

Reproduction

Mark Scheme 1

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

Time Allowed: 57 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

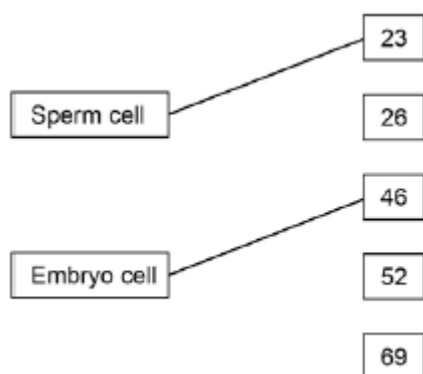
1

[9]

M2.(a) 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
X	XX	XX
Y	XY	XY

either circled

1

(e) 1 in 2

1

[7]

M3.(a) (i) (female) has XX / only X's / no Y

allow has X chromosomes

ignore ref to genes / cells

1

(ii) extra chromosome / has 47 chromosomes / one set has 3 copies

ignore reference to chromosome numbers other than 47 or
no. 18

1

no. 18

1

(b) (i) 14

allow in range of 13.5 to 14.5

1

(ii) 7

allow in range of 6.75 to 7.25

accept ecf from 5bi

1

(c) Advantages:

any **two** from:

- more than 1 embryo (so more chance of success)
allow method 2 may cause a miscarriage
- tested at 3 days cf 10 weeks **or** tested earlier
tested when only 3 days old
- tested before pregnancy
- no termination / abortion
- spare embryos have a potential use.

2

Disadvantages:

any **one** from:

- needs an operation
accept described hazard of operation
- (spare) embryos / human life destroyed / harmed
must be comparative
- higher cost
- embryos might not implant / might not develop.

1

[8]

M4.(a) (i) fertilisation

1

(ii) in sequence:

accept 1 next to gene, 2 next to chromosome and 3 next to nucleus in box

- 1 gene
- 2 chromosome
- 3 nucleus

*allow 1 mark for smallest **or** largest in correct position*

2

(iii) DNA

1

(b) (i) On diagram:

tick drawn next to **X** and / or **Y** from Parent 1

tick(s) must be totally outside grid squares

allow ticks around “parent”

extra ticks elsewhere cancel

1

(ii) 0.5 / $\frac{1}{2}$ / 50% / 1:1 / 50:50 / 1 in 2

allow 2/4 / 2 in 4 / 2 out of 4 / ‘even(s)’ / ‘fifty – fifty’

*do **not** allow 1:2 or ‘50 / 50’ or ‘50 – 50’*

1

2 (out of 4) boxes are **XX**

or

half of the sperm contain an **X**-chromosome

*allow **XY** is male and 2 (out of 4) boxes are **XY***

1

[7]

M5.(a) DNA

1

(b) X and Y

1

(c) (i) 46 chromosomes

1

(ii) half the number

1

(d) meiosis

1

[5]

M6.(a) Mendel

1

(b) (i) **TT**

1

(ii) a dominant allele

1

(c) 1 : 1

1

(d) 100 short plants

1

[5]

M7.(a) (i) gametes

apply list principle

1

(ii) chromosomes

apply list principle

1

(b) (i) The allele is recessive

no mark if more than one box is ticked

1

(ii) two
apply list principle 1

(c) (i) **A**
apply list principle 1

(ii) **B**
apply list principle 1

[6]

M8.(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]