

Understanding Genetics And Evolution

Mark Scheme 1

Level	GCSE (9-1)
Subject	Combined Science – Trilogy - Biology
Exam Board	AQA
Topic	4.6 Inheritance Variation and Evolution
Sub-Topic	Dev. Understanding Genetics + Evolution
Difficulty Level	Bronze Level
Booklet	Mark Scheme 1

Time Allowed: 56 minutes

Score: / 54

Percentage: /100

Grade Boundaries:

M1.(a) animal cells also have cell membrane

1

(b) 1945–1955

allow 1946–1956

or 1947–1957

1

(c) $(2 / 22 =) 9.\overset{\bullet}{0}\overset{\bullet}{9}$

allow 9.09 (%) or 9 (%) with no working shown for 1 mark

1

9.1 (%)

allow 9.1 (%) with no working shown for 2 marks

1

(d)

More likely	Less likely
	✓
	✓
✓	
✓	
✓	

allow 3 marks for 4 correct

allow 2 marks for 3 correct

allow 1 mark for 2 correct

4

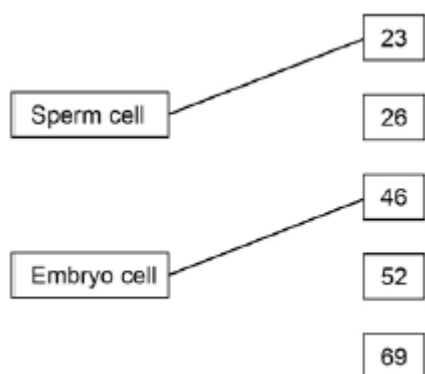
more than one tick in a row negates a mark

[8]

M2.(a) Nucleus

1

(b) **Type of cell** **Number of chromosomes**



extra lines from left cancel the mark

2

(c)

	X	X
X	XX	XX
Y	XY	XY

*all three correct for 2 marks
one or two correct for 1 mark
allow XY or YX in correct places*

2

(d)

	X	X
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X	XX	XX
Y	XY	XY

either circled

1

(e) 1 in 2

1

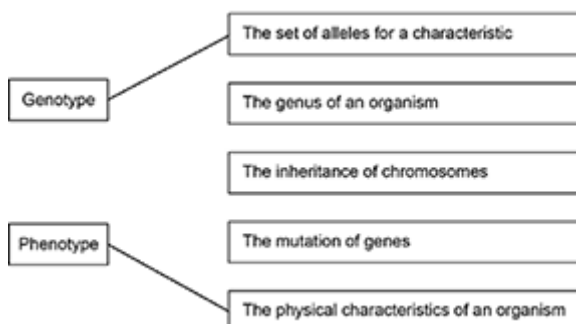
[7]

M3.(a)

Characteristic	Environmental	Genetic	Both
Eye colour		✓	
A scar	✓		
Weight			✓

3

(b) **Key term** **Definition**



extra lines from the left negate the mark

2

(c)

Stage in selective breeding	Order of stage
Cows are bred over many generations	4
Parents are bred together	2
Cows with the desired characteristics are chosen	1
Calves with the most desired characteristics are bred together	3

all 3 correct for 2 marks

1 or 2 correct for 1 mark

max. 2

(d) beef / meat

allow hardiness, disease resistance

1

milk yield

1

(e) higher veterinary costs

1

less income from sale of (milk and meat) products

1

[11]

M4.(a) (i) any **two** from:

- trapped / held (since sticky)
- engulfed / covered by resin
- allow engulfed / covered by amber*
- prevented decay.

2

- (ii) any **two** from:
- animal / plant (dies and) body covered in sediment / mud
ignore ref to rock
allow covered in tar / ice
 - 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.

2

- (b) (i) New technology provides more valid evidence.

1

- (ii) any **three** from:
examples of physical factors, e.g.
accept 3 physical factors or 3 biological factors or some of each for full marks

- flooding
- drought
- ice age / temperature change.

ignore pollution

examples of biological factors, e.g.

- (new) predators (allow hunters)
- (new) disease / named pathogen
- competition for food
- competition for mates

competition must be qualified

- cyclical nature of speciation
- isolation
- lack of habitat or habitat change.

if no other answers given allow natural disaster / weather change / catastrophic event / environmental change / climate change for **1** mark

3

[8]

- M5.(a) (i) (volume) increases (with time)
ignore numbers

1

	(ii) there is more evidence / specimens / results (for Homo sapiens) <i>allow examples of this, eg more / better fossils</i> <i>allow converse if clearly referring to Australopithecus</i> <i>ignore reference to being 'more recent'</i>	1
(b)	2.5 – 3.15 (million years ago) <i>accept any number in range</i>	1
(c) (i)	Darwin	1
	(ii) any one from: <ul style="list-style-type: none">• they believed in other theories <i>allow they believed that God made all life</i>• insufficient evidence <i>ignore 'no evidence'</i>• no proof <i>allow not enough proof</i>• genes / mechanism of inheritance not known / discovered	1
[5]		
M6.(a)	fossils show change over time.	1
(b)	covered in sediment / mud or sinks into the mud	1
	soft parts decay / are eaten or bones / hard parts / shell do not decay	1

minerals enter bones / parts are replaced by minerals / mineralisation

accept turns to rock

allow 'is an impression' / 'imprint' / 'cast'

1

(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

(d) any **two** examples of:

accept 2 physical factors or 2 biological factors or one of each for full marks

physical factors such as volcanic activity (allow volcanoes) / earthquakes / asteroid (collision) / ice age / temperature change

ignore pollution

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

if no other answers given allow natural disaster / climate change / weather change / catastrophic event / environmental change for 1 mark

2

[7]

M7.(a) (i) natural

1

(ii) simple

1

(iii) three billion

1

(b) any **two** from:

- reference to religion
- insufficient evidence / couldn't prove it / no proof
ignore no evidence
- mechanism of inheritance / variation not known
allow genes / DNA not known about
- reference to other theories
- reference to Darwin's status

2

(c) (i) tree

1

- (ii) hippopotamus **and** pig
both required, either order
allow hippo

1

(iii) new evidence from fossils

1

[8]