4.6.3.6 Extinction

Answer 28 · Mark scheme

June 2015 | BL2FP | Original Q6 | Legacy



4.6.3.6 Extinction

Answer 29 · Mark scheme

June 2016 | BL2FP | Original Q5 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
5(a)(i)	reduced photosynthesis	ignore growth do **not** allow need light for respiration	1	AO2 2.3.1a/b 2.8.1e
5(a)(ii)	less food (for animals) **or** less oxygen (for animals)	allow loss of habitat	1	AO2 2.3.1a/b 2.8.1e
5(a)(iii)	any **two** from: examples of physical factors, eg • flooding • drought • ice age / temperature change • volcanic activity examples of biological factors, eg • (new) predators (allow hunters / poachers) • (new) disease / named pathogen • competition for food • competition for mates • cyclical nature of speciation • isolation • lack of habitat or habitat change	accept 2 physical factors or 2 biological factors or one of each for full marks ignore pollution If no other answers given allow natural disaster / climate change / weather change / catastrophic event / environmental change for **1** mark	2	AO1 2.8.1e
5(b)(i)	3		1	AO2 2.8.1e
5(b)(ii)	fossils	ignore bones, remains, fossil fuels	1	AO1 2.8.1a/e

4.6.3.6 Extinction

Answer 29 · Mark scheme

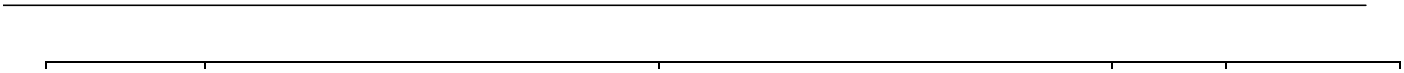
June 2016 | BL2FP | Original Q5 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
5(c)(i)	65 million years ago		1	AO2 2.8.1e
5(c)(ii)	17	allow ecf	1	AO2 2.8.1e
5(c)(iii)	fossil record incomplete **or** some fossils destroyed	accept not enough evidence **or** cannot perform experiment to test	1	AO3 2.8 2.8.1a/e
Total			**9**	

4.6.3.6 Extinction

Answer 29 · Mark scheme

June 2016 | BL2FP | Original Q5 | Legacy



4.6.3.6 Extinction

Answer 30 · Mark scheme

June 2017 | BL2FP | Original Q2 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
2(a)(i)	remains of an organism (which was alive) a long time ago	allow skeleton / shell / impression if years given, must be >1000	1 1	AO1 2.8.1b
2(a)(ii)	(**Y** was) found in deeper / older rock layer		1	AO3 2.8 2.8.1a/d
2(a)(iii)	The fossils of animals **Y** and **Z** have many features in common The fossil of animal **Y** is more complex than the fossil of animal **Z**		1 1	AO3 2.8 2.8.1a/d

4.6.3.6 Extinction

Answer 30 · Mark scheme

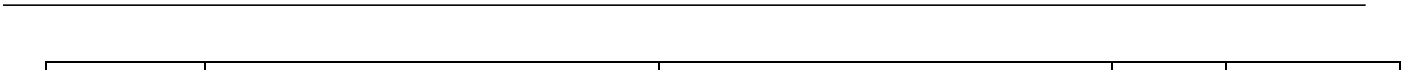
June 2017 | BL2FP | Original Q2 | Legacy

2(b)(i)	any **two** from: examples of physical factors, e.g. • flooding • volcanic activity (allow volcanoes) • asteroid collision • drought • ice age / temperature change / global warming • tsunami / earthquake / tornado examples of biological factors e.g. • predators / hunters / poachers • disease / named pathogen • competition for **or** lack of food / water • competition for mates **or** lack of mates • cyclical nature of speciation • lack of habitat **or** habitat change **or** deforestation	allow 2 physical factors or 2 biological factors or one of each for full marks ignore pollution ignore nuclear explosions ignore natural selection if no other answers given allow natural disaster / climate change / weather change / catastrophic event / environmental change for **1** mark	2	AO1 2.8 2.8.1e
2(b)(ii)	lack of evidence **or** no-one was there to observe it happening **or** cannot perform experiment to test		1	AO3 2.8 2.8.1e
Total			**8**	

