AQA GCSE Biology | 8461

SPECIFICATION POINT 4.6.3.1

Theory of evolution (biology only)

Mark schemes and examiner comments

Tier	**Higher**
Question groups	**23**
Available paper years	**2007–2024**

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.

4.6.3.1 Theory of evolution (biology only)

Answer 01 · Mark scheme March 2007 | BLY1B | Original Q8 | Legacy

Eight	**4**	**4**	**2**	**1**

Answer 02 · Mark scheme June 2007 | BLY1B | Original Q3 | Legacy

Three	**2**	**2**	**4**	**4**

Answer 03 · Mark scheme June 2007 | BLY1H | Original Q8 | Legacy

The full source mark scheme begins on page 25. Follow original question 8 in that document.

Answer 04 · Mark scheme November 2007 | BLY1B | Original Q8 | Legacy

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

Answer 05 · Mark scheme March 2008 | BLY1BP | Original Q3 | Legacy

Three	**3**	**2**	**3**	**2**

Answer 06 · Mark scheme June 2008 | BLY1BP | Original Q5 | Legacy

Five	**1**	**3**	**2**	**1**

Answer 07 · Mark scheme November 2008 | BLY1BP | Original Q1 | Legacy

One	A	observed that all species change over time	**3**
	B	had sufficient evidence to prove evolution	**4**
	C	thought that evolution was by natural selection	**1**
	D	changes that happen during an organism's lifetime are inherited by offspring	**2**

4.6.3.1 Theory of evolution (biology only)

Answer 08 · Mark scheme

March 2009 | BLY1BP | Original Q9 | Legacy

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

Answer 09 · 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**

4.6.3.1 Theory of evolution (biology only)

Answer 10 · Mark scheme

November 2009 | BLY1BP | Original Q9 | Legacy

Nine	**2**	**1**	**2**	**2**

4.6.3.1 Theory of evolution (biology only)

Answer 11 · Mark scheme

January 2010 | BLY1H | Original Q2 | Legacy

Question 2

question	answers	extra information	mark
2(a)	any **two** from • survival of fittest • amplification of fittest ie has adaptations to survive • go on to breed **or** genes / characteristics passed on to next generation	 allow examples allow examples NB best adapted organisms survive gains **2** marks	2
2(b)	any **two** from eg: • increased height • increased erectness / backbone or spine straighter • shorter arms • legs straighter • larger skull • larger pelvis **or** changing shape described • humans walk on two legs / feet	ignore unqualified change eg 'the skull changes shape' allow description of modern human characteristic eg 'modern humans stand up straight' allow description of ape-like characteristics eg ape-like ancestor walked on four legs	2
2(c)	any **two** from: • religious objections • insufficient evidence • mechanism of heredity not known did not know about genes / chromosomes / DNA / mutations • did not like the thought of being descended from apes	 ignore **no** evidence accept could not prove	2

4.6.3.1 Theory of evolution (biology only)

BLY1H

Question 2 continued

question	answers	extra information	mark
2(d)	Darwin's theory depends on differences in genes at birth / inborn variation / mutation	allow Darwin's theory depends on genetics ignore references to time	1
Total			**7**

4.6.3.1 Theory of evolution (biology only)

Answer 11 · Mark scheme January 2010 | BLY1H | Original Q2 | Legacy

BLY1H

4.6.3.1 Theory of evolution (biology only)

Answer 12 · Mark scheme

June 2010 | BLY1H | Original Q7 | Legacy

Question 7

question	answers	extra information	mark
7(a)	variation / range of leg sizes / mutation	do **not** allow <u>intention</u> to mutate	1
	ones with longer legs could feed in deeper water / get more food **or** long legged ones less likely to get feathers wet **or** long-legged ones could escape from leopards	allow reverse argument	1
	survive / <u>breed</u> / pass on genes	allow characteristics passed onto next generation	1
7(b)	flamingos stretched their legs (to be able to feed in deeper water/ keep feathers dry / escape from leopards)	It must be clear that the characteristic develops during the organisms lifetime ie it is not inherited from parents accept long legs are an acquired characteristic	1
	longer legs / acquired characteristic inherited by offspring	accept (acquired) genes for long legs passed on	1
Total			**5**

