



KS3 Science

Inheritance

Mark Scheme

Time available: 24 minutes

Marks available: 33 marks

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Mark schemes

1.

(a) any **one** from

- less cellulose is needed or fewer cell walls produced **or** less glucose changed to cellulose
accept 'less stalk is made'
- less glucose **or** energy needed **or** used for growth
accept 'less glucose used in respiration'
'less starch is used for growth' is insufficient
accept 'it does not have to grow as much'
- more glucose is available to be changed into starch
accept 'more glucose goes to the grain'
*do **not** accept 'the glucose gets to the grain quicker'*
accept 'blown over less easily or less frequently'

1 (L7)

(b) (i) any **two** from

- cross plants with short stalks and low grain mass with plants with long stalks and high grain mass
accept 'breed from varieties A and B'
'mix varieties A and B' is insufficient
- collect **or** plant the seeds
- choose offspring with shortest stalks and which produce a high mass of grain
accept 'choose the best'
- repeat with offspring or continue the whole process
a three mark answer must include two of the first three marking points and a reference to repeating or continuing the process

2 (L7)

1 (L7)

(ii) any **one** from

- disease resistance
- pest resistance
'increased amount of grain'
or *'number of ears of corn' are insufficient*
'more stalks' is insufficient
accept *'com' for 'wheat'*
- drought tolerance
- frost resistance
- resistance to herbicides **or** weed killers
- resistance to wind
accept *'strong stalk' or 'long roots'*
accept *'hardy'*
accept *'big or long leaves or lots of leaves'*
accept *'faster growing'*

1 (L7)

[5]

2.

(a) (i) • genes **or** DNA **or** chromosomes

1 (L7)

- in gametes **or** sex cells **or** eggs or sperm
accept *'at fertilisation*
'in the nucleus' is insufficient

1

(ii) • they have genes **or** DNA **or** chromosomes from both parents
accept *'they have genetic information from both parents'*
accept *'from eggs and sperm'*

1 (L7)

(b) • they have the same genetic information or the genes or DNA **or** chromosomes

- accept *'they are from the same egg and same sperm'*
accept *'the fertilised egg or zygote split in two'*
accept *'they are from the same fertilised egg*
'from the same egg' or 'from the same sperm' is insufficient
accept references to the egg dividing if the answer makes clear that this is after fertilisation eg *'the egg divides after it has joined with a sperm*
'the egg divides in the uterus' is insufficient

1 (L7)

(c) any **one** from

- eye colour is inherited or controlled by genes
- eye colour is not affected by environmental factors

1 (L7)

any **one** from

- weight and skin colour are affected by environmental factors
- weight is affected by diet **or** exercise and skin colour by the Sun
accept 'weight and skin colour are not just controlled by genes'
answer must refer to both weight and skin colour
'weight and skin colour are not controlled by genes' is insufficient

1

[6]

3.

(a) (i) Katie ✓
Becca ✓

both answers are required for the mark
if more than two boxes are ticked, award no mark

1 (L3)

(ii) any **one** from

- their mother **or** Pam has freckles
- their father **or** David has freckles
- their parents have freckles
- their grandmother **or** Mary has freckles
- only family B has freckles

accept 'Rachel and Bill do not have freckles'
accept 'a grandparent has freckles'
*accept 'their family **or** the family on the right has freckles'*
accept 'freckles run in the family'
accept 'family A does not have freckles'

1 (L4)

(iii) his parents **or** Bob and Emily do not have freckles

accept 'his family does not have freckles'
accept 'his grandparents do not have freckles'
accept 'he is not in family B' if the answer for (ii) is
'only family B has freckles'

1 (L4)

- (b) (i) egg cell ✓
sperm cell ✓

*both answers are required for the mark
if more than two boxes are ticked, deduct
one mark for each incorrect tick
minimum mark zero*

1 (L4)

- (ii) reproductive system ✓

if more than one box is ticked, award no mark

1 (L4)

[5]

4.

- (a) feature: strong muscles

accept 'muscles'

1 (L3)

reason: to pull a sledge **or** to carry a load

1 (L3)

feature: thick fur

accept 'fur'

1 (L3)

reason: to keep them warm **or** to trap air

accept 'to insulate them'

*do **not** accept 'to keep the cold out'*

features may be in either order

each reason must correspond to the correct feature

1 (L3)

- (b) (i) variation.

if more than one box is ticked, award no mark

1 (L4)

- (ii) information passed from the mother in an egg.

if more than one box is ticked, award no mark

1 (L4)

[6]

5.

- (a) any **one** from

- in the eggs and sperm

*accept 'gametes' **or** 'sex cells'*

- on chromosomes

accept 'DNA'

accept 'at fertilisation'

*answers must refer to **both** eggs **and** sperm*

'by sexual reproduction' is insufficient

1 (L6)

(b) any **three** from

- choose zebras which look most like quaggas
- breed from them **or** cross them
- choose the most quagga- like offspring
- breed from the offspring
- repeat the process

accept for two marks 'mate the zebras with most quagga genes'

3 (L7)

[4]

6.

(a) (i) oviduct **or** fallopian tube

1 (L7)

(ii) cilia move in a wave **or** from side to side

*accept 'they waft **or** carry it along'*

accept 'the hairs move it along'

*accept 'the hairs **or** cilia waft **or** move'*

'the hairs' or 'the cilia' are insufficient

1 (L7)

(b) (i) *embryo*: stage 3

accept '3'

foetus: stage 4

accept '4'

both answers are required for the mark

1 (L7)

(ii) uterus

accept 'womb'

1 (L6)

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

- a reference to genes **or** genetic material **or** DNA **or** chromosomes

accept for one mark 'to be the same as someone else you need exactly the same genes'

- it has a different combination (of genes)

- it is made from an egg and sperm

*accept for two marks 'it only has half the DNA **or** chromosomes from each parent'*

- (it gets genetic information) from both parents

2 (L7)

(ii)

human characteristic	inherited only	inherited and affected by environmental conditions
eye colour	✓	
skin colour		✓
weight		✓

all three ticks are required for the mark
if there is more than one tick in any row, award no mark

1 (L7)

[7]