4.6.3.6 Extinction

Answer 30 · Mark scheme

June 2017 | BL2FP | Original Q2 | Legacy



4.6.3.6 Extinction

Answer 31 · Mark scheme

June 2018 | 8461/2F | Original Q3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.1	(organism) soft-bodied **or** (fossil) destroyed	allow lack hard parts / skeleton / shell allow (organism) eaten / decayed allow buried (very) deep allow they are (very) small	1	AO1 4.6.3.5
03.2	any **two** from: • the fish (dies) buried in sediment / sand / mud • (only) the soft parts decayed / eaten **or** the hard parts / bones did not decay or were not eaten • mineralisation occurred	allow other examples of sediments do **not** accept rock(s) allow description of mineralisation eg bones turned to stone allow imprinted (in the sediment)	2	AO2 4.6.3.5
03.3	any **two** from: • drought • ice age / global warming • volcanic activity • asteroid / meteor collision • (new) predators • (new) disease / named pathogen • competition for food • competition for mates • lack of habitat or habitat change	ignore pollution allow earthquakes / tsunami allow hunters / poachers allow eaten allow lack of food allow isolation or lack of mates if no other marks awarded allow natural disaster / climate change / weather change / catastrophic event / environmental change for **1** mark	2	AO1 4.6.3.6

4.6.3.6 Extinction

Answer 31 · Mark scheme

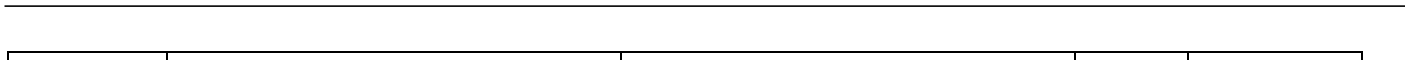
June 2018 | 8461/2F | Original Q3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.4	a change in a gene		1	AO1 4.6.2.1
03.5		allow in terms of an example		AO1 4.6
	there is variation (between members of a species)	allow mutation	1	4.6.2.2 4.6.3.1
	better adapted survive	allow 'survival of the fittest'	1	
	(reproduce and) pass on (favourable) allele(s) / gene(s) / mutation(s) / DNA / genetic material	ignore pass on characteristic(s)	1	
Total			9	

4.6.3.6 Extinction

Answer 31 · Mark scheme

June 2018 | 8461/2F | Original Q3



4.6.3.6 Extinction

Answer 32 · Mark scheme

June 2019 | 8461/2F | Original Q5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	Raphus		1	AO2 4.6.4
05.2	any **two** from: • humans hunted / killed / ate the dodo **or** dodo easy to catch • humans ate / collected eggs • humans ate the dodo's food • animals brought by humans ate dodo / eggs • diseases introduced by humans **or** by imported animals • humans destroyed dodo's habitat / nests	allow examples – eg cats / dogs / pigs / rats allow deforestation	2	AO2 4.6.3.6
05.3	any **one** from: • growing crops / biofuels • grazing animals • building houses • quarrying / mining • dumping waste	allow farming / agriculture allow other correct examples – eg building roads	1	AO1 4.7.3.3 4.7.3.4
05.4	there is less photosynthesis the trees are burned		1 1	AO2 4.4.1.1 4.4.1.2 4.7.3.4 4.7.3.5
05.5	increase		1	AO1 4.7.3.5
05.6	9 × 30 270	an answer of 270 scores **2** marks	1 1	AO2 4.7.3.4 4.7.3.6

4.6.3.6 Extinction

Answer 32 · Mark scheme

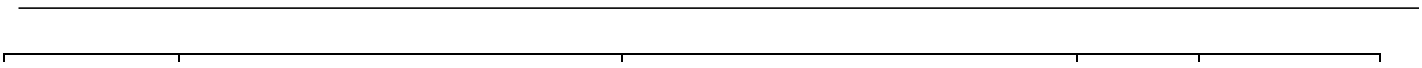
June 2019 | 8461/2F | Original Q5

Question	Answers	Mark	AO / Spec. Ref.
05.7	**Level 2:** Relevant points (reasons/causes) are identified, given in detail and logically linked to form a clear account.	3–4	AO3
	Level 1: Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.	1–2	
	No relevant content	0	
	Indicative content • displaced animals can move to adjacent areas • where suitable habitat is found **or** where the trees have not been cut down • seeds return to deforested area • from other (forested) areas • plants / trees begin to grow back • so provide food / shelter / nest sites / suitable habitat for animals • animals return to re-growing area • from other (forested) areas • sufficient time for regeneration • old growth area is a source of recolonising organisms		4.7.3.1 4.7.3.4 4.7.3.6
Total			**13**

