

# Reproduction

## Mark Scheme 1

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

**Time Allowed:** 46 minutes

**Score:** / 45

**Percentage:** /100

**Grade Boundaries:**

<b>M1.(a)</b>	asexual reproduction	1	
	(b) mitosis	1	
	(c) clones	1	
	(d) 44	1	[4]
<b>M2.(a)</b>	wolves	1	
	(b) moose and wolves are on different scales	1	
	(c) wolf population has increased so more moose are eaten <i>do <b>not</b> accept there are more wolves than moose</i>	1	
	(d) any <b>two</b> from: <ul style="list-style-type: none"><li>• (other) predators <i>allow correct examples</i> <i>allow 'humans hunting moose'</i></li><li>• (new) pathogens <i>allow diseases</i></li><li>• competition</li></ul>	2	

(e) any **four** from:

- variation (within species) of antler size  
*allow description relating to antlers*
- (caused by) different genes
- as a result of sexual reproduction / process of meiosis / mutation
- (phenotype) most suited to environment most likely to survive and breed  
*ignore natural selection unqualified*
- genes for large antlers (more likely to be) passed on to next generation

4

reference to mate selection

**or**

fighting

**or**

gaining territory

**or**

competition for mates

**or**

avoiding predation

1

[10]

**M3.(a)** (i) in the chromosome(s)

*ignore genes / alleles*

1

in the nucleus

*allow nuclei*

*allow mitochondria*

1

(ii) the DNA / chromosomes / genes are replicated / copied / multiplied / doubled / duplicated

*allow DNA is cloned*

*ignore same DNA / chromosomes / genes if unqualified*

1

(b) (i) 1 / one

1

(ii) 2 / two

1

(c) **B**

1

[6]

**M4.(a)** (different / alternative) forms of a gene  
do **not** accept types of genes

1

(b) DNA isolated from embryo

1

(fluorescent) probe mixed with embryo DNA

1

probe (then) binds with embryo DNA

1

(UV light) to show alleles / gene for disorder

1

(c) genotypes of parents and gametes correct (Man **D** and **d**, Wife **d** and **d**)  
allow half-size genetic diagram with only one **d** from wife

1

offspring genotypes correct ( $\frac{1}{2}$  = **Dd** and  $\frac{1}{2}$  = **dd**)  
allow ecf if parental genotypes are wrong

1

offspring phenotypes correctly assigned to genotypes

1

(d) genotypes of parents and gametes correct (**N** and **n**)  
allow ecf if parental genotypes are wrong

1

offspring genotypes correct (**NN**, 2 × **Nn**, and **nn**)

1

offspring phenotypes correctly assigned to genotypes;

1

correct probability = 0.25 /  $\frac{1}{4}$  / 25% / 1 in 4 / 1:3, only;  
do **not** allow '3:1' / '1:4'

1

[12]

**M5.(a)** (i) nucleus

*correct spelling only*

*accept mitochondrion*

*ignore genes / genetic material / chromosomes*

1

(ii) base(s)

*Accept all four correct names of bases*

*ignore nucleotides and refs to organic / N-containing*

1

(iii) 4

1

(iv) codes for sequence / order of amino acids

*ignore references to characteristics*

1

codes for a (specific) protein / enzyme

**or**

the sequence / order of three bases / compounds / letters

codes for a specific amino acid

**or**

the sequence / order of 3 bases / compounds / letters

codes for the order / sequence of amino acids

1

(b) (i) DNA

1

circular / a ring **or** a vector / described

1

- (ii) kills any cells not having **kan<sup>r</sup>** gene / so only cells with **kan<sup>r</sup>** gene survive

1

hence surviving cells will also contain **Bt** gene / plasmid

1

- (iii) cells divide by mitosis  
*ignore ref to asexual reproduction*  
*correct spelling only*

1

genetic information is copied / each cell receives a copy of (all) the gene(s) / all cells produced are genetically identical / form a clone

1

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

- gene may be passed to pathogenic bacteria
- cannot then kill these pathogens with kanamycin
- **or**
- cannot treat disease with kanamycin
- may need to develop new antibiotics
- gene may get into other organisms
- outcome unpredictable

2

[13]