KS3 Science

Green Plants

Mark Scheme

Time available: 50 minutes
Marks available: 64 marks

1. (a) (i)

- absorb **more** light **or** have a larger green area

  accept 'they have more chlorophyll'

  *do **not** accept 'attract more light'*

  accept 'the variegated leaves have less chlorophyll'

  'catch more light' is insufficient
  'absorb more Sun' is insufficient

- make more food **or** photosynthesise more

  *accept 'make more glucose **or** starch **or** sugar **or** protein'*

2 (L7)

(ii)

- variegated and normal (leaved plants) (IV)

  accept 'both types of plant'

  a full description of the investigation can be awarded the full marks e.g. 'take both types of plant, count the leaves, give them the same amount of water, repeat the measurement at the end of the experiment and see how much the plants grew'

1 (L7)

- named factor which can be measured (DV)
  e.g. weight of the plant **or** height of the plant **or** number of leaves

  accept 'size of leaves'
  *accept 'weight **or** mass of plant'*

1 (L7)

- named condition(s) for a fair test (CV) e.g.
  temperature **or** amount of water **or** same species of plant **or** ambient conditions such as light **or** same size plant at the beginning **or** same age of plant

  'the same place' is insufficient for the CV
  'time' is insufficient as it is given in the question

1 (L7)

- calculate (percentage) change for each type of plant

  *accept 'measure both (groups of) plants at the start **and** measure both (groups of) plants at the finish'*
  accept 'record how much each plant grew over 6 weeks and compare results'

1 (L7)

(b)

- respiration ✓

  if more than one box is ticked, award no mark

1 (L6)

[7]

2.

(a) • leaves are bigger

*accept 'there are leaves **or** a canopy'*

*accept 'leaves open **or** grow'*

'trees block the light' is insufficient

1 (L5)

(b) any **two** from

• light is needed for photosynthesis

accept 'photosynthesis'

• more (photosynthesis)

accept, for two marks, 'the rate
***or** amount of photosynthesis increases if the light increases'*

• light provides energy for growth

'they need light to grow' is insufficient
'light is a source of food' is insufficient

• biomass **or** food **or** sugar **or** starch **or** carbohydrate is produced

2 (L6)

(c) • glucose

1 (L6)

• water

answers must be in the correct order

1 (L6)

[5]

3.

(a) (i) • 8

1 (L3)

(ii) • 17 °C

1 (L3)

(iii) • 18

1 (L4)

(iv) • no ✓

if more than one box is ticked, award no mark
***both** the answer and the correct explanation*
are required for the mark

any **one** from

• 18 seeds germinated at both temperatures

• the number that germinated was the same

accept 'the results were the same'
accept 'the bars are the same height'

1 (L4)

(v) any **one** from

- all the seeds germinated **or** grew
  *accept 'they all germinated **or** grew'*
- 20 seeds germinated **or** grew
- the most **or** more seeds germinated **or** grew
  accept 'the bar is higher'

1 (L3)

(b) any **one** from

- he used the same number of seeds
  accept 'the same amount of seeds'
  'number of seeds' is insufficient
- he counted them after two days **or** after the same time
  'he counted the seeds' is insufficient
- he used the same type of seeds **or** they were all cress seeds
- he used filter paper to grow all the seeds on
- he used 5 cm^3 of water each day
  accept 'the same amount of water'
  'he used the same sized dishes' is insufficient

1 (L4)

[6]

4. **Both the pollen transfer method and the explanation must be correct for the mark to be awarded, a reference to the feature only is insufficient.**

(a)

plant	method	explanation	additional guidance	
pine	wind	large surface area **or** light	do **not** accept 'air sacs'	**1**
sunflower	insects	spikes get caught on insect **or** insect hair	do **not** accept 'spikes'	**1**
lupin	insects	sticks to insect	do **not** accept 'sticky surface' **or** 'insects like sticky things' **or** sticky things are sweet'	**1**

(b) (i) to propel **or** move the sperm
accept 'to swim'

1

(ii) any **one** from

- to carry **or** contain **or** transfer genetic material

  *accept 'genes' **or** 'chromosomes'*
  ***or** 'nucleus **or** 'DNA' for genetic material*

- to penetrate the egg

  accept 'to fertilise the egg'

  *do **not** accept 'to control the cell'*

1

[5]

5. (a) oxygen

1

(b) carbon dioxide

*do **not** accept light*

1

water

*do **not** accept chlorophyll*

1

(c) D

if more than one letter is given award no mark

1

(d) (i) chlorophyll

1

(ii) blue ✓**or** red ✓

if blue and red are both ticked award the mark,
but if green is ticked award no mark

1

(e) any **two** from

- as an energy source **or** for respiration

  *accept 'for energy' **or** 'for food'*

- to make starch

  *accept 'for growth' **or** 'as a starting*

- to make cellulose material for other compounds'

2

[8]

6. (a) There is **not** enough light at X. ✓

if more than one box is ticked, award no mark

1 (L3)

(b) flower

*accept 'ovary' **or** 'ovule'*

1 (L4)

(c) (i) the food chain must begin with the producer

any **one** from

- waterweed → tadpole → water beetle
- waterweed → tadpole → minnow
- waterweed → minnow → perch

1 (L4)