4.6.3.6 Extinction

Answer 32 · Mark scheme

June 2019 | 8461/2F | Original Q5



4.6.3.6 Extinction

Answer 33 · Mark scheme

November 2020 | 8461/2F | Original Q6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1	*Elasmotherium*		1	AO2 4.6.4
06.2	eukaryota		1	AO2 4.6.4
06.3	Carl Woese		1	AO1 4.6.4
06.4	any **one** from: • fighting / competing for mates / food / territory • to kill predators / prey	allow for defence / protection	1	AO2 4.7.1.1 4.7.1.4
6.5	(bones **or** hard tissues) did not decay	allow soft tissues decayed **or** were eaten allow other parts decayed or were eaten allow horn could be damaged / lost in fighting	1	AO1 4.6.3.5
06.6	any **one** from: • compare to other fossils of known age • by the age of the rocks (where fossil was found)	allow compare with the fossil record allow depth underground (where fossil was found) allow (radio)carbon / isotope dating allow DNA analysis	1	AO2 4.6.3.5 4.6.3.6

4.6.3.6 Extinction

Answer 33 · Mark scheme

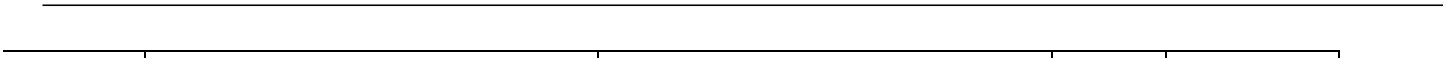
November 2020 | 8461/2F | Original Q6

06.7 mark with 06.8	0.05 (million years ago)		1	AO2 4.6.3.6
06.8 mark with 06.7	0.2 – 0.05 0.15 150 000 (years)	allow 0.05 × 3 allow ecf from question **06.7** allow 0.15 million (years)	1 1 1	AO2 4.6.3.6
06.9	any **two** from: • drought • ice age / global warming • volcanic activity • asteroid / meteor collision • (new) predators • (new) disease • competition for food • competition for mates • lack of habitat **or** habitat change	ignore pollution allow earthquakes / tsunami allow hunters / poachers / eaten allow named pathogen allow lack of food allow isolation **or** lack of mates if no other marks awarded allow natural disaster **or** climate change **or** catastrophic event for **1** mark	2	AO2 4.6.3.6
Total			**12**	

4.6.3.6 Extinction

Answer 33 · Mark scheme

November 2020 | 8461/2F | Original Q6



4.6.3.6 Extinction

Answer 34 · Mark scheme

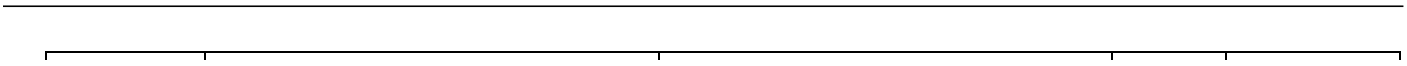
November 2021 | 8461/2F | Original Q1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1	Alfred Russel Wallace Charles Darwin		1 1	AO1 4.6.3.1 4.6.3.2
01.2	remains of an organism from a long time ago	allow remains of an animal / plant allow from thousands / millions of years ago	1 1	AO1 4.6.3.5
01.3	the animal walked on mud		1	AO2 4.6.3.5
01.4	any **two** from: • flooding • drought • ice age • global warming • volcanic activity • asteroid collision • (new) predators • (new) disease / pathogen • competition for food • competition for mates • lack of habitat **or** habitat change	 } if none of these, allow climate change for **1** mark ignore weather } if neither of these, allow catastrophic event **or** natural disaster for **1** mark allow hunters / poachers allow named example allow lack of food allow lack of mates ignore competition unqualified ignore environment change ignore isolation ignore pollution	2	AO1 4.6.3.6
01.5	bacteria can become resistant to an antibiotic older fossils are simpler than more recent ones		1 1	AO1 4.6.2.2 4.6.3.4
Total			9	