4.6.3.1 Theory of evolution (biology only)

Answer 12 · Mark scheme June 2010 | BLY1H | Original Q7 | Legacy

BLY1H

Answer 13 · Mark scheme November 2010 | BLY1BP | Original Q9 | Legacy

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

Answer 14 · Mark scheme June 2011 | BLY1BP | Original Q1 | Legacy

Question	Key		
One	**A**	extinction	4
	B	mutation	2
	C	reproduction	3
	D	variation	1

Answer 15 · Mark scheme November 2011 | BLY1BP | Original Q7 | Legacy

Seven	**3**	**3**	**1**	**4**

4.6.3.1 Theory of evolution (biology only)

Answer 16 · Mark scheme

June 2012 | BL1HP | Original Q4 | Legacy

Question 4

question	answers	extra information	mark
4 (a)	any **two** control variables for **1** mark each: • age / size of shoots • species **or** type of plant / seeds • light intensity • (other) named condition eg temperature / water	 accept amount of light / colour of light 	2
4 (b)	ref to auxin / hormone unequal (lateral) distribution more hormone on dark side causes growth on dark side	ignore reference to phototropism	1 1 1 1
4 (c)(i)	(detection) in tip / top / end		1
4 (c)(ii)	(response) behind tip	allow at tip / end / top half	1
Total			8

4.6.3.1 Theory of evolution (biology only)

Answer 16 · Mark scheme

June 2012 | BL1HP | Original Q4 | Legacy

BL1HP

4.6.3.1 Theory of evolution (biology only)

Answer 17 · Mark scheme

January 2013 | BL1HP | Original Q7 | Legacy

Question 7

question	answers	extra information	mark
7(a)	variation (between organisms within species)	allow described example allow mutation – but **not** if caused by change in conditions	1
	those most suited / fittest survive		1
	genes / alleles passed on (to offspring / next generation)	allow mutation passed on	1
7(b)(i)	any **two** from: • increase in latitude reduces number of (living) species • increase in latitude reduces time for evolution (of new species) • the less the time to evolve the fewer the number of (living) species	allow converse ignore references to severity of conditions	2
7(b)(ii)	any **two** from: • (increase in latitude reduces number of (living) species because) less food / habitats / more competition at high latitude • increase in latitude reduces time for evolution (of new species) because) severe conditions act more quickly / to a greater extent on the weakest • (the less the time to evolve the fewer the number of (living) species because) species that evolve slowly don't survive	do **not** accept intention or need to evolve allow only extremophiles / well-adapted species can survive	2
Total			**7**

4.6.3.1 Theory of evolution (biology only)

Answer 17 · Mark scheme

January 2013 | BL1HP | Original Q7 | Legacy

BL1HP

4.6.3.1 Theory of evolution (biology only)

Answer 18 · Mark scheme

June 2013 | BL1HP | Original Q8 | Legacy

Question 8

question	answers	extra information	mark
8(a)	Lamarck	ignore any first name(s)	1
8(b)(i)	variation / range of sword lengths (in ancestors)	accept mutation produced longer sword	1
	those with long swords get more food	accept those with short swords get less food	1
	swordfish (with long swords) survive **and** breed	allow have offspring for breed	1
	(survivors) pass on gene(s) / allele(s) (for long sword)	allow mutation for gene(s) / allele(s)	1
8(b)(ii)	any **one** from: • more evidence (now) • DNA / genes / mechanism of inheritance discovered	accept examples of evidence, e.g. more fossils allow Lamarck's theory has been disproved ignore religious arguments ignore proof	1
Total			**6**

4.6.3.1 Theory of evolution (biology only)

Answer 19 · Mark scheme

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**	

4.6.3.1 Theory of evolution (biology only)

Answer 19 · Mark scheme

June 2014 | BL1HP | Original Q7 | Legacy

Question	Answers	Extra information	Mark	AO / spec ref.

