AQA GCSE Biology | 8461

SPECIFICATION POINT 4.1.3.3

Active transport

Mark schemes and examiner comments

Tier	**Foundation**
Question groups	**6**
Available paper years	**2010–2025**

Using this booklet

1. Booklet answer numbers match the question booklet.
2. Use the original question number within marking tables.
3. Examiner comments are included where available.

Name: _____ **Date:** _____

Where a precise marking extract is unavailable, the full source document is included in an appendix. Any missing mark scheme is explicitly identified.

4.1.3.3 Active transport

Answer 01 · Mark scheme

June 2010 | BLY3F | Original Q1 | Legacy

Question 1

question	answers	extra information	mark
1(a)(i)	root hair		1
1(a)(ii)	any **two** from: • water • ions / minerals / nutrients / salts / correct named eg nitrates • oxygen	ignore food ignore N,P,K	2
1(b)(i)	stomata		1
1(b)(ii)	diffusion		1
Total			**5**

4.1.3.3 Active transport

Answer 01 · Mark scheme

June 2010 | BLY3F | Original Q1 | Legacy

BLY 3F

4.1.3.3 Active transport

Answer 02 · Mark scheme

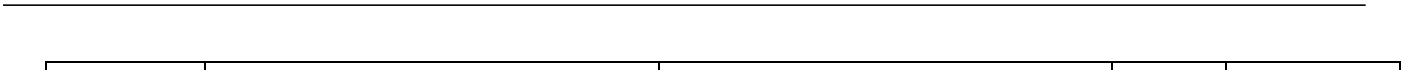
June 2015 | BL3FP | Original Q1 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
1(a)(i)	alveoli / alveolus	allow air sacs allow phonetic spelling	1	AO1 312a
1(a)(ii)	any **one** from: • protection (of lungs / heart) • help you breathe / inflate lungs		1	AO1 312a
1(b)(i)	diffusion		1	AO1 312b
1(b)(ii)	capillaries		1	AO1 311h/i/k
1(b)(iii)	any **two** from: • (have many) alveoli • large surface / area • thin (exchange) surface **or** short diffusion pathway • good blood supply / many capillaries	allow air sacs accept only one / two cell(s) thick allow (kept) ventilated or maintained concentration gradient	2	AO1 321g
Total			**6**	

4.1.3.3 Active transport

Answer 02 · Mark scheme

June 2015 | BL3FP | Original Q1 | Legacy



4.1.3.3 Active transport

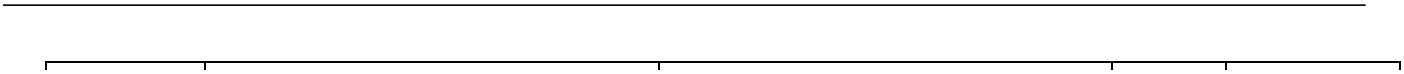
Answer 03 · Mark scheme June 2015 | BL3FP | Original Q5 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
5(a)(i)	water / H_2O	accept oxygen allow H_2O do **not** allow H^2O or H2O	1	AO1 313a
5(a)(ii)	the mineral ions are absorbed by active transport the absorption of mineral ions needs energy		1 1	AO1 / AO2 311a/g, 313a
5(a)(iii)	have (many root) <u>hairs</u> (which) give a large surface area (for absorption)		1 1	AO2 313b
5(b)	carbon dioxide in **or** oxygen out **or** control water loss	accept gas exchange ignore gases in and out ignore gain / lose water	1	AO1 313c
5(c)(i)	guard cells		1	AO1 313e
5(c)(ii)	(stomata are) closed	allow there is no gap / space	1	AO2 313d/e
5(c)(iii)	plant will wilt / droop	ignore die	1	AO3 313d/e
Total			**9**	