4.6.3.6 Extinction

Answer 34 · Mark scheme

November 2021 | 8461/2F | Original Q1



4.6.3.6 Extinction

Answer 35 · Mark scheme

June 2022 | 8461/2F | Original Q7

Question 7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.1 *view with Table 3*	kingdom genus	in this order only	1 1	AO1 4.6.3.5 4.6.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.2	Linnaeus		1	AO1 4.6.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.3	*Elrathia kingii*		1	AO2 4.6.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.4	trilobite **A** was found in older rocks than trilobite **B** trilobite **B** is more complex than trilobite **A**		1 1	AO3 4.6.3.4 4.6.3.5

4.6.3.6 Extinction

Answer 35 · Mark scheme

June 2022 | 8461/2F | Original Q7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.5	sediments soft parts minerals	in this order only	1 1 1	AO2 4.6.3.5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.6	any **three** from: • drought • ice age • global warming • volcanic activity • asteroid collision • (new) predators • (new) disease / pathogen • competition for food • competition for mates • lack of habitat or habitat change	if none 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 food allow lack of mates ignore competition unqualified ignore isolation ignore pollution	3	AO1 4.6.3.6

4.6.3.6 Extinction

Answer 35 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.7	no / insufficient evidence **or** cannot perform experiment to find out	allow lack of evidence allow no-one was there to observe	1	AO3 4.6.3.5 4.6.3.6

Total Question 7		**13**

4.6.3.6 Extinction

Answer 36 · Mark scheme

June 2024 | 8461/2F | Original Q2

Question 2

Question	Answers	Extra information	Mark	AO / Spec Ref.
02.1	kingdom		1	AO1 4.6.4

Question	Answers	Extra information	Mark	AO / Spec Ref.
02.2	genus species		1 1	AO1 4.6.4

Question	Answers	Extra information	Mark	AO / Spec Ref.
02.3	3 million years ago		1	AO3 4.6.4

Question	Answers	Extra information	Mark	AO / Spec Ref.
02.4	black-backed jackal	ignore jackal do **not** accept golden jackal	1	AO3 4.6.4

4.6.3.6 Extinction

Answer 36 · Mark scheme

June 2024 | 8461/2F | Original Q2

Question	Answers	Extra information	Mark	AO / Spec Ref.
02.5	any **two** from: • drought • ice age • global warming • volcanic activity • asteroid collision • (new) predators • (new) disease / pathogen • competition for food • competition for mates • lack of habitat or habitat change	if none of these awarded, allow **1** mark for climate change 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 food allow lack of mates ignore competition unqualified ignore environment change ignore isolation ignore pollution	2	AO1 4.6.3.6

Question	Answers	Extra information	Mark	AO / Spec Ref.
02.6	any **one** from: • wolves ate humans • wolves get left-over food from humans • humans gave food to wolves		1	AO3 4.6.2.3 4.7.1.1

4.6.3.6 Extinction

Answer 36 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec Ref.
02.7	breed the least / less aggressive wolves		1	AO2
	breed (least / less aggressive) offspring	ignore repeat breeding of the original pair(s)	1	AO1 4.6.2.3

Total Question 2	10

4.6.3.6 Extinction

Answer 37 · Mark scheme

June 2025 | 8461/2F | Original Q8

Question 8

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.1	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.
08.2	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.
08.3	phylum family	in this order only	1 1	AO1 4.6.3.5 4.6.4

4.6.3.6 Extinction

Answer 37 · Mark scheme

June 2025 | 8461/2F | Original Q8

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.4	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 8	9

4.6.3.6 Extinction

Answer 33 · Examiner comments — November 2020 | 8461/2F | Original Q6

Question 6 (low & standard demand)

This question was about classification, the fossil record and extinction. In **06.5** students often did not make themselves clear when describing the decomposition of various tissues. 'It' or 'they' decomposed were insufficient as the subject of the question was bones. A number of students described the fossils themselves as decomposing. Students did not find **06.6** easy, often just rephrasing the question. A small number suggested the use of carbon dating but the most common correct answers referred to depth or age of the rocks in which the fossils were found as a means of dating them.

06.7 was not well done. Many students were unable to determine the correct time period from the scale on the graph. Some of those who got close to the answer did not realise that the answer line was already primed with 'million' and left their answer as '50 000 million' million. Very few students were able to work out the required answer to **06.8**, despite the mark scheme making allowance for errors from the previous question being carried forward. Many showed numbers in their working which had no evidence of their origin from the graph.