4.6.3.1 Theory of evolution (biology only)

Answer 20 · Mark scheme June 2016 | BL1HP | Original Q5 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
5(a)	any **two** from: • larger / longer / thicker • fewer (bones in total) • fewer bones touching the ground	 allow examples eg fewer toes **or** bones fused allow smaller surface area touching the ground	2	AO2 1.8.1d
5(b)(i)	large(r) surface / area in contact with the ground **or** low / less pressure on ground (so) less likely to sink into mud / ground **or** (so) could run fast(er)	 allow easy / easier to escape predators	1 1	AO2 1.4.1c/d
5(b)(ii)	variation (in size / number / arrangement of bones) (and) those with large(r) / few(er) bones more suited to running **or** run faster (on harder / drier ground) these survive **and** breed (so) genes / DNA (for larger / fewer bones) passed on	allow mutation(s) (in size / number / arrangement of bones) allow ref to offspring for breed allow alleles passed on	1 1 1 1	AO1 / AO2 1.8.1e/f
Total			**8**	

4.6.3.1 Theory of evolution (biology only)

Answer 20 · Mark scheme

June 2016 | BL1HP | Original Q5 | Legacy

4.6.3.1 Theory of evolution (biology only)

Answer 21 · Mark scheme

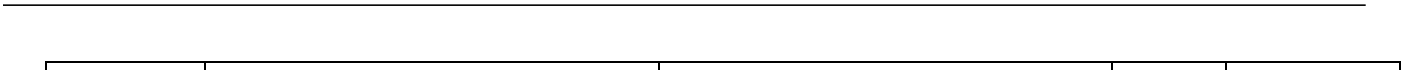
June 2017 | BL1HP | Original Q2 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
2(a)	any three from: • mutation **or** variation • better adapted survive **or** survival of the fittest • (survivors / better adapted) reproduce • genes passed on	allow points if given in example allow genetic changes allow differences in appearance allow ref to offspring	3	AO1 1.8.1e/f
2(b)(i)	wanted to discredit theory / Darwin	allow wanted to make Darwin / theory look stupid allow idea that (cartoon shows) humans evolved from monkeys	1	AO3 1.8.1b/c
2(b)(ii)	any **two** from: • Darwin's theory challenged idea that God created life • little / insufficient evidence • there were other (scientific) theories (at the time) • mechanism of inheritance not known	allow Darwin's theory challenged / against religious ideas/teaching. ignore against religion ignore no evidence allow examples, eg Lamarckism, allow genes / DNA not discovered ignore did not know about inheritance	2	AO1 1.8.1b/c
Total			**6**	

4.6.3.1 Theory of evolution (biology only)

Answer 21 · Mark scheme

June 2017 | BL1HP | Original Q2 | Legacy



4.6.3.1 Theory of evolution (biology only)

Answer 22 · Mark scheme

June 2023 | 8461/2H | Original Q9

Question 9

Question	Answers	Mark	AO / Spec Ref.
09	**Level 3:** Relevant points (reasons / causes) are identified, given in detail and logically linked to form a clear account.	5–6	AO1 4.6.3.1 4.6.3.2 4.6.3.3 4.6.3.4 4.6.3.5 4.6.3.6 4.6.3.7 4.6.4
	Level 2: Relevant points (reasons / causes) are identified, and there are attempts at logical linking. The resulting account is not fully clear.	3–4	
	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 **Fossil evidence:** • fossils show evidence of life in the past • fossils show change over time • fossil record shows development of species over time • fossils show evidence of extinction • fossil record shows how organisms from the past are related to species alive today • gaps in fossil record • gaps in fossil record are being filled in with new evidence • ref to evolutionary trees • description of how fossils are formed **Genetics:** • ref to Mendel's breeding experiments with plants • Mendel's description / idea of units / factors of inheritance • dominant and recessive units / alleles / genes • observation of chromosome behaviour during cell division • chromosome behaviour and Mendel's units work in similar ways • structure of DNA worked out • gene mechanism in determining protein synthesis worked out • (genetic) variation in a species • (variation) due to mutation or change in gene (structure) • individuals with advantageous characteristics more likely to survive • individuals with advantageous characteristics more likely to reproduce • (survivors) pass on (advantageous) alleles / genes • eg of evolution (such as antibiotic resistance in bacteria) • new species arise when sufficient changes occur to prevent (successful) reproduction For **Level 3**, the response must include details about fossils and about the mechanisms of genetics For **Level 2**, the response should include descriptions about fossils and / or genetics		

