

Photosynthesis

Mark Scheme 1

Level	GCSE (9-1)
Subject	Combined Science: Trilogy - Biology
Exam Board	AQA
Topic	4.4 Bioenergetics
Sub-Topic	Photosynthesis
Difficulty Level	Bronze Level
Booklet	Mark Scheme 1

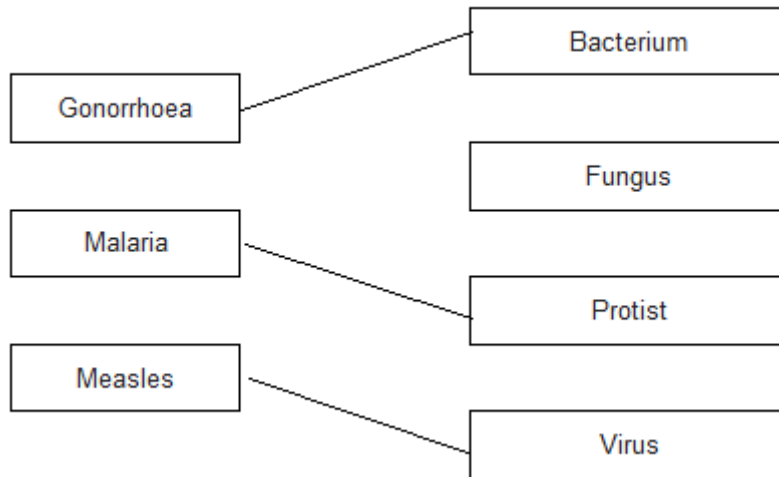
Time Allowed: 60 minutes

Score: /59

Percentage: /100

Grade Boundaries:

M1.(a)



3

(b) (trachea) has mucus

1

to trap pathogens

1

(trachea) has cilia

1

to move mucus out of trachea

1

(c) **dependent variable:**
number of times mosquitoes landed on socks

1

control variable:
any **one** from:

- number of mosquitoes in each container
- length of time socks worn
- dampness of socks
- same type of socks
- size of container
- time
- temperature
- species of mosquito
- age of mosquito

1

- (d) use worn socks
or
use chemical from worn socks

1

to attract / trap infected mosquitoes

1

or accept:

wear clean socks / change socks regularly (1)

to reduce the chance of attracting mosquitoes (1)

- (e) less chlorophyll present

1

(so) less light absorbed

1

(so) reduced photosynthesis

or

(so) less sugar / food made

1

[14]

- M2.(a)** (i) LHS = water

accept H_2O

*do **not** accept H^+O / H_2O*

1

	RHS = oxygen accept O ₂ do not accept O / O ² / O2	1
(ii)	light / sunlight ignore solar / sun / sunshine do not allow thermal / heat	1
(iii)	chloroplasts allow chlorophyll	1
(b) (i)	20	1
(ii)	any one from: • light (intensity) • temperature.	1
(c) (i)	To increase the rate of growth of the tomato plants	1
(ii)	Because it would cost more money than using 0.08%	1
	Because it would not increase the rate of photosynthesis of the tomato plants any further	1
		[9]
M3.(a)	chlorophyll is needed for photosynthesis	1
	light is needed for photosynthesis	1
(b)	increases	1

levels off / reaches a maximum / remains constant / stays the same / plateaus
*do **not** allow stops / stationary / peaks*
allow stops increasing

1

goes up to / reaches a maximum / levels off at (a rate of) 200 (arbitrary units)
or
levels off at 225 – 240 (light units)
ignore references to other numerical values

1

- (c) (i) higher light intensity does not increase rate of photosynthesis
accept the graph stays level (above this value)
allow stops increasing
allow the rate of photosynthesis stays the same (above this value)

1

- (ii) any **two** from:
- carbon dioxide (concentration)
 - temperature / heat
 - (amount of) chlorophyll / chloroplasts
- allow water*
allow ions / nutrients
ignore ref to surface area of the leaf

2

[8]

M4.(a) (i) **C and D**

no mark if more than one box is ticked

1

- (ii) any **one** from:
*do **not** allow if other cell parts are given in a list*

- (have) cell wall(s)
- (have) vacuole(s)

1

(b) (i) **A**

apply list principle

1

(ii) **D**

apply list principle

1

(c) respiration

apply list principle

1

[5]

M5.(a) oxygen

allow O₂ / O₂

*do **not** accept O² or O*

1

(b) (i) light

1

(ii) chlorophyll

1

(iii) decrease

1

(c) any **three** from:

- for respiration / energy
*do **not** accept use energy for photosynthesis*
- to make cellulose / starch
accept named carbohydrate other than glucose
- to make lipid / fat / oil
accept fatty acid / glycerol
- to make protein
accept named protein / amino acid / named amino acid
- to build big molecules from small molecules / metabolism
if no other marks awarded for making molecules allow 1 mark for growth / repair / new cells

3

[7]

M6.(a) xylem and phloem

either order

allow words ringed in box

allow mis-spelling if unambiguous

1

- (b) (i) movement / spreading out of particles / molecules / ions / atoms
ignore names of substances / 'gases'

1

from high to low concentration

accept down concentration gradient

ignore 'along' / 'across' gradient

ignore 'with' gradient

1

- (ii) oxygen / water (vapour)

allow O₂ / O₂

ignore O² / O

allow H₂O / H₂O

ignore H²O

1

[4]

M7. (a) water

1

oxygen

in this order only

accept correct chemical symbols

allow H_2O / OH_2

1

(b) allow light (in / through) / need light

*do **not** accept attracts light*

ignore heat / moisture / carbon dioxide

ignore so the plants can be seen

accept the converse, ie the black plastic bag would not let light in (1)

1

for photosynthesis / make sugar / glucose

so there would be no photosynthesis (1)

*do **not** allow make food unqualified*

1

(c) Increase (in leaves / new leaves)

ignore growth unqualified

1

(then) level off **or** number of (new) leaves (then) stays the same

1

numerical statement eg max at 3 tablets / 5 (new) leaves

should refer to one of the first two marking points

*for every extra tablet get 1 extra leaf = **2** marks*

*for every extra tablet get 1 extra leaf then it levels off = **3** marks*

1

[7]

- M8.** (a) (LHS) water / H_2O
allow H_2O
*do **not** accept H^+O* 1
- (RHS) glucose / sugar / $\text{C}_6\text{H}_{12}\text{O}_6$
allow starch / carbohydrate
allow $\text{C}_6\text{H}_{12}\text{O}_6$
*do **not** accept $\text{C}^6\text{H}_{12}\text{O}^6$* 1
- (b) (i) 1 arbitrary unit
extra box ticked – cancel 1
- (ii) 210 1
- (iii) carbon dioxide / CO_2 / CO_2
or
temperature / heat / warmth
*do **not** accept CO°*
ignore mineral ions
ignore water 1

[5]