Answer 35 · Examiner comments — June 2022 | 8461/2F | Original Q7

Question 7

This question was about classification, evolution and extinction.

07.1 **Table 3** gave the classification of two species of trilobite with two of the classification groups left blank. Students had to choose the missing groups, *kingdom* and *genus*, from a list of five alternatives. Only a quarter of students chose correctly. 'Community' and 'mammal' proved to be good distractors.

07.2 A similarly small proportion knew that the given classification system was invented by Linnaeus. In fact, 'Darwin' was a more common choice.

07.3 The binomial name of trilobite **A** should have been relatively easy to deduce from **Table 3** but *Elrathia kingii* was the *least* common option selected from the three given alternatives.

4.6.3.6 Extinction

Answer 35 · Examiner comments

07.4 The correct two pieces of evidence in support of the scientist's hypothesis that trilobite **B** may have evolved from trilobite **A** were that **A** was found in older rocks and that **B** was the more complex of the two. Almost 40 percent of students ticked both these options, but the idea that both were found in the same type of rock, although incorrect, was commonly selected.

07.5 Completion of the three sentences to describe fossilisation, using words from the box, proved challenging for many with only one in eight getting all three correct.

07.6 Considering the number of times that causes of extinction have been asked for in previous examination years, performance here was not as strong as might have been expected. However those who gained marks often referred to climate change or global warming, predators and the lack of food. Common insufficient answers included 'changes' in temperature (which happen by the hour) and unsuitable 'weather' or 'environmental change', each of which is too vague. Fewer than one quarter were able to give three suitable suggestions.

07.7 A lack of evidence or that nobody was there at the time were each given frequently as a suggestion for why scientists cannot be sure of the cause of extinction of the trilobites. Weaker students got no further than saying that it was a 'long time ago' or that there are 'many ways to become extinct'. Only just over one third gained credit.

4.6.3.6 Extinction

Answer 36 · Examiner comments — June 2024 | 8461/2F | Original Q2

Question 2 (low demand)

02.1 Almost 65% of students knew that balance is the function of the cerebellum.

02.2 A third of students were able to identify both classification groups that form the binomial name. However, a further 50% of students could identify at least one. It was common to see only one box ticked in this question; students are reminded to read the instructions given in the question carefully.

02.3 Almost 80% of students identified the correct time as 3 million years ago.

02.4 Just under two thirds of students gained this mark.

02.5 Almost half of students could give two possible causes of extinction, with a further one third of students able to give at least one. The most common causes given were predators and lack of food. A noticeable number of students failed to gain credit by only giving a vague statement about environment change.

02.6 25% of students could suggest a correct reason as to why wolves began to follow humans, with lots of vague statements about the similarities between wolves and humans in terms of what they ate and how they hunted.

02.7 Over half of students did not gain any credit on this question. Most commonly a student that gained one mark did so by describing the breeding of two less aggressive wolves but did not go further to describe breeding the offspring to achieve the second mark.

Answer 37 · Examiner comments — June 2025 | 8461/2F | Original Q8

Question 8 (Standard demand)

08.1
This question required students to apply their knowledge of fossil formation to the specific example of an ichthyosaur fossil.
Only two steps in the fossilisation process were required to score full marks, so misunderstanding or omission of one step, was not critical. Only 7% of students achieved the full 2 marks, with 60% scoring no marks or not attempting the question.
Students that gained credit often did so for showing an understanding of the first step in fossil formation, by referring to sediment, or an appropriate synonym. However, several 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 some students were aware that the dead ichthyosaur had decayed, they were often imprecise in terms of what had decayed. Some described the whole 'body' or the 'tissues' decaying, which implied that both soft and hard material decays. Very few students referred to the soft tissues being eaten (by detritivores).

4.6.3.6 Extinction

Answer 37 · Examiner comments

June 2025 | 8461/2F | Original Q8

08.2

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.

Many students completed this calculation well with 40% 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.

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.

08.3

Students were required to recall the classification hierarchy, completing a partial classification using given terms.

This was very well attempted with over half of students gaining at least 1 mark. It was clear that many students had remembered the sequence by using a mnemonic. However, many students confused population for phylum, presumably due to the same initial letter.

08.4

Students were required to suggest causes for the extinction of ichthyosaurs, and over 50% of students gained at least one of the available 2 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'.

Common correct responses included reference to 'disease' and 'habitat loss', although all of the possible answers were seen.