Total Question 9	**6**

4.6.3.1 Theory of evolution (biology only)

Answer 23 · Mark scheme

June 2024 | 8461/2H | Original Q1

Question 1

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.1	a change in: • DNA • base code **or** nucleotide sequence • base (in DNA) • gene / allele • part of a chromosome • number of chromosomes • genetic code / material	ignore genetic information / variation ignore reference to amino acids or proteins	1	AO1 4.6.2.1

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.2	any **three** from: • variation (between members of a species) • better adapted survive • (better adapted or survivors) reproduce • pass on (favourable) allele(s) / gene(s) / mutation(s)	allow in terms of an example ignore mutation allow survival of the fittest allow converse ignore passing on genetic material **or** chromosomes **or** characteristic	3	AO1 4.6.2.1 4.6.2.2 4.6.3.1

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.3	Alfred Wallace and Charles Darwin		1	AO1 4.6.2.2 4.6.3.1 4.6.3.2

4.6.3.1 Theory of evolution (biology only)

Answer 23 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.4	hoverfly looks like a wasp	allow pattern of the markings is similar (on the hoverfly and wasp) ignore predator / animal thinks the hoverfly is a wasp	1	AO3 4.6.3.2 4.7.1.1 4.7.1.4
	predator / animal avoids **wasps** so it does not get stung		1	
	(so) predator / animal does not attack / eat hoverfly	allow correctly named predator ignore bite / harm	1	

Total Question 1	8

Version 1.0: 0707

ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Science B 4462 / Biology 4411

BLY1H Unit Biology 1

Mark Scheme

2007 examination - June series

4.6.3.1 Theory of evolution (biology only)

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' 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 to download from the AQA Website: www.aqa.org.uk

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4.6.3.1 Theory of evolution (biology only)

MARK SCHEME

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 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

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 lines 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.)

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which candidates 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.

4.6.3.1 Theory of evolution (biology only)

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

Candidate	Response	Marks awarded
1	4,8	0
2	green, 5	0
3	red*, 5	1
4	red*, 8	0

Example 2: Name two planets in the solar system. (2 marks)

Candidate	Response	Marks awarded
1	Pluto, Mars, Moon	1
2	Pluto, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a candidate 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, as shown in the column 'answers', 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;

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 are 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 Unexpected Correct Answers not in the Mark Scheme

The Examiner should use professional judgement to award credit where a candidate has given an unexpected correct answer which is not covered by the mark scheme. The Examiner should consult with the Team Leader to confirm the judgement. The Team Leader should pass this answer on to the Principal Examiner with a view to informing all examiners.

4.6.3.1 Theory of evolution (biology only)

BLY1H Question 1

	answers	extra information	mark
(a)	scientists figures based on research / calculations / data **or** scientists sample whole area	ignore reasons based on bias	1
	fishermen based on impression / hearsay / experience **or** fishermen fish in well-stocked / limited areas	scientists sample a wider area = **2** marks fishermen only fish in well-stocked areas = **2** marks if no marks gained fishermens' opinion **and** scientists' opinion gains **1** mark	1
(b)	any **two** from: • economic considerations • political impact • pressure groups **or** fears of extinction	eg fear for jobs, profits, big demand for cod eg allow EU / government decide or laws will be passed	2
total			4