4.1.3.3 Active transport

Answer 03 · Mark scheme

June 2015 | BL3FP | Original Q5 | Legacy



4.1.3.3 Active transport

Answer 04 · Mark scheme June 2019 | 8461/1F | Original Q1

01.1	rice		1	4.2.2.1 AO3
01.2	25 (%)	allow an answer between 23 and 27 (%) ignore ¼ / 0.25	1	4.2.2.1 AO2
01.3	(beans) contain all (four) food groups	allow converse for chicken allow chicken contains no / less carbohydrate **or** beans contain carbohydrate allow beans contain more nutrients ignore references to water / fat / protein	1	4.2.2.1 AO3
01.4	amylase		1	4.2.2.1 AO1
01.5	Benedict's reagent		1	4.2.2.1 AO1
01.6	(brick) red / green / yellow / orange / brown		1	4.2.2.1 AO1
01.7	C		1	4.2.2.1 AO3
01.8	small intestine	allow ileum ignore intestine unqualified do **not** accept large intestine / duodenum	1	4.1.3.3 4.2.2.1 AO1
01.9	active transport osmosis		1 1	4.1.3.2 4.1.3.3 AO1 AO1
Total			**10**	

4.1.3.3 Active transport

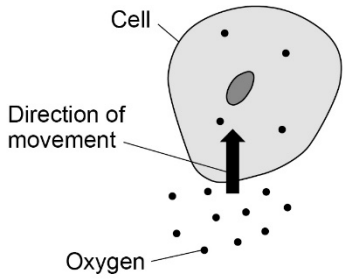
Answer 04 · Mark scheme

June 2019 | 8461/1F | Original Q1

Question	Answers	Extra information	Mark	AO / Spec. Ref.

4.1.3.3 Active transport

Answer 05 · Mark scheme November 2021 | 8461/1F | Original Q1

01.1			1	AO3 4.1.3.1
01.2	water mineral ions energy	in this order only allow minerals / ions	1 1 1	AO1 4.1.3.2 4.1.3.3 4.2.3.2
01.3	root hair (cell)	ignore root / hair unqualified	1	AO1 4.1.1.3 4.2.3.2
01.4	large surface / area	allow it has a long projection allow the walls are thin allow it has lots of mitochondria	1	AO1 4.1.1.3 4.2.3.2
01.5	**Feature of sperm cell** / **How the feature helps** Contains a nucleus → To provide the chromosomes for fertilisation Has a long tail → To help the cell to swim to the egg To break the outer layer of the egg To release energy do **not** accept more than one line from a box on the left		1 1	AO1 4.1.1.3

4.1.3.3 Active transport

Answer 05 · Mark scheme

01.6	nerve (cell) any **one** from: • long • has branches • has insulation	allow neuron(e) ignore motor / sensory / relay allow myelin / fat	1 1	AO1 4.1.1.3
Total			**10**	

4.1.3.3 Active transport

Answer 05 · Mark scheme

November 2021 | 8461/1F | Original Q1

Question	Answers	Extra information	Mark	AO / Spec. Ref.

4.1.3.3 Active transport

Answer 06 · Mark scheme

June 2025 | 8461/1F | Original Q8

Question 8

Question	Answers	Mark	AO / Spec Ref.
08.1	**Level 3**: A judgement, strongly linked and logically supported by a sufficient range of correct reasons, is given.	5–6	AO3
	Level 2: Some logically linked reasons are given. There may also be a simple judgement.	3–4	AO3
	Level 1: Relevant points are made. They are not logically linked.	1–2	AO3
	No relevant content.	0	4.1.3.2 RPA3

	Indicative content: *(strengths)* • same / a / one plant / potato used • all potato pieces used were cubes • mass was recorded before and after • change in mass was calculated • different concentrations of salt solution were used *(improvement and reason)* • use the same / a / one potato for all pieces o (because the student) may have used different potatoes • remove skin **or** peel the potato o (because) skin (may still be) present • blot / dry cube before measuring mass o (because) cube will have excess water on surface • use same / set size / surface area of potato piece each time o (because) size / surface area of cubes not controlled / specified • repeat (whole investigation **or** at each concentration) o (because there were) no repeats o to spot anomalies • calculate mean (from repeats) o (because there was) no mean calculated • same time for each piece to be in solution o (because) length of time in solution not specified • control temperature of solution using water bath o (because) temperature (of solution) not controlled / specified • use same volume of solution for each piece of potato **or** ensure all pieces are completely submerged o (because) volume of solution not specified / controlled • calculate percentage change in mass o (because) percentage change in mass not calculated **or** (because) each potato piece had a different starting mass • include control experiment with boiled cube o (because) no control experiment included • increase the number of concentrations (of salt solution) used o (because) only 3 different concentrations (of salt solution) used For **Level 3**, a strength and improvements / reasons must be included.		

