

# Understanding Genetics And Evolution

## 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>	Dev. Understanding Genetics + Evolution
<b>Difficulty Level</b>	Silver Level
<b>Booklet</b>	Mark Scheme 1

**Time Allowed:** 60 minutes

**Score:** / 60

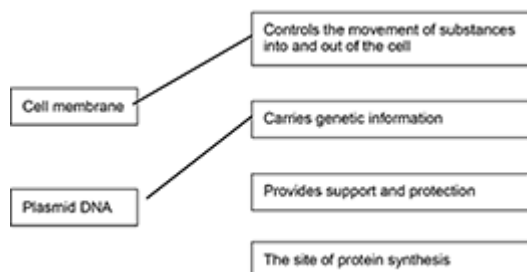
**Percentage:** /100

**Grade Boundaries:**

M1.(a)

**Feature**

**Function**



*extra lines from the left negate the mark*

2

(b) Contaminated food

1

(c) any **two** from:

- cook food (thoroughly)
- pasteurise food
- wash hands properly
- disinfect work surfaces
- keep raw and cooked foods separate
- only drink clean water

2

(d) It will not cause sickness and diarrhoea side effects

1

(e) **E**

1

**B**

1

**D**

1

- M2.(a)** organisms that reproduce together to form fertile offspring 1
- (b) (i) fossils of **P** and **Q** in same stratum / layer / level / height 1
- (ii) earlier – fossil in deeper layer / further down 1
- (iii) the fossils of animals **S** and **T** have many features in common, but **T** is more complex than **S** 1
- the fossil of animal **S** was found in a deeper layer of rock than the fossil of animal **T** 1
- (c) (i) **X** has white tail / shorter tail 1
- allow other points eg X has furrier tail / smaller feet / is furrier*
- or**
- W has sharper claws / W has larger claws* 1
- (ii) two (ancestral) populations separated / isolated (by geographical barrier / by canyon / river) 1
- genetic variation (in each population) / different alleles / different genotypes / (different) mutation(s) 1
- different environmental conditions / example described 1
- allow abiotic or biotic example*
- the better adapted survive / natural selection occurs 1
- allow survival of the fittest*
- ignore they adapt to the environment*
- so (different / favourable) alleles / genes passed on (in each population) 1
- eventually two types cannot interbreed successfully 1
- allow to produce fertile offspring*

(iii) any **two** from:

- environments similar / described  
*allow example, e.g. similar predator(s) / food / climate*
- therefore similar adaptations / features / phenotypes suit  
*accept suitable named feature*
- original ancestor already well adapted  
*ignore reference to not enough time for evolution.*

2

[14]

**M3.(a)** any **three** from:

- parts of organisms have not decayed  
*accept in amber / resin*  
*allow bones are preserved*
- conditions needed for decay are absent  
*accept appropriate examples, eg acidic in bogs / lack of oxygen*
- parts of the organism are replaced by other materials as they decay  
*accept mineralised*
- or other preserved traces of organisms, eg footprints, burrows and rootlet traces  
*allow imprint or marking of organism*

3

(b) (i) teeth for biting (prey)

*must give structure + explanation*

1

claws to grip (prey)

*accept sensible uses*

1

wing / tail for flight to find (prey)

1

(ii) any **two** from:

- new predators
- new diseases
- better competitors
- catastrophe eg volcanic eruption, meteor

- changes to environment over geological time  
*accept climate change*  
*allow change in weather*
- prey dies out **or** lack of food  
*allow hunted to extinction*

2

[8]

**M4.(a)** (i) decrease

1

rate of decrease slows

1

(ii) any **one** from:

- more use of disinfectant  
*allow any reasonable increase in hygiene or sterilisation precautions*
- more use of hand washing
- more careful / more often cleaning of patient facilities
- raised awareness / education about hygiene

1

Explanation:

stops / reduces the bacteria being transferred / spreading

1

(iii)  $800 - 500 / 800 \times 100 =$

1

37.5 (%)

*correct answer with or without working gains 2 marks*

1

(iv) any **one** from:

- numbers quite low now so hard to reduce further
- was a big campaign / much publicity (in 2009) so more people already doing it
- hygiene / cleaning now good so hard to improve
- hospitals short of money so less staff to clean

1

- (b) mutation occurred giving resistance (to methicillin)  
*do **not** accept overuse caused mutation*

1

resistant bacteria not able to be treated / not killed

1

these bacteria multiplied / reproduced / spread quickly

1

[10]

- M5. (a) (soft) body parts / other parts / named parts  
*accept flesh*

1

decayed / decomposed / rotted / eaten

**or**

bones do not decay / decompose / rot / get eaten  
*ignore disintegrated / dissolved*  
*ignore microorganisms*

1

- (b) any **one** aquatic feature from: eg
- streamlined body shape
  - long tail
  - eyes on top of head
  - scales
  - fins / paddles / flippers / webbed feet  
*ignore gills*

1

any **one** terrestrial feature from:

- (front) legs / limbs / hands

- could lift front end upwards  
*ignore feet*  
*accept for 2 marks eg fin / flipper can be used for walking*  
*or fins like legs*

1

[4]

- M6.** (a) kills / destroys bacteria / MRSA  
*do **not** allow germs*

1

prevents / reduces transfer  
*allow stops MRSA entering ward*

1

- (b) mutation  
*do **not** accept antibiotics causes mutation*

1

(causes) resistance  
*allow not effective*  
*ignore immunity*

1

to antibiotics

1

[5]

- M7.** (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

[7]

**M8. Quality of written communication**

for correct use of at least **two** scientific terms eg mutation, resistant (**not** just 'antibiotic-resistant', **not** 'immune') / selection / natural selection / survival / reproduction / gene / allele / DNA

1

any **two** from:

mutation occurs in bacteria or change in DNA / gene occurs  
cancel if mutation 'caused by' antibiotic

(when antibiotic used) only resistant bacteria survive **or** non-resistant bacteria are killed **or** reference to 'natural selection'

resistant bacteria pass on the gene / allele  
allow pass on the mutation  
do **not** accept just 'pass on resistance'

2