4.6.3.1 Theory of evolution (biology only)

BLY1H Question 2

	answers	extra information	mark
(a)	any **two** from: • area of bed sampled • sampling time • size of net • kicking action • net position	control variables from information given	2
(b)	any **two** from: • some animals not dislodged • some animals missed / through / escaped net • invertebrates difficult to identify • invertebrates from outside area	must be ideas related to a sample ignore reliability etc	2
(c)	10 to 99 **or** 10 – 99 **or** 99 to 10 **or** 99 – 10		1
(d)	any **two** from: • increased / goes up • 0 at sample 4 • to (more than) 100	allow increase implied from all data described	2
(e)	mayfly because not found downstream of point where sewage enters stream **or** only in the unpolluted water		1 1
total			9

4.6.3.1 Theory of evolution (biology only)

BLY1H Question 3

	answers	extra information	mark
	adaptation and linked advantage eg	max **2** for 3 adaptations	max 2 max 2
	• roots widespread / long (1) to collect water from large area (1)	ignore large roots accept to collect more water	
	• some roots deep / long (1) to collect water from deep down (1)	ignore large roots accept to collect more water	
	• absence of leaves (1) reduces water loss (1)		
	• swollen stem (1) to store water (1)		
	• roots near surface (1) to absorb rainwater (1)		
	• roots widespread (1) support in sandy soil (1)		
total			4

4.6.3.1 Theory of evolution (biology only)

BLY1H Question 4

	answers	extra information	mark
(a)(i)	viruses live inside cells		1
	viruses inaccessible to antibiotic	allow drug / antibiotic (if used) would (have to) kill cell	1
(ii)	mutation	ignore mutation caused by antibiotic	1
	natural selection **or** no longer recognised by antibiotics	accept description of natural selection	1
(b)	(stimulate) antibody production	ignore antitoxin	1
	(by) white cells		1
	rapidly produce antibody on re-infection	ignore antibodies remain in blood	1
total			7

4.6.3.1 Theory of evolution (biology only)

BLY1H Question 5

	answers	extra information	mark
(a)	ovary or ovaries		1
(b)	(hormone) implant		1
(c)	do not have to remember to take		1
(d)	does not involve hormone **or** it is a mechanical method	allow coil may be dislodged allow egg is fertilised / released allow not preventing egg fertilisation / release	1
(e)	involves death of fertilised egg **or** (regard) fertilised egg as human **or** stops fertilised egg developing	allow embryo / baby for fertilised egg ignore against religion only allow fertilised egg is alive ignore side effects	1
(f)(i)	inhibit FSH (production) so no eggs mature / develop / are produced	allow inhibits LH allow (LH) stimulates egg release ignore progesterone	1 1
(ii)	contains FSH which causes egg to mature / develop / be produced **or** in women whose FSH is low	allow contain LH allow (LH) stimulates egg release	1 1
total			9

4.6.3.1 Theory of evolution (biology only)

BLY1H Question 6

	answers	extra information	mark
(a)	asexual reproduction / mitosis **or** no fusion of gametes **or** division after fusion **or** from fertilised egg **or** from same embryo **or** from same egg **and** sperm	ignore cloning	1
	each embryo has identical genetic information / genes / DNA / chromosomes		1
(b)	any **two** from: • experimental subject and control are identical **or** fair test since monkeys identical • monkeys similar to humans, so effect of drugs likely to be similar • all identical so will have same reaction to drugs / disease • it's better than catching wild ones	allow closely related so… ignore evolved from	2
total			4

4.6.3.1 Theory of evolution (biology only)

BLY1H Question 7

	answers	extra information	mark
(a)	any **two** from: • balance between two important for good heart health • high LDL causes heart disease / high cholesterol • high HDL reduces heart disease / cholesterol	ignore blood pressure do **not** accept converse argument do **not** accept converse argument	2
(b)	heart attacks greater amongst patients with low HDL levels statins reduce heart attacks of patients **or** placebo is less effective	ignore statins cause heart disease ignore comparative effects of the two statins allow pravastatin is more effective supported by appropriate calculations eg pravastatin > 39 33% < 39 31.4% Average 32.4 > 39 32% < 39 28.2% Average 30.05%	1 1
total			4

