

Variation 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	Variation and Evolution
Difficulty Level	Bronze Level
Booklet	Mark Scheme 1

Time Allowed: 58 minutes

Score: / 56

Percentage: /100

Grade Boundaries:

M1.(a) only genetic causes

any **one** from:

- pattern of scales
- number of fins
- eye colour

1

only environmental causes:

- scar

1

both genetic and environmental causes:

- length

1

(b)

	B	b
b		bb
b	Bb	bb

allow 2 correct for 1 mark

2

(c) any bb circled

1

(d) 0.5

allow ecf from 04.2

1

(e) (260 000 / 2 =) 130 000

allow ecf from **04.4**

1

(f) mutation

allow change in diet / hormones / DNA

1

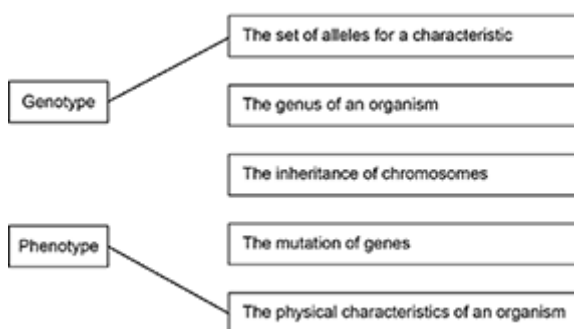
[9]

M2.(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	4

generations	
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

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M3.(a) (i) (volume) increases (with time)

ignore numbers

1

(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

(b) 2.5 – 3.15 (million years ago)
accept any number in range 1

(c) (i) Darwin 1

(ii) any **one** from: 1

- they believed in other theories
allow they believed that God made all life
- insufficient evidence
ignore 'no evidence'
- no proof
allow not enough proof
- genes / mechanism of inheritance not known / discovered

[5]

M4.(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

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M5.(a) genes

1

chromosomes

1

- (b) (i) higher yield

1

less use of pesticides

1

- (ii) any **two** from:

- uncertain about effects on health
- fewer bees
- might breed with wild plant
- seeds only from one manufacturer

2

[6]

M6.(a) sexual reproduction

1

(b) (i) genes

1

(ii) gametes

1

(c) (i) any **two** from:

answers must be comparative

- more meat (per cow)
ignore bigger unqualified
- more milk each day
- can be milked for more time after giving birth / greater proportion of time
accept '(produce) more milk', for 1 mark, if neither more milk each day nor can be milked for more time after giving birth are given

2

(ii) (milk contains) more protein

answers must be comparative

1

less time before having a calf when no milk produced

1

- (d) (i) genes from one organism are transferred to a different organism

1

- (ii) (possible) harm to babies' long term health

allow don't know long-term / side effects (on baby)

accept idea that there may be other things in (genetically engineered) cow's milk that might harm babies' health e.g. bacteria

ignore ethical / religious arguments

1

[9]

M7.(a) lemur(s)

1

- (b) gorilla(s)

in either order

1

chimpanzee(s)

accept chimps

1

- (c) (i) (Charles) Darwin

accept (Alfred) Wallace

if first name given it must be correct

1

- (ii) variation

in this order

1

environment

allow phonetic spellings

1

survive

1

generation

1

[8]