(ii) award one mark for the predator (upper answer) and one mark for its prey (lower answer)

either

- pike
- water beetle **or** tadpole **or** minnow **or** perch

or

- water beetle
- tadpole

or

- perch
- water beetle **or** minnow

or

- minnow
- tadpole

the mark for the prey may only be awarded if it is directly linked to the predator in the diagram

2 (L4)

(d) breathing **or** gas exchange

accept 'take in oxygen'

1 (L3)

movement **or** swimming

*accept 'balance' **or** 'steering'*

1 (L3)

[7]

7. (a) ovary B

1 (L4)

ovule C

1 (L4)

sepal D

1 (L4)

stamen A

1 (L4)

if more than one letter is given in any box, award no mark for that box

(b) makes pollen

*accept 'releases **or** holds pollen'*
***or** 'puts pollen onto insect'*

*do **not** accept 'sends pollen to other flowers'*

1 (L5)

[5]

8. (a) (i) a line from **X** to the ovary as shown

*this line must end on **or** inside the outline of the appropriate part*

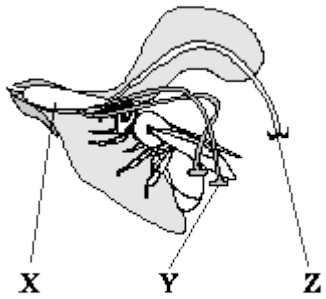
1 (L5)

(ii) a line from **Y** to **either** of the anthers as shown

this line may stop slightly short of the anthers

1 (L5)

(iii) a line from **Z** to the stigma as shown



*do **not** accept a line from **Z** to the style this line may stop slightly short of the stigma*

*accept either **X, Y or Z** written in the correct position on the diagram*

1 (L5)

(b) stigma

1 (L6)

pollination

1 (L6)

fertilisation

1 (L6)

[6]

9. (a) **both the feature and the explanation are required for each mark**

any **two** from

- stigmas have a large surface area so they can catch pollen

  accept 'stigmas are hairy or feathery to catch pollen'

- stigmas are not shielded **or** enclosed so pollen can be blown onto them

- anthers hang outside the flower so the pollen can be blown away

  *do **not** accept 'anthers hang down'*

- anthers have long filaments so they can shake easily

2 (L6)

(b) it prevents self-pollination

accept 'it ensures cross-pollination'

accept 'it leads to variation'

1 (L7)

(c) any **one** from

- the mass of the grain is only part of the total mass of the plant

  accept 'energy is stored in the whole plant'

- photosynthesis leads to an increase in the mass of other parts as well

  accept 'plants with the same mass can have different amounts of grain'

1 (L7)

[4]

10. (a) **answers should imply competition for resources between weeds and carrot plant A**

any **two** from

- the weeds shaded the carrot plants

  accept 'the weeds stopped the Sun getting to the carrots'

- the weeds left the carrots with less space to grow

  accept 'weeds choked the carrots' ***or*** *'weeds took up all the space'* ***or*** *'carrot plant A had less space'*

  do ***not*** *accept 'the carrot plants had less space'*

- the weeds absorbed **or** took most of the available water

  accept 'the weeds took the water'
  or *'carrot plant A had less water'*

- the weeds absorbed **or** took most of the available mineral salts **or** nutrients

  accept 'the weeds took the minerals
  or *nutrients* ***or*** *nitrates'* ***or*** *'carrot plant A had less minerals'*

  do ***not*** *accept 'weeds took the food'*

2 (L5)

(b) **there are three marking areas: photosynthesis, carbohydrate production, and carbohydrate transfer or storage. At least one of these areas must contain the term 'more' to gain the three marks**

- more photosynthesis took place

  accept 'photosynthesis took place'

  ***or** 'the plants made more food'*

  1 (L6)

- more carbohydrate was produced in the leaves

  *accept 'carbohydrate **or** sugar **or** glucose was made in the leaves'*

  *do **not** accept 'food was made in the leaves' for this mark*

  1 (L6)

- more carbohydrate was transported to the roots **or** stored in the roots

  *accept 'carbohydrate **or** sugar **or** glucose **or** food was transported to the roots'*

  *accept 'carbohydrate **or** food **or** starch was stored in the roots'*

  1 (L6)

[5]

11. (a) $6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$

the first mark is for giving the correct formulae

***all three** formulae in the correct places are required for the mark*

reactants may be in either order

the second mark is for correctly balancing the equation

2

(b) CO_2

H_2O

***both** formulae are required for the mark*

formulae may be in either order

1

(c) because octane contains hydrogen and carbon

accept 'because octane contains carbon, hydrogen and oxygen'
***or** 'because they contain the same elements'*
***or** 'because octane is a hydrocarbon'*

*do **not** accept 'they contain similar elements'*
***or** 'they have similar formulae'*

1

(d) $2CH_4 + 3O_2 \rightarrow 2CO + 4H_2O$

the first mark is for giving the correct formulae

***all four** formulae in the correct places are required for the mark*
reactants may be in either order products may be in either order
the second mark is for correctly balancing the equation

accept '$4CH_4 + 6O_2 \rightarrow 4CO + 8H_2O$'

***or** '$CH_4 + 1\frac{1}{2}O_2 \rightarrow CO + 2H_2O$' for both marks*

2

[6]