4.6.3.1 Theory of evolution (biology only)

BLY1H Question 8

	answers	extra information	mark
(a)	present day organisms have evolved from simpler organisms	ignore answers in terms of natural selection	1
	over long periods of time **or** millions / billions of years		1
(b)	(natural selection operates on successful) characteristics produced by chance / (random) mutation		1
	in this experiment caused by hormones / environment	allow this example indicates inheritance of acquired characteristics for **2** marks allow this is Lamarckism only for **1** mark	1
total			4

4.6.3.1 Theory of evolution (biology only)

Answer 22 · Examiner comments

June 2023 | 8461/2H | Original Q9

Question 9

This question was about how fossil evidence and our increasing understanding of the mechanisms of genetics have contributed to our understanding of evolution.

This was a high demand and challenging extended response question. Level 3 responses were rarely seen, but such answers were clear and well-structured, addressed several of the points of indicative content in the mark scheme and told the 'story' particularly well and eloquently.
Level 2 responses were common. For the most part, students answered well when writing about fossils. They tended to do less well when writing about the genetics aspect of the question and gave some weak accounts about natural selection.

Level 1 responses were weak in general and tended to mention fossils rather than genetics. Many students produced answers that were lacking in specifics and contained little or no relevant information. The question expected students to have some knowledge of fossils and the mechanisms of genetics and how these have contributed to our knowledge of Darwinian evolution. The vast majority of students confined their answers to animals (sometimes only humans) and there was meagre reference to the evolution of plants.

In describing fossil evidence, many students gave much detail of how fossils were formed (and sometimes little else) but others were able to describe the role of fossils in enabling the understanding of how past organisms have developed through time. However, many failed to express that evolution occurred on a species-wide scale, instead referring to the change in individual organisms. Little was mentioned about extinction or how the fossil evidence is incomplete or how modern discoveries are helping to fill the gaps.

Descriptions of how the mechanisms of genetics have contributed to our knowledge of evolution were poorly expressed or not accounted for at all. Such mechanisms began with Mendel and his experiments which have led to our understanding of chromosomes, mechanisms of cell division, genes, alleles and then to the structure of DNA and its detailed function. A few students referred to Mendel's experiments with peas but considerations of genetics were limited to descriptions of speciation which did achieve some credit; however, statements were often made about advantageous characteristics or even genetics being passed on to offspring instead of alleles, or genes or mutations.

4.6.3.1 Theory of evolution (biology only)

Answer 22 · Examiner comments

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results Statistics page of the AQA Website.

4.6.3.1 Theory of evolution (biology only)

Answer 23 · Examiner comments

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Question 1 (standard demand)

01.1 Over 70% of students were able to define a mutation correctly. Those that did not gain credit generally knew that it was something to do with 'a change', but this was anything from a cell or a particular characteristic of a phenotype to a whole species changing.

01.2 A third of students were able to give a full description of natural selection to gain full marks. 15% of students did not gain any marks at all for this question. Very few students talked about variation for the first bullet point. Bullet points 2 and 3 were the most common marks gained by students - the third bullet point often awarded for the implication that those that survived went on to breed, and often was by mentioning 'offspring' in marking point 4. Vague references to 'traits' or 'characteristics' being passed on were not creditworthy in bullet point four. Students who were able to give an example of natural selection had better structures to their answers, with giraffe necks being the most common example given.

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01.3 Just over 75% of students were able to identify Alfred Wallace and Alexander Fleming as the scientists that suggested the theory of evolution by natural selection.

01.4 Over 85% of students managed to gain at least one mark in this question, most commonly for stating 'the hoverfly looks like the wasp'. Marking point 2 was rarely awarded as students did not explicitly refer to the wasp. Some incorrect answers referred to the hoverfly being able to camouflage which did not gain credit. Overall, the main reason marks were not awarded was because of vagueness, or poor articulation of ideas.