Question	Answers	Extra information	Mark	AO / Spec Ref.
08.2	the solution in the potato cells was more concentrated than the distilled water		1	AO2 4.1.3.2

4.1.3.3 Active transport

Answer 06 · Mark scheme

June 2025 | 8461/1F | Original Q8

Question	Answers	Extra information	Mark	AO / Spec Ref.
08.3	any **one** from: • requires energy • (transports substances) against / up a concentration gradient • transports minerals / ions (and not water)	ignore it is active allow it is not passive allow (transports substances) from low concentration to high concentration ignore (transports substances) along / across the concentration gradient do **not** accept (transports substances) down a concentration gradient allow transports other named substances such as glucose allow does not transport water	1	AO2 4.1.3.2 4.1.3.3

Total Question 8	8

4.1.3.3 Active transport

Answer 06 · Examiner comments

June 2025 | 8461/1F | Original Q8

Question 8 (standard demand)

08.1 This was a levelled, extended response question based on a required practical. Students were asked to evaluate a given method to investigate osmosis in pieces of potato.

Students achieving Level 1 (35%) made very few relevant points. Students achieving Level 2 (33%) suggested further improvements to the method and often gave reasons as to why these might be required, but judgements were always incomplete.

Students achieving Level 3 (1%) made full use of the command word 'evaluate' and considered both strengths and weaknesses of the method in addition to indicating the ways it could be improved.

Few students gave responses which allowed them to match the Level 3 requirements. Most omitted any consideration of strengths, so their judgements were incomplete. Many, nevertheless, seemed confident in their attempts at answers and this was pleasing to see.

The question asked for ways to improve the validity of results, and these needed to be clear. Discussion of controlled variables such as size, time and volume required quantification, or clarification that they needed to be the same or specific on each

occasion, rather than just 'similar', 'recorded' or 'precise'. A large number of students suggested that the mass of the cubes should be kept the same, but this was neither plausible, nor required.
The use of specific pieces of equipment only gained credit if they were linked to clear improvements to validity. Several responses referred to the use of a cork borer to obtain cylinders of potato but then neglected to add anything about the control of size; others suggested the use of stop watches but with no link to control of time.
Points which were frequently seen from the indicative content included drying the cubes before measuring mass, repeats and calculation of mean values and the use of more, different concentrations. Some students focused on aspects such as safety considerations, tables of results, graphs or explanations of osmosis. These were not appropriate additions to an evaluation, which asked for ways to improve the validity of results. Discussion of a 'wider range' of concentrations was only relevant if mention was made of 'more than 3' values within it.

08.2 23% of students scored the mark in this question.

08.3 This question asked for one way in which active transport differs from osmosis. It was most easily answered by one clear, distinctive point about active transport being given, without any further mention of osmosis. 33% of students achieved the mark in this question.

The most common correct answer seen was BP1, relating to energy. BP2 was more problematic, as answers often showed confusion in understanding. Some students gave the correct description of active transport being movement from low to high concentration but then continued to make an incorrect statement about osmosis; others gave incorrect descriptions of active transport in the first place. The following examples did not gain credit:

- 'active transport goes from low to high concentration, but osmosis goes from high to low'.
- 'active transport goes down a concentration gradient'.
- 'active transport goes from a high concentration gradient to a low concentration gradient'.

Other answers were not necessarily incorrect but lacked the further detail or qualification required to warrant the mark. These included 'active transport goes along (or across) the concentration gradient' or 'active transport goes from low to high'.
Fewer students referred to the ideas in BP3 and answers which could not gain credit were either incomplete or incorrect. They included those which:

- discussed the vague 'involvement' of minerals rather than their 'transport' or 'movement'.
- stated that 'molecules' or 'substances' were transported rather than, or as well as, water.
- suggested that 'water' was 'actively', rather than passively, transported.

4.1.3.3 Active transport

Answer 06 · Examiner comments June 2025 | 8461/1F | Original Q8

Some students mistakenly thought that active transport happened in both directions whereas osmosis was only one-way. References to partially permeable membranes and to the speed of movement were not, on their own, creditworthy.

4.1.3.3 Active transport

Answer 06 · Examiner comments

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results Statistics page of the AQA Website.