

Transport in Cells

Mark Scheme 1

Level	GCSE (9-1)
Subject	Combined Science: Trilogy - Biology
Exam Board	AQA
Topic	4.1 Cell Biology
Sub-Topic	Transport in Cells
Difficulty Level	Silver Level
Booklet	Mark Scheme 1

Time Allowed: 45 minutes

Score: /44

Percentage: /100

Grade Boundaries:

- M1.(a)** (placed) randomly
allow description of placement 1
- sufficient number (of quadrats) used 1
- count (dandelions) in each quadrat 1
- use mean number of dandelions, area of quadrat and area of field to estimate population
accept (area of field / area quadrat) × mean number of dandelions per quadrat 1
- (b) $(40 \times 145) / 0.25 = 23\,200$ 1
- $(0.42 \times 23\,200 =) 9744$
allow 9744 with no working shown for 2 marks
allow ecf from correct attempt at the previous step) × 0.42 for 1 mark 1
- (c)
- Level 2 (3–4 marks):**
A detailed and coherent explanation is given. Logical links between clearly identified relevant points are made to explain why dandelion growth may be limited.
- Level 1 (1–2 marks):**
Discrete relevant points are made. The logic may be unclear.
- 0 marks:**
No relevant content

Indicative content

factors that may be considered:

competition for resources including:

- light
- water
- space
- mineral ions (allow nutrients / salts / ions from the soil)

reference to why growth may be limited:

- (light) energy for photosynthesis
- water as a raw material for photosynthesis / support
- surface area exposed to light
- sugar / glucose produced in photosynthesis
- (space) to grow bigger
- (space) for growth of root system
- (mineral ions) for growth
- (mineral ions / sugar) for production of larger molecules **or** named example

4

[10]

M2.(a) (i) nucleus

1

(ii) diffusion

1

(b) increases / larger surface area (for diffusion)

ignore large surface area to volume ratio

1

(c) (i) sugar / glucose

accept amino acids / other named monosaccharides

1

(ii) against a concentration gradient

or

from low to high concentration

1

(iii) (active transport requires) energy

1

(from) respiration

1

(d) minerals / ions

accept named ion ignore nutrients

do not accept water

1

[8]

M3.(a) (i) diffusion

1

(ii) carbon dioxide

accept CO₂ / CO₂

do not accept CO²

1

(iii) red blood cells

1

(b) 70

if no / incorrect answer then

70 000 000

or

280 x 0.25 gains 1 mark

ignore doubling the answer

2

(c) allows more gas / oxygen / CO₂
(exchange)

do not accept air

1

[6]

M4.(a) (i) chloroplast

		1
(ii)	cell wall	1
(b)	(i) osmosis <i>accept diffusion</i>	1
	(ii) cell wall (prevents bursting)	1
(c)	(i) carbon dioxide <i>allow correct formula</i>	1
	glucose <i>allow sugar / starch</i>	1
	(ii) any two from: <ul style="list-style-type: none">• light sensitive spot detects light• tells flagellum to move towards light• more light = more photosynthesis	2
(d)	(cell has) larger SA:volume ratio	1
	short (diffusion) distance <i>allow correct description</i>	1

(diffusion) via cell membrane is sufficient / good enough

or

flow of water maintains concentration gradient

1
[11]

M5.(a) (i) xylem

1

(ii) water

1

minerals / ions / named example(s)

ignore nutrients

1

(b) (i) movement of (dissolved) sugar

allow additional substances, eg amino acids / correct named sugar (allow sucrose / glucose)

allow nutrients / substances / food molecules if sufficiently qualified

ignore food alone

1

(ii) sugars are made in the leaves

1

so they need to be moved to other parts of the plant for respiration / growth / storage

1

(c) (i) mitochondria

1

(ii) for movement of minerals / ions

Do not accept 'water'

1

against their concentration gradient

1

[9]